Post Opening Project Evaluation

A14 Haughley New Street to Stowmarket Improvement Five Years After Study

March 2015

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Executive Summary

Scheme Description

The A14 Haughley New Street to Stowmarket Improvement scheme is a Highways Agency major project which opened in December 2008 and provided a section of new, realigned dual carriageway linking Haughley New Street and Stowmarket in Suffolk. This section of the A14 previously had safety issues as a result of the sub-standard staggered crossroads, road alignment and visibility from local access roads entering the A14. The scheme retained one of the former carriageways for a two way local access road, and downgraded the other carriageway to be a cycle, pedestrian and equestrian route.

This document summarises the findings of the five years after post opening evaluation study completed in 2015.

Scheme Objectives

Objectives (Environmental Statement 2006)	Objective Achieved?
To improve safety, fewer accidents	✗[1]
To separate long distance and local traffic	✓
To improve journey times and reliability	✓
To improve access for non motorised users (NMUs)	✓
To achieve the above objectives in an environmentally sustainable and sensitive way	Partial

[1] For further details see key findings and safety summary below.

Key Findings

- Average journey times along the A14 corridor have reduced in line with expectations for traffic using the A14.
- Post opening traffic flows have increased by around 7% along the scheme section, slightly less than forecast, with the majority of through traffic using the route moving to the new route.
- When only the scheme section is considered, post opening collision data shows there has been a small increase of 0.4 collisions per year (6.5%), but this small change does not allow any conclusions to be drawn over the longer term performance of the scheme. When looking over the whole area considered for the scheme appraisal, there has been an average increase of 32%. It is noted that the scheme has eliminated a sub-standard staggered crossroads which had previously been considered highly dangerous for local residents.
- Landscape mitigation measures are considered to be underperforming, impacting upon biodiversity, landscape and townscape.
- Monetary benefits are lower than expected, with outturn present value benefits of £74.4m compared to a forecast of £91.7m. This is primarily due to the collision savings being lower than forecast.

Summary of Scheme Impacts

Traffic

- Average weekday traffic flows (AWT) on the A14 scheme links have increased by 7% post opening, from approximately 38,700 vehicles per day (vpd) to 41,200 vpd.

- Traffic along the former A14 route has reduced by 90% (a reduction from 38,700 vpd to 3,900 vpd). As the majority of traffic on the A14 is through traffic, this has transferred to the new carriageway post opening.
- Observed flows on the A14 are 17% below that forecast, most of which is likely to be due to the lower than expected traffic growth nationally and slightly less new housing and employment development in Stowmarket than expected.
- Along the scheme, average journey times have reduced during all time periods, and in both directions. The greatest savings (three minutes and 50 seconds) are seen in the eastbound direction, where average journey times pre scheme were highest.
- Forecast journey times for the A14 route were accurate. This is to be expected as the majority of journey time savings are due to the raising of the speed limit from 50mph pre scheme to the national speed limit for a dual carriageway post opening.

Safety

- The scheme removed a sub-standard staggered crossroad on the A14 at this location. This eliminated the need for local traffic to cross the dual carriageway and the potential of slow moving traffic being involved in collisions when entering or exiting from local roads and facilitated the raising of the speed limit to 70mph.
- When collisions are considered only for the A14 key links (both new carriageway and former route), an increase of 6.5% (0.4 collisions annually) is observed, but this small change does not allow any conclusions to be drawn over the longer term performance of the scheme.
- Collision data obtained for the study area indicates an annual increase in collisions of 32% (an additional 13.3 collisions per year) post opening. This includes the urban area of Stowmarket.
- Both areas had fewer collisions in the five years after opening than in the five years prior to construction; but that reduction was smaller than the decline we would expect to occur in line with the national trend.
- When traffic flow changes are taken into account, the collision rate for the scheme key links has changed from 0.121 to 0.127, an increase of less than 5%.
- The appraisal forecast a saving of 3.1 collisions per year over the key links, and a saving of 4.6 collisions per year for the whole study area. This was an overestimation, particularly for the larger appraisal area, which suggests that the impact of the scheme on the wider area was overstated.

Environment

- Based on traffic flows, the noise impacts of the scheme are considered as expected for the new A14 and the eastern end of the former A14. As traffic flows are lower than forecast for the western section of the former A14, it is likely that the noise climate is better than expected here.
- Air quality is likely to be better than expected at all locations along the new and former A14 routes as traffic volumes and heavy vehicle numbers are below forecasts.
- Carbon emissions between the pre and post scheme periods have increased by a slightly lesser extent than forecast, mainly due to lower than expected traffic flows.
- The landscaping measures are being maintained as specified, however the plant stock in general is not maturing in line with reasonable expectations at this stage. Therefore the impacts (particularly visual screening/amenity functions) are considered to be worse than expected.
- The impact of the scheme on biodiversity is considered to be worse than expected as the full potential of woodland and shrub planting has not been realised and is likely to have impacted on local ecology.
- In line with the impact on landscape, the impact of the scheme on townscape is considered to be slightly worse than expected as the Tot Hill junction has not been fully integrated into the local landscape as well as would be expected at this stage.

- Remedial works to address the performance of the carriageway in poor weather conditions have been implemented. No other visible issues with water and drainage were found during the site visit undertaken for the study.
- Physical fitness benefits are considered to be as expected, as pedestrians, cyclists and equestrians are segregated from traffic along the former A14 route, and can easily negotiate the new Tot Hill junction.
- The route is generally well signposted and the new junction removes opposing movements across the carriageway reducing driver stress, particularly for local traffic. However ongoing concerns raised by local stakeholders regarding visibility and frequent damage-only collisions at the off slip road to the Tot Hill junction means that driver stress is considered to be worse than expected, resulting in the overall assessment of being slightly beneficial for journey ambience, to be worse than expected.

Accessibility and Integration

- The removal of traffic from local settlements has benefited local communities by improving the quality of the local environment. Local communities are further benefitted by the conversion of the former A14 carriageway for pedestrian, cycle and equestrian use.

Summary of Scheme Economic Performance

All monetary figures in 2002 prices and values		Forecast	Outturn Re-forecast
Journey Time Benefits		£105.3m	£92.6m
Safety Benefits		£12.5m	£0m
Vehicle Operating Costs		-£26.0m	-£18.2m
Present Value Benefits (PVB)		£91.7m	£74.4m
Indirect Tax		£17.8m	£12.5m
Present Value Costs (PVC)		£25.0m	£30.6m
Benefit Cost Ratio (BCR)	**Indirect Tax as a cost**	**12.7**	**4.1**
	Indirect Tax as a benefit	**4.4**	**2.8**

- Journey time benefits are less than forecast, due to lower than forecast traffic flows.
- Outturn safety impacts have not been monetised, as the small increase in collisions observed post opening is not statistically significant, and therefore cannot be confidently attributed to the scheme. However this is clearly lower than forecast.
- Overall the outturn PVB of £74.4m is 19% lower than forecast.
- The outturn BCR of 2.8 is lower than forecast, however the scheme is still considered to deliver value for money.

1. Introduction

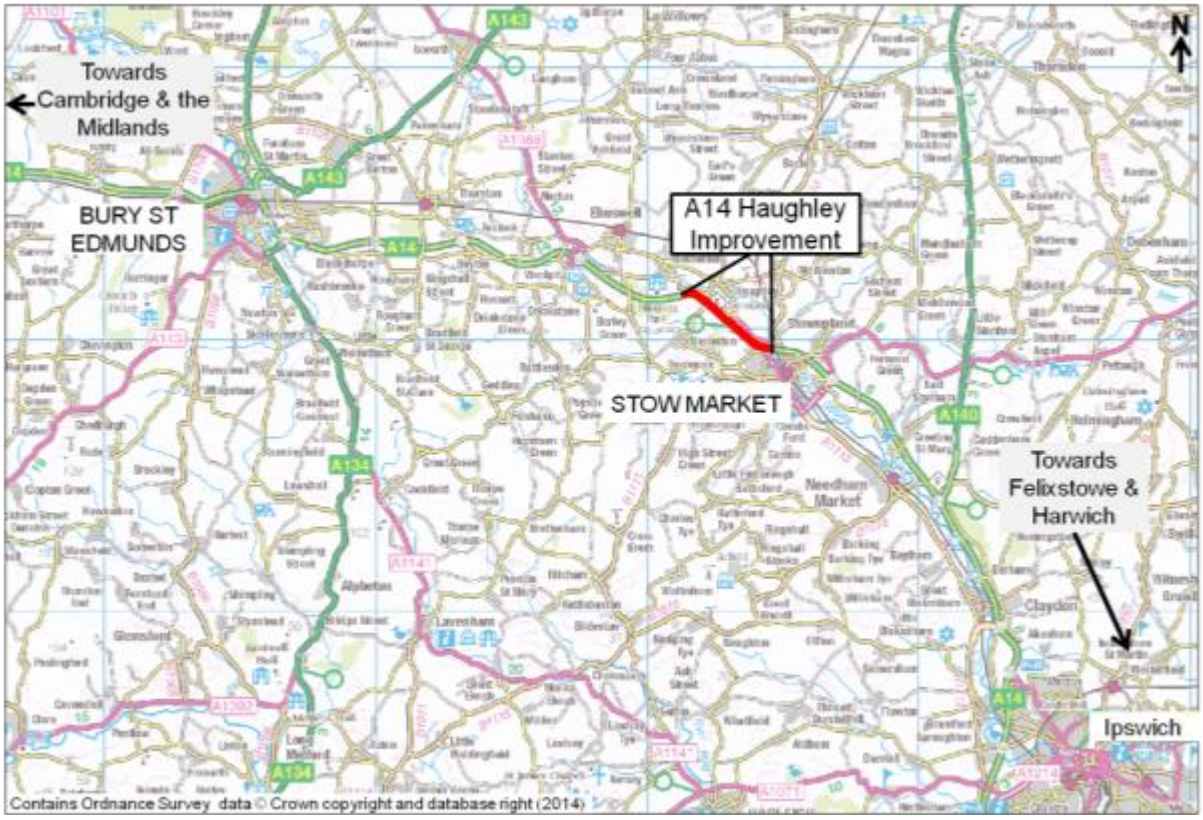
Background

1.1 This report presents a Five Years After (FYA) opening evaluation of the A14 Haughley New Street to Stowmarket Improvement scheme (hereafter known as 'the scheme) which opened to traffic in December 2008. The evaluation has been prepared as part of the Highway Agency's (HA's) Post Opening Project Evaluation (POPE) programme.

Scheme Context

1.2 The A14 at this location is part of a route which is of national and international importance and forms part of the Trans European Network for Transport (TEN-T). The A14 is a key route linking the east coast ports of Felixstowe and Harwich to the Midlands and the North. The route has also been designated as an advisory lorry route. The location of the scheme is illustrated in Figure 1-1.

Figure 1-1 – Scheme Location



1.3 Historically, this section of the A14 had a high collision rate, and speed restrictions (to 50mph, supported by speed cameras) were implemented in 2000 to try to address this. Whilst this reduced the number of collisions, it did not reduce them to the expected national average for a carriageway of this type.

1.4 Prior to the scheme, the mix of strategic and local traffic along this section also resulted in residents and visitors to local businesses experiencing significant delays when joining the A14 from the side roads, and these movements also impacted on trunk road efficiency.

Scheme Description

1.5 The A14 Haughley New Street to Stowmarket scheme is a major HA project which provided 4 miles (2.6km) of new dual carriageway to run parallel to the former A14 route, effectively providing a bypass for the village of Haughley New Street.

1.6 Overall, the scheme included the following key features:

- A new grade separated (two level) junction built to the east of the scheme.
- The former A14 dual carriageway downgraded to provide a single carriageway local road and a non motorised user (NMU) route.
- A new bridge to carry the new road over Haughley Road at the former Quarries Cross junction
- The provision of a right turn stacking lane (central waiting area outside of main traffic lanes) for vehicles accessing a recycling centre at the southern end of the scheme.

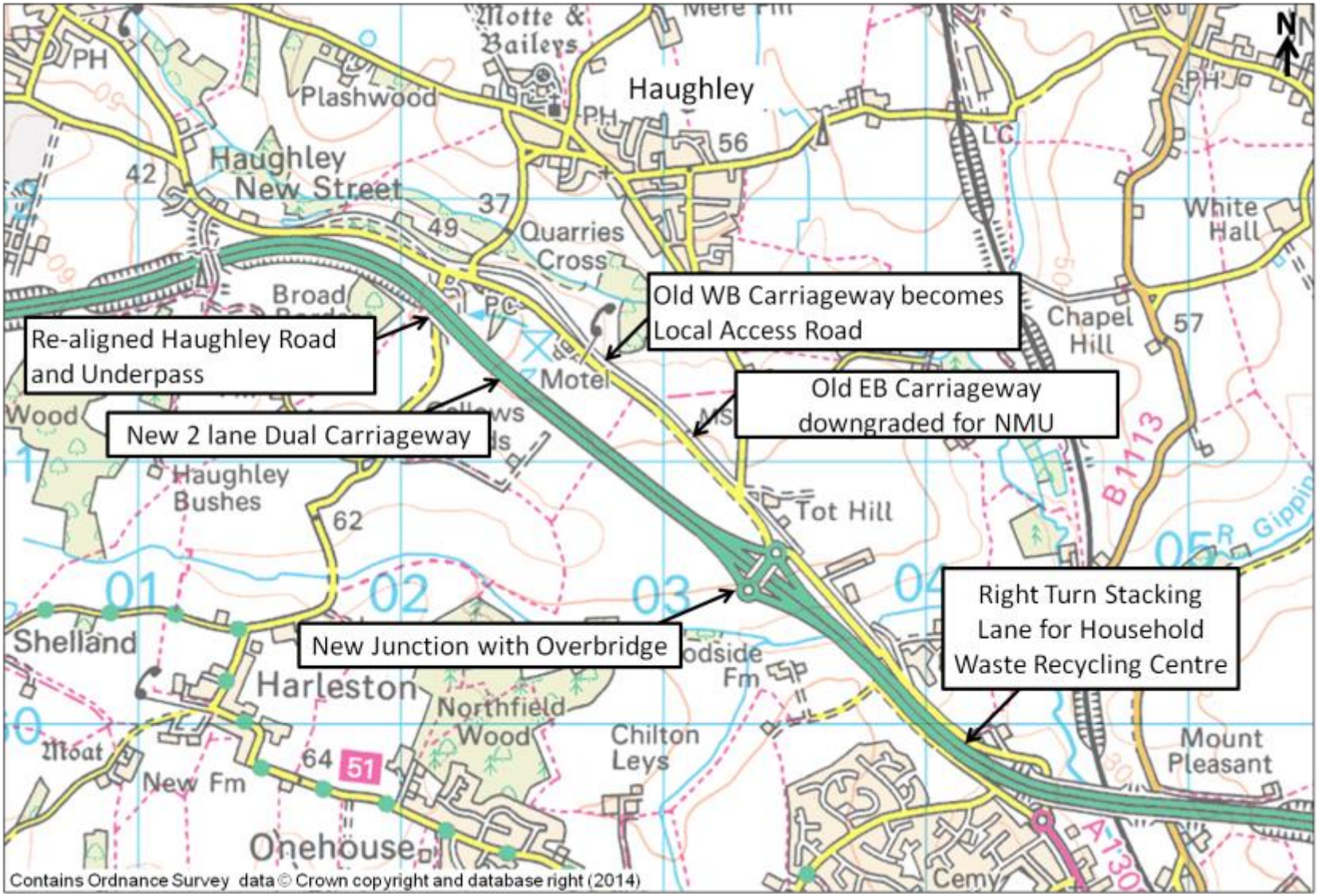
1.7 Further details are shown in Figure 1-2.

Scheme Objectives

1.8 The objectives of the scheme, as set out in the scheme's Environmental Statement (ES) (2006) were:

- **To improve safety, fewer accidents**
- **To separate long distance and local traffic**
- **To improve journey times and reliability**
- **To improve access for non motorised users (NMUs)**
- **To achieve the above objectives in an environmentally sustainable and sensitive way**

Figure 1-2 – Key Features of the Scheme



Scheme History

1.9 A brief history of the key events involved in the development of the scheme is provided in Table 1–1.

Table 1–1 Chronology of the A14 Haughley New Street to Stowmarket Improvement

Date	Event
March 2001	Scheme enters Targeted Programme of Improvements (now called Programme of Major Schemes)
January –May 2003	Public Consultation
March 2004	Preferred Route Announcement
March 2006	Draft Orders Published
November 2006	Public Inquiry
April 2007	Secretary of State Decision
June 2007	**Start of Construction**
December 2008	**Scheme Opened to traffic**

Overview of POPE

1.10 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 the five Central Government[1] objectives for Transport (Environment, Safety, Economy, Accessibility and Integration) have been achieved. The AST for this scheme is presented in Table 7–1 on page 100.

1.11 POPE studies are carried out for all Major Schemes to evaluate the strengths and weaknesses in the techniques used for appraising schemes. This is so that improvements can be made in the future. For POPE, this is achieved by comparing information collected before and after the opening of the 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 on page 101.

1.12 POPE of Major Schemes goes beyond monitoring progress against targets set beforehand. Instead, it 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 (WebTAG) and scheme specific objectives.
- Identify discrepancies between forecast and outturn impacts.
- Explain 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.

Contents of this Report

1.13 The remainder of this report is structured as follows:

- **Section 2 – Traffic Impact Evaluation.** This section looks what impacts the scheme had on traffic volumes and journey times on the A14 and surrounding roads;
- **Section 3 – Safety Evaluation.** This section compares the pre and post opening collision numbers and looks at collision rates;
- **Section 4 – Economy Evaluation.** This section compares the monetary value of any changes in journey times and collisions and compares these benefits with the cost.

[1] 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.

- **Section 5 – Environment Evaluation.** This section looks at the environmental impacts of the scheme and the success of any mitigation;
- **Section 6 – Accessibility and Integration Evaluation.** This section contains a review of the scheme impacts on accessibility for pedestrians and cyclists and considers the impact of the scheme on local land use and Government Policies;
- **Section 7 – Appraisal Summary Table (AST) and Evaluation Summary Table (EST).** This section contains an overview of the actual scheme impacts compared to those predicted in the original AST; and
- **Section 8 – Conclusions.** This section summarises the main findings of this study against the key objectives.

1.14 There are also a number of appendices listed below as follows:

- **Appendix A** – List of Tables and Figures presented in this report
- **Appendix B** – Glossary
- **Appendix C** – Information requested for Environmental section
- **Appendix D** - Photographic record of scheme

2. Traffic Impact Evaluation

Introduction

2.1 This section examines traffic data from a number of sources to provide a before and after opening comparison of traffic flows and journey times along the A14 Haughley New Street to Stowmarket route and the surrounding road network. The purpose of this evaluation is to understand whether changes in traffic flows and journey times may be attributable to the scheme and how this compares to forecasts.

2.2 This chapter comprises:

- An overview of national, regional and local background traffic trends.
- A detailed comparison of before, one year after (OYA) and five years after (FYA) traffic flows on key routes including the A14 and other routes in the study area likely to be affected by the scheme.
- A comparison of before and FYA journey times along the A14.
- An evaluation of the key differences between forecast and outturn impacts of the scheme on traffic flows and journey times.

Background Changes in Traffic

2.3 Historically in POPE evaluations, the before counts have often been factored to take account of background traffic growth so that they are directly comparable with the after counts. However, in light of the recent economic climate, which has coincided with a widespread reductions in motor vehicle travel in the United Kingdom (UK) as a whole in the years following 2008, it is no longer deemed appropriate to use this method of factoring to reflect background changes in traffic. Rather, recent POPE studies have taken a more considered approach in order to assess changes in the vicinity of the scheme, within the context of national, regional and locally observed background changes in traffic.

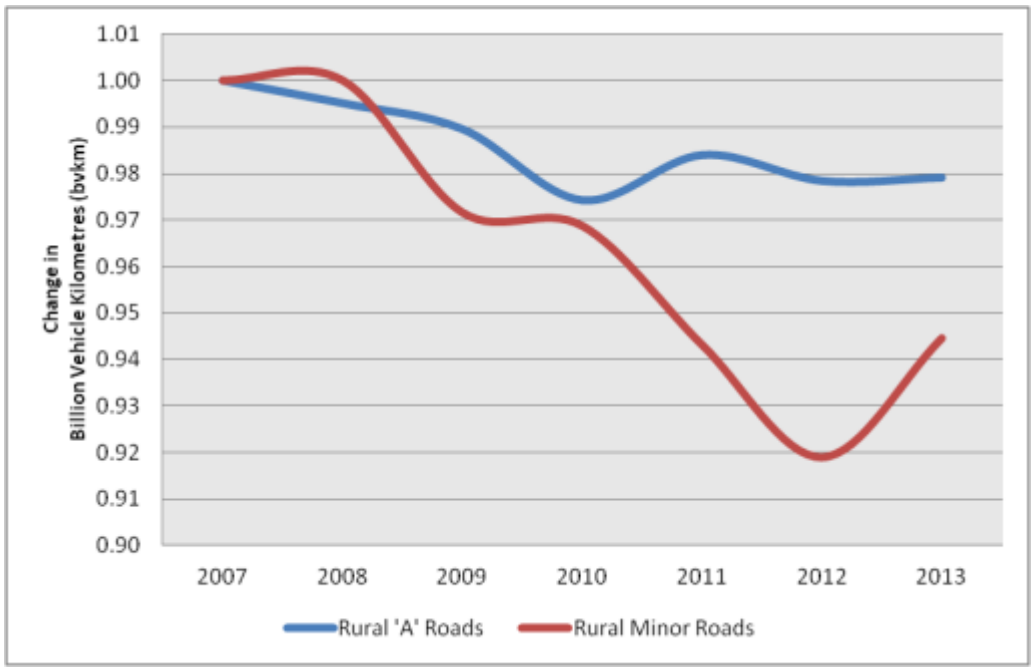
2.4 As such, this section will examine and discuss the national, regional and local trends in traffic flows.

National Trends

2.5 The Department for Transport (DfT) produces observed annual statistics for all motor vehicles in billion vehicle kilometres (bvkm) by road type[2]. Data between 2007 (start of construction) and 2013 (latest available) has been used to calculate the factor of change compared to a base year of 2007 on a yearly basis, and is shown in Figure 2-1 for all rural 'A' roads and all rural minor roads in Great Britain.

[2] Road Traffic and Speeds (http://www.dft.gov.uk/pgr/statistics/datatablespublications/roads/traffic). Table TRA0202. Motor vehicle traffic (vehicle kilometres) by road class in Great Britain, annual from 1993 to 2013.

Figure 2-1 – Nationally Observed Trends by Road Type



2.6 It can be seen from Figure 2-1 that:

- Traffic levels nationally on rural A roads dropped by around 1% during the construction period with a decrease seen immediately after opening for 2009. Post opening, traffic flows are around 2% less than seen prior to construction.
- Traffic levels using rural minor roads nationally have decreased steadily since the construction period. By 2012 flows were 8% lower than in 2007. Data for 2013 indicates that traffic levels are increasing again, with flows approximately 6% below those observed in 2007 prior to construction.

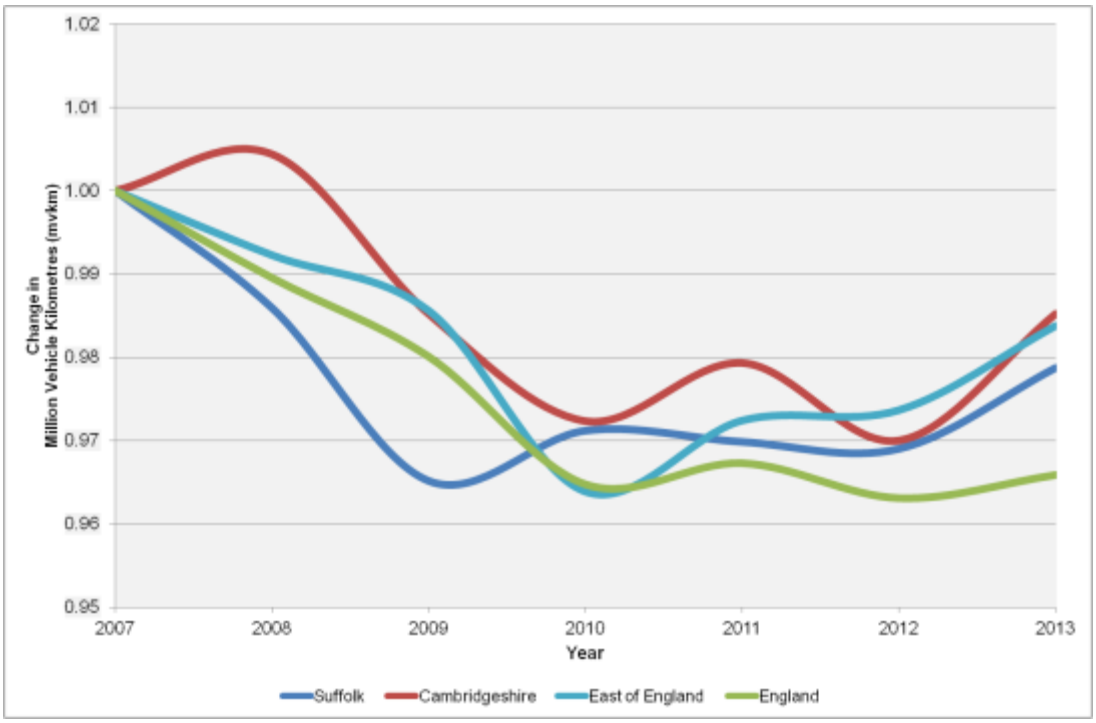
2.7 This should be borne in mind when assessing the changes in traffic volumes around the A14 later in this section, as it is important to determine whether changes have occurred due to the scheme or they are merely indicative of national trends.

Regional and Local Trends

2.8 Regionally and locally observed changes in traffic levels are also available in the form of million vehicle kilometres (mvkm)[3], and these have been used to calculate the factor of change by year compared to 2007, for all roads in England, the East of England region, and for the counties of Suffolk and Cambridgeshire. This is shown in Figure 2-2.

[3] Road Traffic and Speeds (http://www.dft.gov.uk/pgr/statistics/datatablespublications/roads/traffic) Table TRA8904. Motor vehicle traffic (vehicle kilometres) by local authority, annual from 1993 to 2012

Figure 2-2 – Regional and Local Trends



2.9 It can be seen from Figure 2-2 that:

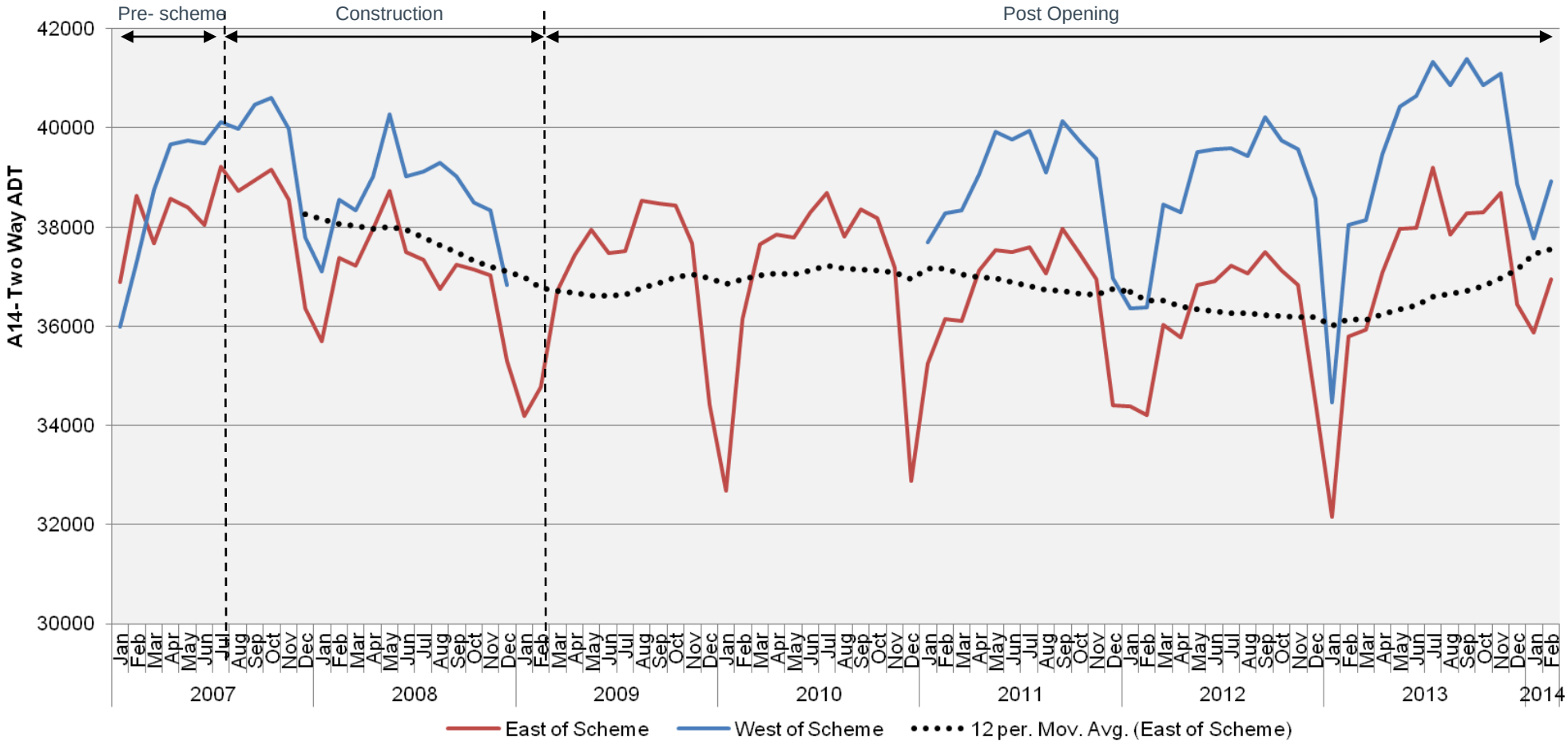
- There is a gradual decrease in vehicle kilometres driven in England, with 2013 levels being around 3.5% less than in 2007.
- Traffic levels in the East of England show a gradual decrease of around 3.5% from 2007 to 2010, however, from 2010 onwards figures indicate a slight increase. Traffic levels remain around 1.5% lower than the base year of 2007.
- Cambridgeshire traffic levels initially showed slight growth in 2008. However by 2012 overall levels are around 1.5% lower than they were in 2007 with an upturn observed between 2012 and 2013.
- Traffic levels in Suffolk show a sharp decrease of around 3.5% between 2007 and 2009. However have been fairly steady, resulting in 2013 levels being around 2% lower than those seen in 2007.

2.10 **Overall based on the trend shown in these figures, no factors have been applied to observed traffic flows to account for an annual change, although a slight decrease can be expected.** The scheme is wholly located in Suffolk, however as a strategic A road route, trends in Cambridgeshire, and rural A roads as a whole may also influence observed flows on the A14.

2.11 As the scheme was an upgrade of a strategic route, the long term average weekday traffic (AWT) trends on sites on the A14 to the east and west of the scheme section (which remained operational during scheme construction) have been looked at. It can be seen from Figure 2-3 that:

- Traffic levels are consistently higher to the west of the scheme, although seasonal trends are similar both east and west of the scheme.
- Traffic levels decreased during construction, which is likely to be due to the speed and lane restrictions that were in force for part of this time. Construction also coincided with the start of the economic downturn.
- Post opening, traffic decreases slightly to the end of 2012. Flows in 2013 appear to show a slight increase, particularly to the west of the scheme, although overall the trend over time indicates that there has been very little change in traffic flows compared to pre scheme.

Figure 2-3 – A14 Average Daily Traffic - Trend over Time



Traffic Volume Analysis

Data Sources

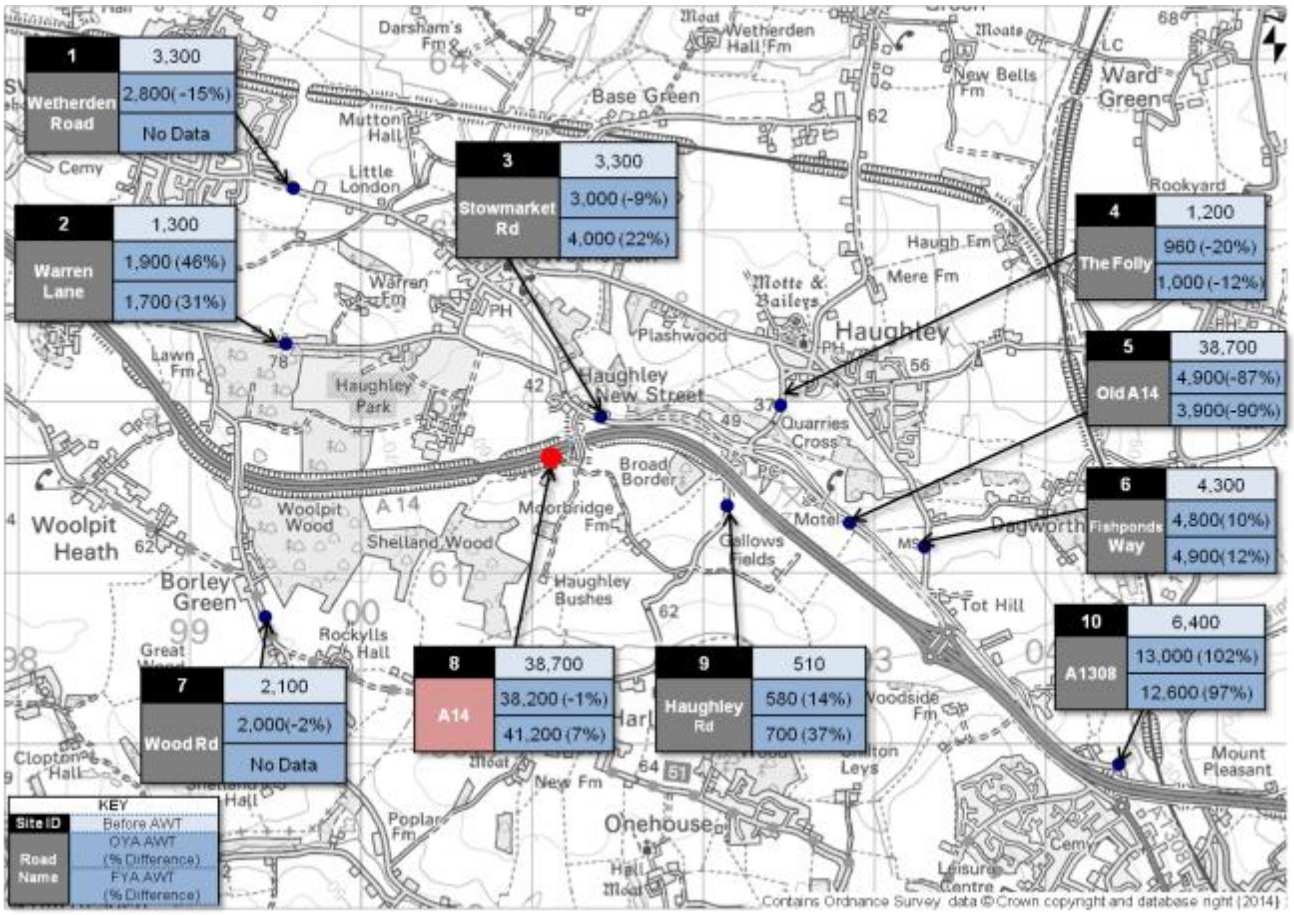
2.12 For the purposes of this evaluation, the main sources of traffic count data (automatic traffic count ATC) include:

- Permanent traffic count data for the HA network from the TRADS database for the periods before construction, one year after and five years after opening.
- Traffic count data supplied by Suffolk County Council for the before and OYA periods.
- Where existing traffic data was not available pre scheme, additional counts were commissioned, and repeated at the OYA/FYA stages.

Observed Flows

2.13 A comparison of pre and post opening 24 hour average weekday traffic (AWT) flows is shown geographically in Figure 2-4.

Figure 2-4 – AWT in Study Area[4]



2.14 The key points to note from Figure 2-4 are:

- Traffic flows on the old A14 have fallen by 90% from approximately 38,700 vehicles per day (vpd) to 3,900 vpd (site 5). As the majority of traffic on the A14 is strategic traffic, this traffic has transferred to the new carriageway post opening.
- Post opening, traffic flows on the A14 have increased around 7% (2,500vpd), against a background slight reduction shown previously (site 8).

[4] Due problems with equipment, no data is available at FYA for Site 1 and Site 7.

- Traffic at site 10, towards the A1308 into Stowmarket has seen an increase of 97% post opening, from 6,400vpd to 12,600vpd. However, as the westbound onslip to the A14 was closed as part of the scheme, this site is now a two way traffic route to allow access to the new A14 junction at Tot Hill.
- Flows have increased around 12% (4,300vpd to 4,900vpd) on Fishponds Way (site 6). Due to the closure of smaller junctions, this is now the most direct route from the village of Haughley to the new junction on the A14 at Tot Hill, and heavy goods vehicles (HGVs) travelling north from the A14 to Bacton are now signposted through Haughley.
- Traffic flows on the alternative route from the A14 to Haughley (site 4, The Folly) have reduced slightly to 1,000vpd, a reduction of 12%. This route is further west from the Tot Hill junction than Fishponds Way.
- Changes are also seen to the west of the scheme. Warren Lane (site 2) showed an increase of 31% five years opening (approx 400vpd), whilst the alternative route (site 1) at Whetherden Road shows a decrease of 500vpd (15%). This suggests that the scheme has influenced routing of traffic. Closer examination of Site 2 shows that the main increase has been in eastbound flows, suggesting that more traffic now exits the A14 along this route to access Haughley New Street and villages to the north west.
- Of the other monitoring sites, Site 9 (Haughley Road) shows the largest percentage increase of 37%, but this equates to a relatively low 190 vehicles.

Screenlines

2.15 In order to further investigate any wider potential reassignment as a result of the scheme, a screenline analysis has been undertaken for the screenline identified in Figure 2-5. Screenline analysis allows a better understanding of total vehicle movements across a wider corridor. The intention is to count vehicles at only one location for each journey they make.

2.16 Using the available count sites, one screenline has been identified for this scheme, running across the eastern section of the scheme. This analysis enables a comparison of how east-west movements on the local alternative routes have been affected by the scheme. Locations are noted in Table 2–1.

Figure 2-5 – Screenline location

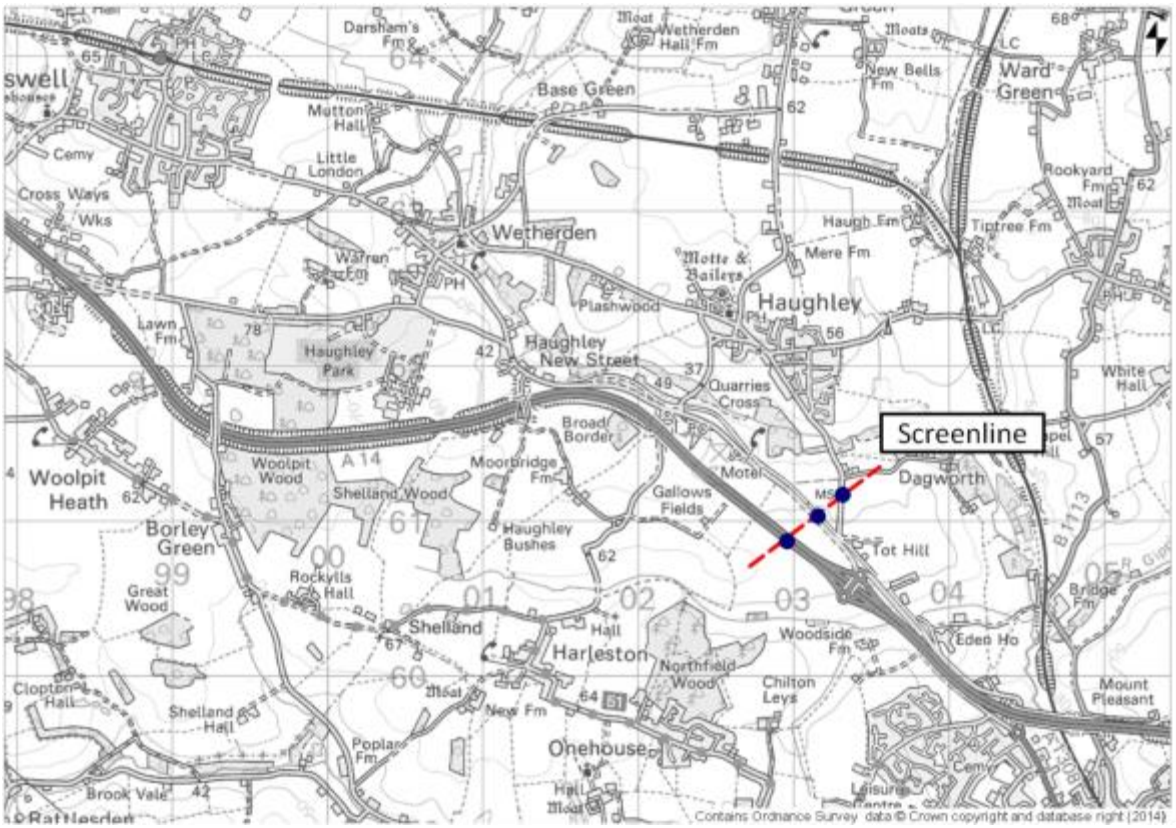


Table 2–1 – Screenline Analysis

Site		Description	Average Weekday Traffic		Pre Scheme to FYA Change	Pre Scheme to FYA % Change
			Pre-Scheme (2007)	FYA (2013)		
Two Way flows	8	A14, Haughley	38,700	45,100	6,400	16%
	5	Former A14				
	6	Fishponds Way	4,300	4,900	600	14%
	Screenline Total		**43,000**	**50,000**	**7,000**	**16%**

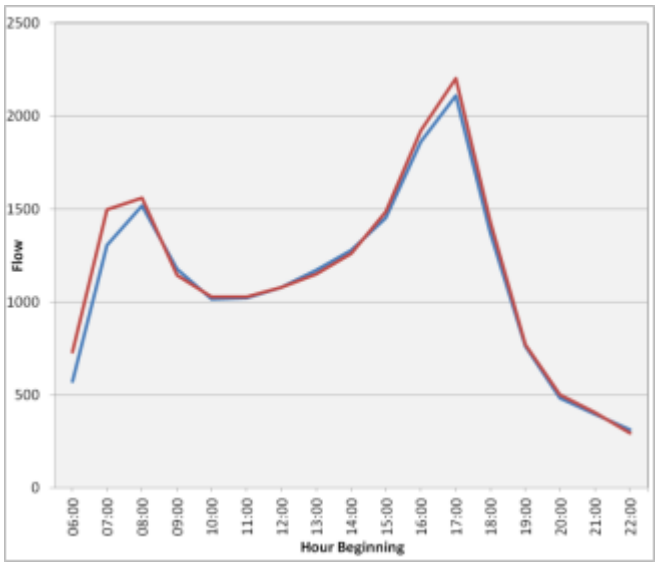
2.17 It can be seen that there has been a 16% increase (7,000 vpd) post opening across the screenline. A percentage of this may be double counting of traffic travelling east on the A14 to Tot Hill, before turning onto the former A14 towards Haughley New Street, and Harleston. The largest increase is from the A14 itself, therefore the following section considers the hourly flow profile to try to identify where the change has occurred.

Hourly flows on A14

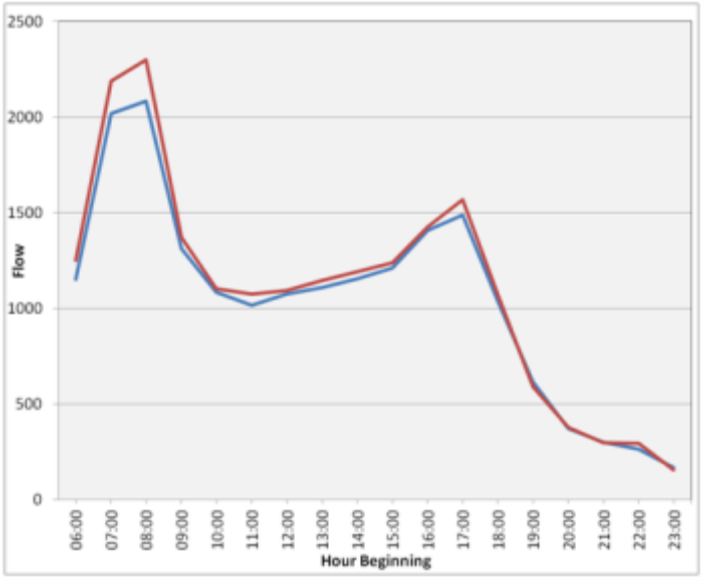
2.18 The previous section notes that there has been an increase in traffic on the A14 post opening. To try to analyse the daily change in more detail, traffic flows have been assessed by time of day for the A14 site (site 5 pre scheme, site 8 post opening).

Figure 2-6 – A14 weekday average hourly flow comparison

Eastbound (Blue Pre scheme, Red Post scheme)



Westbound (Blue Pre scheme, Red Post scheme)



2.19 Figure 2-6 shows that the flows on the A14 at this location are tidal, with more traffic travelling west towards Bury St Edmunds in the AM peak.

2.20 In addition, flows have generally remained unchanged throughout the day, with the exception of the peak periods, which show an increase. This increase is likely to be commuter traffic in the peaks travelling to and from Stowmarket to Bury.

Heavy Goods Vehicles (HGV)

2.21 Table 2–2 shows a comparison of HGV usage (vehicles over 6.6m in length) for the pre and post scheme periods. It can be seen that pre scheme, around 23% (8,900) of traffic were

HGVs. Post opening, whilst the overall traffic flows have increased by 7%, there has been almost no change in HGV numbers. This indicates that the increase in traffic flows seen post opening is mainly cars and light van traffic.

Table 2–2 – HGV flows on A14

Location	Before			FYA		
	AWT	HGV		AWT	HGV	
A14	38,700	8,900	23%	41,200	8,700	21%
Former A14				3,900	30	0.7%

Analysis of Forecast Traffic Flows

2.22 The pre-scheme appraisal process for the A14 Haughley New Street to Stowmarket 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. These modelled forecast flows are compared with observed flows to ascertain the accuracy of the original predictions.

Sources

2.23 Information on forecast traffic flows has been taken from the Economic Appraisal Report (2006) which details opening year flows (2009) and design year flows (2024), but no forecast HGV information. Other information has been taken from the COBA model (dated 2006).

Forecasting Assumptions

2.24 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 then may assist in explaining any differences observed.

2.25 All forecasting for the A14 Haughley New Street to Stowmarket scheme was undertaken using SATURN modelling software for fixed demand modelling, with traffic growth using NRTF and TEMPRO.

2.26 The forecast flows area was fairly compact, and was smaller than the appraisal area (see Figure 3-2 for modelled area/COBA area) and included the A14 from the Elmswell junction (A1088) to the east through to the Stowupland junction (A1120) to the west. Minor roads through the villages along the route were also included as well as key routes into Stowmarket, but detailed changes in Stowmarket were not included.

2.27 The base year used in the model was 2005 with an opening year forecast of 2009 and a design year forecast of 2024 (15 years after opening). As the scheme opened at the end of 2008, it has been assumed that the opening year of 2009 is accurate for comparison purposes.

Network Improvement Assumptions

2.28 The base model was the starting point for developing the future year network. The Forecasting Report for this scheme considered a number of improvements to the road network which may affect future flows. None were considered to have a significant impact on flows with the exception of one larger scheme, the B1115 Stowmarket Relief Road, linking the centre to Stowmarket to the B1115 just south of the A14 at the eastern end of the scheme. This route was due to be complete by the opening year, hence was included in the Do Minimum (DM) and Do Something (DS) scenarios.

2.29 This relief road was fully open to traffic slightly later than noted in the Forecasting Report, opening in September 2010.

Development Assumptions

2.30 The area around Stowmarket was highlighted as a major development area in the forecasting documents. A summary of the anticipated developments in the ‘most likely’ scenario is shown in Table 2–3 along with the status of each in 2014, as provided by Mid Suffolk District Council.

Table 2–3 – Development Progress

Proposal	Forecast opening year	Status in Spring 2014
Cedars Park Residential – 1800 units by 2024	1,367 units built	Approx 1,700 units complete
Chiltern Estate – 146 houses by 2009	146	Complete
Chiltern Leys – 1000 units	Not built	Not built (site now due to be 800 units)
Stowmarket Development Area (employment)	50% occupied	Not built
Former TXU recovery centre (employment)	50% occupied	Complete

2.31 This should be borne in mind when considering the flow comparison presented in the following section, although it is noted that none of these developments were dependent on the A14 Haughley New Street to Stowmarket scheme being built.

Forecast vs. Outturn Traffic Flows

2.32 As detailed previously, the forecast flows used in this report have been derived from the EAR and COBA files. Linear interpolation between 2009 and 2024 has been undertaken to provide 2014 forecast flows.

Table 2–4 – Forecast Impact vs Observed Change

Map Reference	Location	Forecast Impact			Observed Change		
		DM AADT 2009	DS AADT 2014	% Difference	Pre Scheme ADT 2007	Post Scheme ADT 2013/4	% Difference
8	A14 Haughley	40,000	44,300	11%	34,700	36,800	6%
5	Former A14	-	1,600	-	-	3,700	-
4	The Folly	900	200	-76%	1,040	980	-6%
6	Fishponds Way	3,700	5,500	48%	4,100	4,700	15%

2.33 It can be seen that observed traffic on the A14 was below forecast levels both pre and post scheme. As noted previously, the modelling for this scheme did not expect the scheme itself to result in extra traffic; all traffic growth is due to overall traffic growth expectations. Overall, an 11% increase in traffic was forecast for the A14, with a 6% increase observed. This is likely to be as a result of the reduction in traffic overall linked with the recession, but also shows that some growth has occurred, in variance to the trends presented earlier in this section which show a reduction.

2.34 The impact on local flows around Haughley overall is not as forecast. The following observations can be made:

- It is noted that the former A14 route has more than double the amount of traffic than was forecast.
- Fishponds Way (site 6) was forecast to have a 48% increase. Whilst traffic flows pre scheme were lower than observed, overall, there has only been a 15% increase observed post opening.

- Traffic using The Folly route was expected to fall by 76% to just 200 vpd. Whilst observed pre scheme flows were higher than forecast, overall, flows have only fallen 6% post opening.

2.35 This indicates that less traffic than forecast is accessing Haughley via Fishponds Way. Traffic travelling west seems to remain on the former A14 (through site 5) for longer, to access Haughley via The Folly. As a result, flows are higher than expected on these two routes.

2.36 The forecasting report noted that '*in addition Fishponds Way would generally become more attractive to traffic in the Do Something due to its proximity to the new A14 Tot Hill junction and the removal of the connections to the A14 at Haughley New Street and Quarries Cross. Fishponds Way would therefore attract traffic travelling between the local villages and the A14 east (in both directions). Consequently, there would be a large transfer from The Folly to Fishponds Way'*. Observed traffic flows on these routes have not seen the level of increase/decrease forecast, which indicates that the proximity to the new Tot Hill junction may not be the draw for drivers, rather that the journey time is more important. The route from Tot Hill junction to west Haughley and Wetherden is quicker when not using Fishponds way due to the lower speed limit imposed through Haughley and the presence of parked cars.

Journey Time Analysis

2.37 One of the main objectives of the scheme was to improve journey times along this section of the A14. This section considers the impact of the scheme on journey times. The analysis will focus on:

- Analysis of observed journey time differences for traffic using the A14 route before and FYA.
- A comparison of forecast and observed journey times for the same route.

Sources

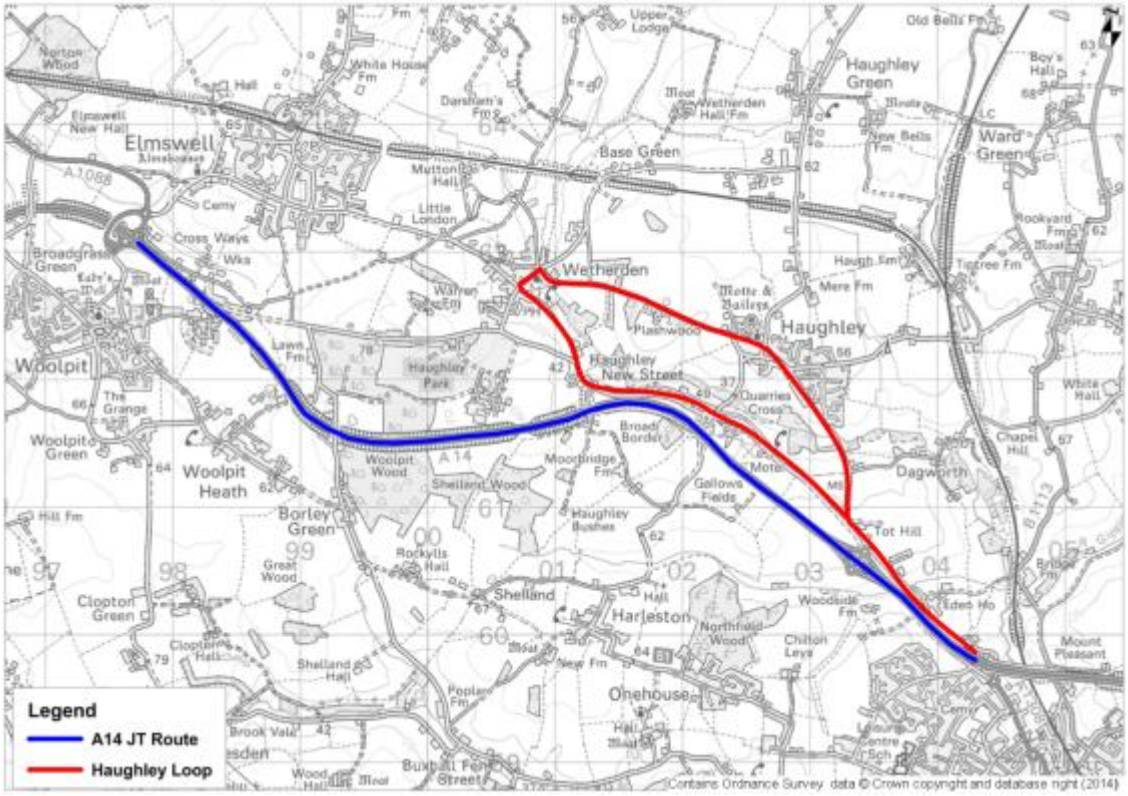
2.38 Forecast journey times for the scheme have been extracted from the COBA model for this scheme along the A14 between the Elmswell junction (J47) and east of the A1308 junction (J49) north of Stowmarket.

2.39 Observed journey times were collected for the same route (and an additional local route around Haughley before and OYA) for the following time periods to enable comparison with forecast impacts later in this chapter, and are shown in:

- Weekdays AM peak (07:30 – 09:00)
- Weekdays IP peak (10:00 – 13:00)
- Weekdays PM peak (16:30 – 18:00)

2.40 For the before and OYA journey time data collection, a moving observer method was used. For FYA, satellite navigation has been used for the same routes. 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 specified routes.

Figure 2-7 – Journey Time routes



A14 Journey Time Analysis

2.41 This section considers the observed journey time results along the A14 scheme section, both eastbound and westbound, comparing the old route with the new dual carriageway section between the Elmswell junction to the west of the scheme and east of the Tot Hill A1038 junction to the eastern end of the scheme.

2.42 Pre scheme (May 2007) and OYA (April 2010) times were collected using the moving observer method, with an average of eight runs undertaken in each direction, each time period in each of the two years.

2.43 At the FYA stage, satellite navigation data (from November 2012 to October 2013) has been used to derive post opening journey times on the A14 for the same sections and time periods.

2.44 The before, OYA and FYA journey times have been analysed for the A14 route in Table 2–5.

Table 2–5 – Journey Time Comparison on the A14

Direction	Time Period	Average Journey Times (mm:ss)			Pre Scheme to FYA Change	Pre Scheme to FYA %Change
		Pre-Scheme (2007)	**OYA (2010)**	**FYA (2013)**		
A14 Eastbound	AM	05:49	04:30	04:33	-01:16	-22%
	IP	05:48	04:37	04:38	-01:10	-20%
	PM	05:51	04:42	04:36	-01:15	-21%
A14 Westbound	AM	05:24	04:37	04:56	-00:28	-9%
	IP	05:20	04:34	04:39	-00:41	-13%
	PM	05:21	04:34	04:34	-00:47	-15%

2.45 The results presented here show that journey times have reduced in all time periods post opening. The key points to note from Table 2–5 are:

- The largest decreases are seen for traffic travelling eastbound, in both the AM and PM peaks where reductions of 21-22% (75-76 seconds) are observed. Savings of 70 seconds are also observed in the interpeak period eastbound.
- These savings are in line with those observed at the OYA stage, indicating that the scheme has had a consistent impact on lowering journey times.
- Westbound savings are lower, with the largest saving seen in the PM peak where a 47 second (15%) saving is observed post opening. Savings are also observed of 41 seconds (interpeak).
- Savings of 28 seconds are observed in the westbound AM peak, however this is the only time period where there has been a noticeable increase in journey time since the OYA. A 19 second (7%) increase has occurred since the OYA observed times. This may be partly due to an increase in traffic at this time period, as shown in Figure 2-6.
- The increase in speed from 50mph to 70mph on the A14 post opening is the primary reason for the journey time improvement for traffic using the A14 route.

2.46 One of the main aims of the scheme was to separate long distance and local traffic. One year after (OYA) opening, journey time surveys were undertaken on the 'Haughley Loop' to understand the impact on local traffic, which included a section of the former A14, and local roads through Haughley, Wetherden and Haughley New Street. As shown in the traffic surveys previously in this chapter, there have been limited changes between OYA and FYA traffic flows along this section. Therefore no further JT surveys along this route have been undertaken as those seen at OYA are considered valid for FYA as flows have not significantly changed. These have been replicated from the OYA report in Table 2–6.

Table 2–6 – Journey Time Comparison Haughley Loop

Direction	Time Period	Average Journey Times (mm:ss)		Pre Scheme to OYA Change	Pre Scheme to OYA% Change
		Pre-Scheme (2007)	**OYA (2010)**		
Clockwise	AM	12:43	10:21	-02:23	-19%
	IP	12:24	10:07	-02:17	-18%
	PM	11:52	10:09	-01:43	-15%
Anticlockwise	AM	13:41	10:08	-03:34	-26%
	IP	13:54	10:03	-03:50	-28%
	PM	13:40	10:26	-03:14	-24%

2.47 The changes observed in the Haughley Loop comparison show that users travelling anticlockwise have experienced larger savings than those travelling clockwise, but all users experienced at least a 1 minute 43 second saving. These savings are mainly be due to a reduction in delays at junctions on the A14, and an increase in the speed limit along the former A14 section from 50mph pre scheme to 60mph post scheme (on the local access road).

Forecast vs. Observed Journey Time Savings

2.48 Forecast journey times have been extracted from the COBA model for this scheme, to represent a Do Minimum (DM) and a Do Something (DS) scenario for the key links of the A14, and the Haughley Loop. These have then been compared to the observed journey times pre and post scheme opening in Table 2–7. The COBA model only forecast times for a 'peak' rather than an AM and a PM peak, whilst observed times are by AM/PM peak period and direction.

Table 2–7 - Forecast vs Observed Journey Times on A14 (mm:ss)

Direction	Time Period	Forecast			Observed		
		Do Minimum	Do Something	Difference	Pre Scheme 2007	FYA 2013	Difference
Eastbound	AM Peak	05:16	04:41	00:35	05:49	04:33	01:16
	Interpeak	05:12	04:33	00:39	05:48	04:38	01:10
	PM Peak	05:16	04:41	00:35	05:51	04:36	01:15
Westbound	AM Peak	05:16	04:41	00:35	05:24	04:56	00:28
	Interpeak	05:12	04:33	00:39	05:20	04:39	00:41
	PM Peak	05:16	04:41	00:35	05:21	04:34	00:47

2.49 The key points to note from the data presented in Table 2–7 are:

- Observed FYA journey times are close to those forecast in all time periods, with the exception of the AM peak, where there is a 15 second discrepancy. Overall, forecast journey times are accurate for the DS scenario.
- Overall observed journey time savings are better than forecast, as observed journey times before were higher than forecast for the pre scheme scenario, particularly in the eastbound direction, perhaps indicating that the substandard junctions and lower speed limit (which was included in the model) resulted in a longer than expected journey time, therefore a larger saving has been achieved.

2.50 The one year after evaluation report for this scheme reported that observed journey times on the Haughley Loop were much higher than forecast, both pre and post scheme. However, whilst the forecasts only anticipated small changes in journey time (<20seconds) for local traffic, observed journey times showed savings for traffic using the Haughley Loop of around 3 minutes. It is likely that the savings seen on the Haughley Loop are from reduced delays for traffic waiting at junctions.

Journey Time Reliability

2.51 The DfT's Transport Analysis Guidance (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 reliability. The term reliability in this section refers to the variation in journey times such as from recurring congestion at the same period each day (day-to-day variability) or from non-recurring events, such as incidents.

2.52 The assessment of reliability made in this section is based on available data for the scheme.

Appraisal

2.53 One of the scheme objectives was to improve journey time reliability for traffic using the A14 route. The scheme AST states that the scheme would '*provide segregated journeys for trunk road and local road traffic, thus improving journey time reliability*'. Overall the AST scored the reliability sub-objective as Moderate Beneficial.

Evaluation

Route Stress Approach

2.54 A stress based approach has been used to assess the reliability impacts of this scheme FYA after its opening in order to make a comparison with the forecast.

2.55 The Stress Factor for a particular link is defined as the ratio of the Annual Average Daily Traffic (AADT) flow to the Congestion Reference Flow (CRF). The CRF is expressed as an AADT flow estimate at which a road is likely to be congested in the peak periods on an average day. DfT Guidance[5] states that only values between 75% and 125% should be

[5] http://www.dft.gov.uk/pgr/economics/rdg/multimodal/anewdealfortrunkroadsinengla5491?page=7

considered and anything outside this range should be adjusted up or down to 75% or 125%. As a result, the adjusted stress figures are included in brackets where applicable.

2.56 The route stress calculation using observed traffic data is shown in Table 2–8**.** It can be seen that there has been no noticeable impact on route stress.

Table 2–8 – Observed Changes in Route Stress

	Calculated Outturn 'stress' (adjusted stress in brackets)	
	Before	**FYA**
A14	31% (75%)	31% (75%)

2.57 The removal of at-grade junctions and an improved highway alignment has reduced the delays incurred by local traffic attempting to cross or join the A14. As a result the scheme is likely to have had a beneficial impact on journey time variability, particularly for local traffic as journey times are more consistent throughout the day.

Key Points – Traffic Impacts

Traffic Flow impacts

- Post opening, traffic flows on the A14 (AADT) have increased by around 7% (2,500vpd). Traffic flows on the old A14 (site 8) have fallen by 90% from approximately 38,700 vehicles per day (vpd) to 3,900 vpd. As the majority of traffic on the A14 is strategic traffic, this traffic has transferred to the new carriageway post opening.
- Flows have increased around 12% (4,300vpd to 4,900vpd) post opening on Fishponds Way (site 6, into the village of Haughley). Due to the closure of smaller junctions, this is now the most direct route from the village of Haughley to the new junction on the A14 at Tot Hill.
- Traffic flows on the alternative route from the A14 to Haughley (site 4, the Folly) have reduced slightly to 1,000vpd, a reduction of 12%. This route is further west from the Tot Hill junction than Fishponds Way.
- Changes are also seen to the west of the scheme. Warren Lane (site 2) showed an increase of 31% five years after opening (approx 400vpd), whilst the alternative route (site 1) at Whetherden Road shows a decrease of 500vpd (15%). This suggests that the scheme has influenced behaviour. Closer examination of Site 2 shows that the main increase has been in eastbound flows, suggesting that more traffic now exits the A14 along this route to access Whetherden and Haughley New Street.

Traffic Forecasting

- It can be seen that observed daily traffic on the A14 was below forecast levels both pre and post scheme. Overall, an 11% increase in traffic was expected, with a 6% increase observed.
- It is noted that the former A14 route has more than double the amount of traffic than was forecast, although still shows that the majority of traffic has transferred to the new A14 route.
- Fishponds Way (site 6) into Haughley was forecast to have a 48% increase. Whilst traffic flows pre scheme were lower than observed, overall, there has only been a 15% increase observed post opening.
- Traffic using The Folly route was expected to fall by 76% to just 200 vpd. Whilst observed pre scheme flows were higher than forecast, overall, flows have only fallen 6% post opening.

Journey Times

- Journey time savings are observed on the A14 in all time periods, with the largest decreases seen for traffic travelling eastbound, in both the AM and PM peaks where reductions of 21-22% (75-76 seconds) are observed. Savings of 70 seconds are also observed in the interpeak period eastbound. These savings are in line with those observed at the OYA stage, indicating that the scheme has had a consistent impact on lowering journey times.
- Westbound savings are lower, with the largest saving seen in the PM peak where a 47 second (15%) saving is observed post opening. Savings are also observed of 41 seconds (interpeak).
- Savings of 28 seconds are observed in the westbound AM peak. However this is the only time period where there has been a noticeable increase in journey time since the OYA. A 19 second (7%) increase has occurred since the OYA observed times. It is likely that some of this change is due to a comparison of different data sources.
- The increase in speed from 50mph to 70mph post opening is the primary reason for the journey time improvement for traffic using the A14 route.

Journey Time Forecasting

- Observed FYA journey times are close to those forecast in all time periods, with the exception of the AM peak westbound, where observed times are 15 seconds longer than forecast. Overall, forecast journey times are accurate for the DS scenario.
- Overall observed journey time savings are higher than forecast, as observed journey times for the pre scheme were slower than anticipated, particularly in the eastbound direction.

3. Safety Evaluation

Introduction

3.1 Safety problems along this stretch of the A14 have been subject to a number of smaller schemes over the past 15 years. The most notable of these was the 50mph speed limit (supported by safety cameras) which was implemented in 2000 over a 2.5 mile (4km) stretch between Haughley New Street and the Stowmarket junction. The *Haughley New Street to Stowmarket Improvement Accident Study Report (2006)* showed that the impact of the speed limit reduction was to reduce the average number of personal injury collisions (PIC) per year from 12.3 (between 1997-2000) to an average of 8.9 per year (2001-2005). That scheme did not have the expected impact on reducing the proportion of killed and seriously injured casualties (KSI) which only decreased from 21.6% to 17.5%, which was still considered high as the national average KSI rate for this type of road was 15.1%, as noted in the *Statement of Case (SoC)* for this scheme, October 2006.

3.2 The SoC also notes that a total of 37 collisions were recorded over the same section, of which 65% (24) were travelling eastbound, and 13 on the westbound carriageway. It is noted that the westbound carriageway was built to a higher standard than the eastbound (original carriageway).

3.3 The scheme AST states that *'the scheme would result in accident benefits over 60 years, particularly KSI, due to improved alignment and removal of at-grade junctions and crossings'*.

3.4 Figure 3-1 shows the substandard pre scheme layout of the Quarries Cross junction which local residents had to use in order to access/exit the A14, with poor visibility and almost no acceleration/deceleration opportunities. This junction has been removed as part of this scheme, therefore eliminating potential collisions caused by the sub standard design at this location.

Figure 3-1 – Quarries Cross junction pre scheme

3.5 This section of this study considers the impact of the scheme in terms of the level of success in addressing the objective of reducing collisions.

3.6 This assessment is based on the analysis of the number of personal injury collisions (PICs) occurring in the five year pre-construction period, and the five years post-opening period.

3.7 Evaluation of the scheme's impact on personal security has been undertaken through the use of observations made during a site visit.

Data Collection

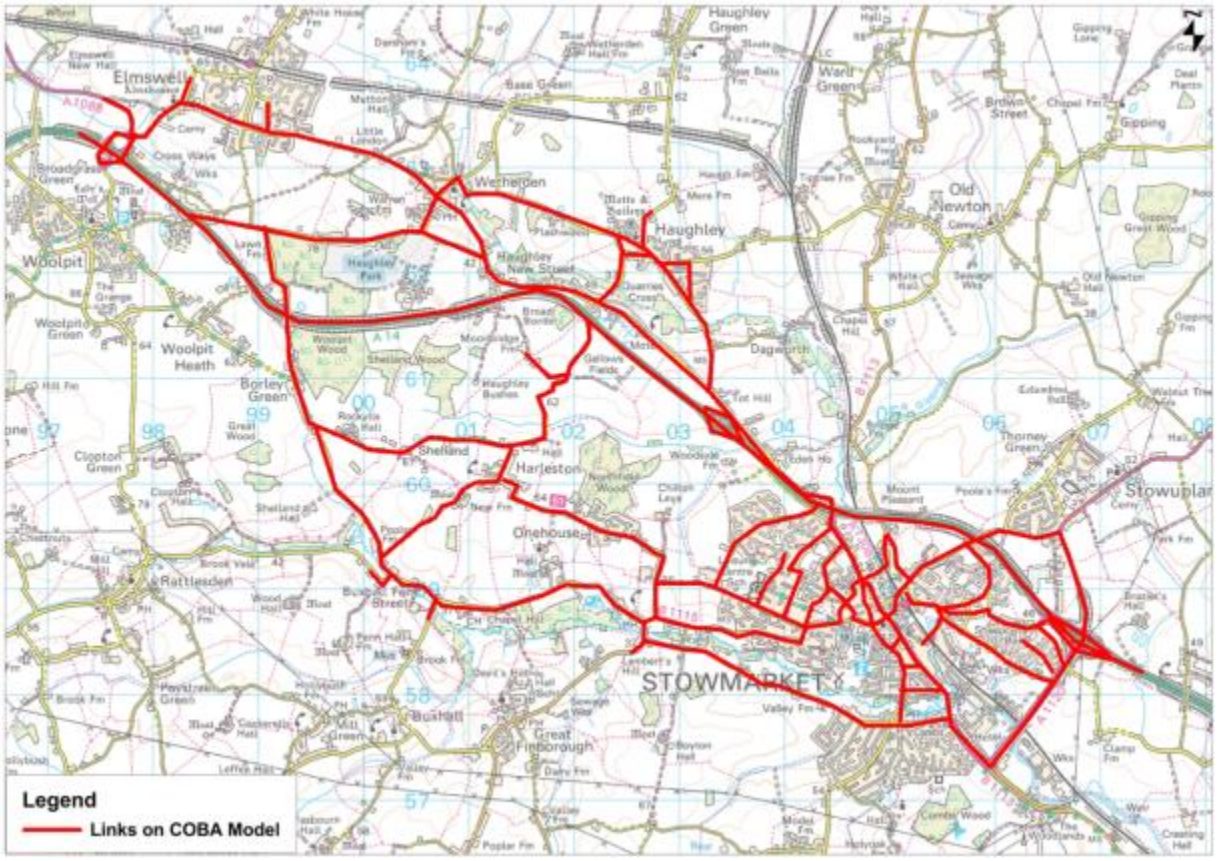
Forecast

3.8 For the purposes of appraising the safety 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 A14 Haughley New Street to Stowmarket Improvement scheme on safety have been obtained from the scheme's Cost Benefit Analysis model (COBA). The forecast saving was calculated for the opening year, and over the scheme appraisal period of 60 years. This section of the study concerns collision numbers; the economic impact of the change in collisions is evaluated later in the Economy section of this report.

3.9 The extent of the COBA model area is shown in Figure 3-2. This covers the network, and covers all the main routes in the immediate and wider vicinity of the scheme where changes in traffic were anticipated, and hence changes in collisions may occur.

Figure 3-2 – COBA Modelled Area



Observed Data

3.10 Collisions by their nature include a random element and are somewhat unpredictable events, therefore to ensure that the scheme is the only known change, pre scheme collision data has been obtained for the five years immediately prior to construction rather than using the older data used in the COBA model (years 2000-2005). Collision data has been obtained covering the following time periods:

- Pre scheme – 1 June 2002 – 31 May 2007 (5 years)
- Construction – 1 June 2007 – 31 December 2008 (1 year, 7 months)
- Post scheme - 1 January 2009 – 30 November 2013 (4 years, 11 months)

3.11 All available data was requested from five years prior to scheme construction, through to as recent as available post opening. At the time of request, post opening data was available up to the end of November 2013.

3.12 The collision data is based on the records of PICs (i.e. collisions that may involve injuries to one or more persons) recorded in the STATS19 data collected by the police when attending collisions. Collisions that do not result in injury are not included in this dataset and are therefore not considered in this evaluation.

3.13 It should also be noted that at this stage the collision data may not yet have been validated by the DfT. The requirement for up-to-date and site specific information necessitated the use of unvalidated data sourced from the local authority. Thus 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

3.14 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.

3.15 This section analyses the observed changes in PICs following the implementation of the scheme. One of the stated objectives of this scheme was to reduce the number of collisions along the route. This section includes an investigation into the changes in the number of collisions and associated casualties as well as whether there has been any change in the relative severity. The impact on the whole modelled (COBA) area is also considered, and then further detail is provided regarding the impacts just on the key links of the scheme section.

Background Collision Reduction

3.16 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. Consideration of this background trend is needed when comparing the collision numbers in the before and after periods in the scheme area. If the scheme had not been built, collision rates in the area are still likely to have been influenced by wider trends and reduced.

3.17 When the numbers of collisions in this area in the years before and after the scheme was built are compared, and the net change is primarily associated with the scheme, this background reduction is 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[6]. This gives what is known as a counterfactual scenario. A comparison is then made between this data for the counterfactual 'without scheme' scenario on a like-for-like basis and the observed post opening data which is the 'with scheme' scenario.

3.18 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

3.19 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 3-3. This enables a direct comparison with forecast collision savings derived from COBA. The severity of an collision is defined by the most serious injury incurred. The information presented in this chapter is as observed for severity, as no counterfactual scenario has been calculated for severity.

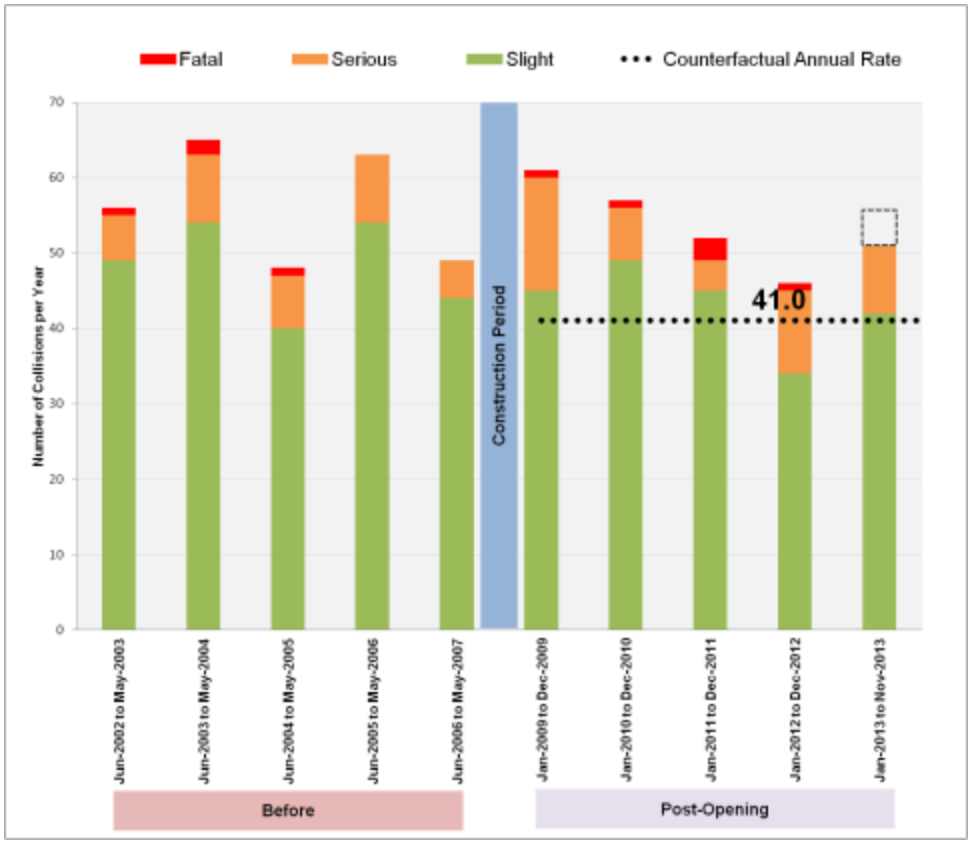
3.20 The table also includes the counterfactual without scheme which is comparable to the after data. It should be noted that where periods of less than one year are displayed, the number of collisions for the period has been extrapolated to provide an equivalent number of collisions per year; the number of collisions added as a result of the extrapolation is shown as a dotted bar.

[6] National trend data is sourced from DfT table RAS10002

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	6	49	56	56.2
	June 2003	May 2004	2	9	54	65	
	June 2004	May 2005	1	7	40	48	
	June 2005	May 2006	0	9	54	63	
	June 2006	May 2007	0	5	44	49	
Without scheme Counterfactual (adjusted for background reduction)[7]							41.0
Construction	June 2007	May 2008	0	3	45	48	49.3
	June 2008	Dec 2008	1	0	29	30	
Post Opening	Jan 2009	Dec 2009	1	15	45	61	54.3
	Jan 2010	Dec 2010	1	7	49	57	
	Jan 2011	Dec 2011	3	4	45	52	
	Jan 2012	Dec 2012	1	11	34	46	
	Jan 2013	Nov 2013	0	9	42	51	

Figure 3-3 – Number of Collisions by Severity in the COBA Area



3.21 From Table 3–1 and Figure 3-3 it can be seen that:

- In the post opening period, the average number of collisions recorded post opening is 54.3 collisions per year. This represents a 3% decrease (1.9 collisions) compared to the observed number pre scheme.
- The 'without scheme' counterfactual rate (accounting for the background reduction in collisions over time) is calculated as 41.0 collisions per year. Compared to the post

[7] Background factor in collision numbers for all roads between the years 2004 to 2011 was 0.73.

opening collision numbers, this represents an annual increase of 13.3 collisions (32%) per year post opening.

- The average number of fatal and serious collisions observed per year has increased 30% post opening (increase from an average of 8 per year, to an average of 10.4 per year). This may be due to the increased speeds on the A14 post opening.
- The average number of slight collisions per year has decreased by 9% (4.4 collisions) post opening.

Evaluation of Casualty Numbers and Severity

3.22 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 (ie the KSI index) is also a useful indicator of trends in the severity of casualties over time. The 'without scheme' counterfactual value (accounting for background reduction in associated casualties) has also been calculated for overall casualty numbers here, although reductions have not been applied based on severity.

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	7	71	79	**76.2**
	June 2003	May 2004	2	11	78	91	
	June 2004	May 2005	1	8	55	64	
	June 2005	May 2006	0	9	76	85	
	June 2006	May 2007	0	5	57	62	
Without scheme Counterfactual (adjusted for background reduction)[8]							**55.3**
Construction	June 2007	May 2008	0	3	59	62	64.4
	June 2008	Dec 2008	1	0	39	40	
Post Opening	Jan 2009	Dec 2009	1	15	64	80	**72.4**
	Jan 2010	Dec 2010	1	7	63	71	
	Jan 2011	Dec 2011	3	5	64	72	
	Jan 2012	Dec 2012	1	11	55	67	
	Jan 2013	Nov 2013	0	10	56	66	

3.23 From Table 3–2 it can be seen that:

- Overall there has been a decrease in the number of casualties, with a 5% (3.8 casualties) reduction seen post opening, however, when the overall background reduction in casualties is taken into account, an increase of 17.1 is observed, an increase of 31%.
- As with collisions, there has been a 50% increase in fatal casualties (0.4 per year), and a 22% (1.8 per year) increase in serious casualties, although the change in fatal casualties is based on very low numbers and firm conclusions cannot be drawn.
- Post opening there has been an observed 9% decrease in slight casualties (5.9 per year) compared to pre scheme.

A14 Haughley New Street Key Links Section

3.24 An analysis of collision records for the A14 key links has also been undertaken to investigate the impact of the scheme on collisions on the directly improved A14 section between Haughley New Street and the Tot Hill junction.

Evaluation of Collision Numbers and Severity

3.25 An evaluation of the before and after collision numbers by year for the scheme key links is shown in Table 3–3 and Figure 3-4.

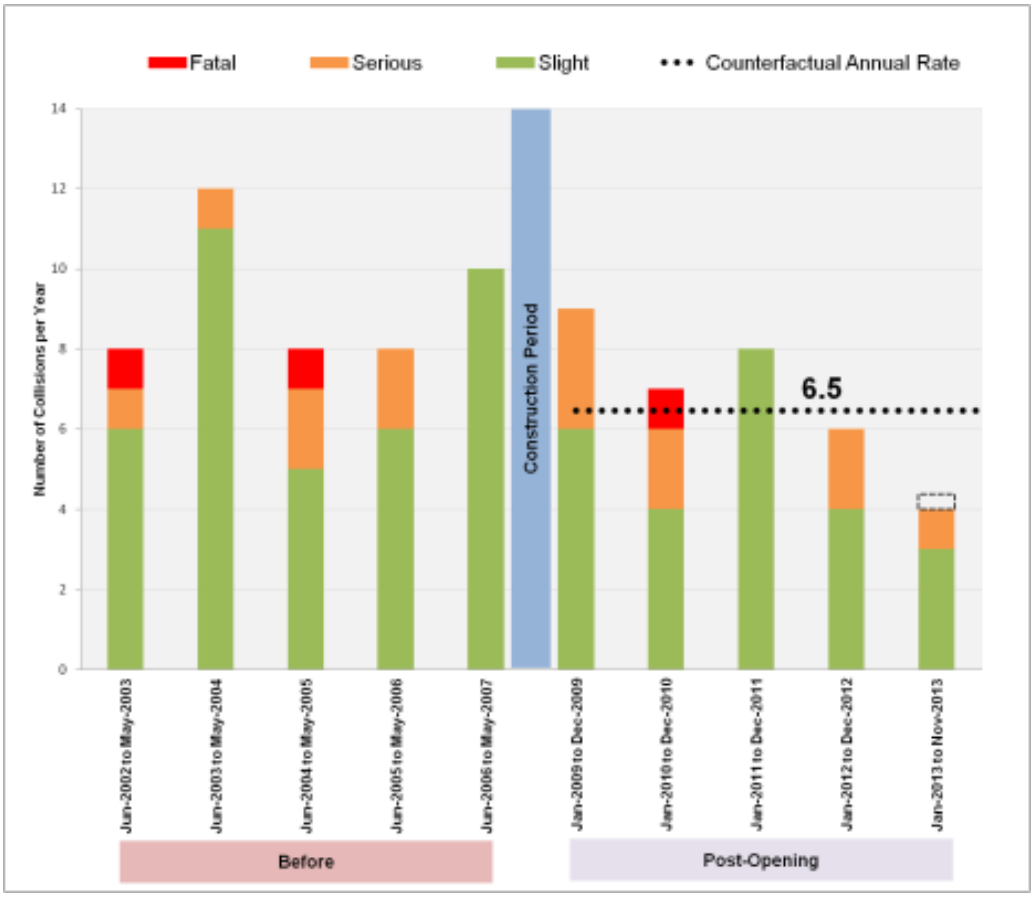
3.26 It should be noted that where periods of less than one year are displayed, the number of collisions for the period has been extrapolated to provide an equivalent number of collisions per year; the number of collisions added as a result of the extrapolation is shown as a dotted bar.

[8] Background factor in casualty numbers for UK 2004-2011 was 0.73

Table 3–3 – Number of Collisions by Severity for Scheme Key Links

Period	Time Period		Collision Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	1	1	6	8	9.2
	June 2003	May 2004	0	1	11	12	
	June 2004	May 2005	1	2	5	8	
	June 2005	May 2006	0	2	6	8	
	June 2006	May 2007	0	0	10	10	
Without scheme Counterfactual (adjusted for background reduction)[9]							6.5
Construction	June 2007	May 2008	0	0	6	6	4.4
	June 2008	Dec 2008	0	0	1	1	
Post Opening	Jan 2009	Dec 2009	0	3	6	9	6.9
	Jan 2010	Dec 2010	1	2	4	7	
	Jan 2011	Dec 2011	0	0	8	8	
	Jan 2012	Dec 2012	0	2	4	6	
	Jan 2013	Nov 2013	0	1	3	4	

Figure 3-4 – Number of Collisions by Severity for Key Links



3.27 From Table 3–3 and Figure 3-4 it can be seen that:

- The average number of collisions recorded over the post opening period was 6.9 per year. This is a 25% decrease when compared to the pre scheme period and represents an annual saving of 2.3 collisions.
- The 'without scheme' counterfactual collision rate (accounting for the background reduction in collisions over time) is calculated as 6.5 collisions per year. When compared to the post opening collision rate, this represents a 6.5% increase (an annual increase of 0.4 collisions) after scheme opening. This is a much lower increase than observed over

[9] Factor for the background reduction in collision numbers for all roads 2004-2011 was 0.73

the wider COBA area where an increase of 32% is seen, indicating that something in the wider area has impacted the results, rather than the scheme itself.

- The number of fatal collisions has reduced post opening from 0.4 per year to 0.2 per year, however due to the low numbers, firm conclusions cannot be drawn.
- Serious collisions have increased post opening by 36% (0.4 per year), although again, due to the low numbers it is difficult to draw any firm conclusions.
- Slight collisions have decreased by 33% (2.5 per year), post opening, indicating that the scheme has had a beneficial impact on reducing the lower severity incidents along the route.
- Section 3.44 later in this section shows that the results on the key links is not statistically significant, and therefore cannot be confidently attributed to the scheme.

Evaluation of Casualty Numbers and Severity

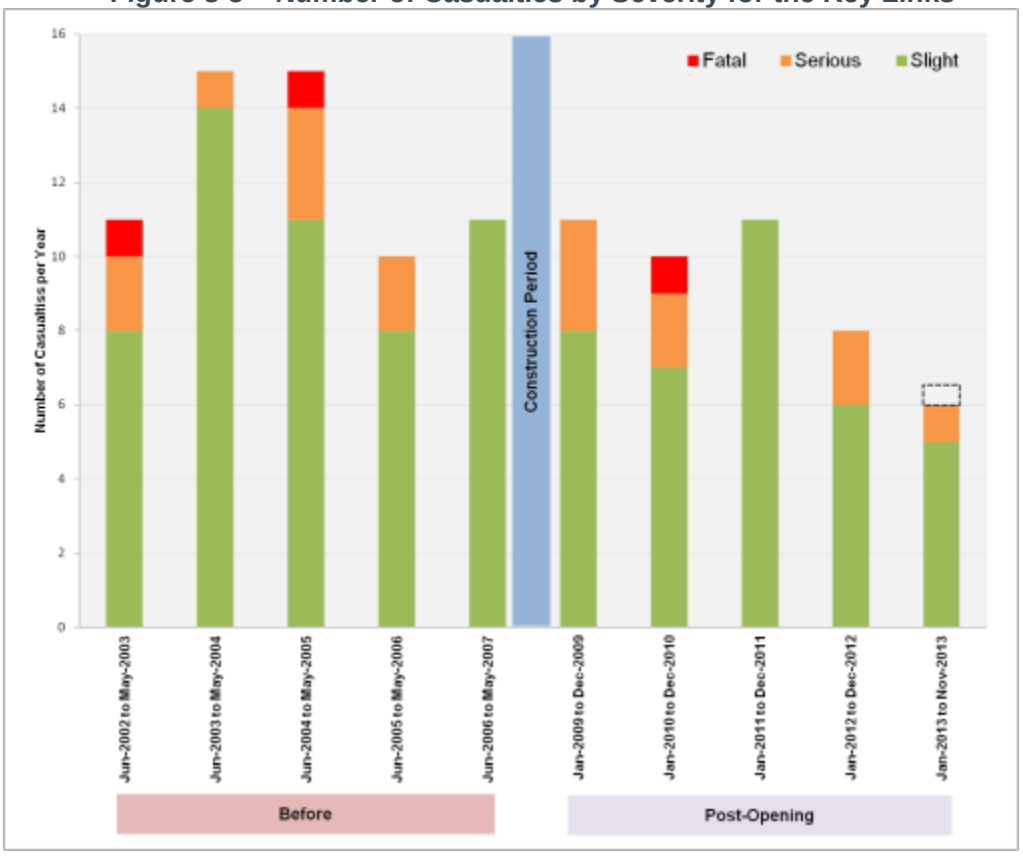
3.28 The casualty numbers for the scheme key links are presented in Table 3–4 and Figure 3-5.

Table 3–4 – Number of Casualties by Severity for the Key Links

Period	Time Period		Casualty Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	1	2	8	11	12.4
	June 2003	May 2004	0	1	14	15	
	June 2004	May 2005	1	3	11	15	
	June 2005	May 2006	0	2	8	10	
	June 2006	May 2007	0	0	11	11	
Without scheme Counterfactual (adjusted for background reduction)[10]							9.0
Construction	June 2007	May 2008	0	0	11	11	8.8
	June 2008	Dec 2008	0	0	3	3	
Post Opening	Jan 2009	Dec 2009	0	3	8	11	9.4
	Jan 2010	Dec 2010	1	2	7	10	
	Jan 2011	Dec 2011	0	0	11	11	
	Jan 2012	Dec 2012	0	2	6	8	
	Jan 2013	Nov 2013	0	1	5	6	

[10] Background factor in collision numbers for all roads 2004-2011 was 0.73, and the national reduction in casualties between 2004-2011 was 0.73.

Figure 3-5 – Number of Casualties by Severity for the Key Links



3.29 From Table 3–4 and Figure 3-5 it can be seen that:

- Overall there has been a decrease in the number of casualties, with a 25% (3 casualties) reduction seen post opening, although when the background reduction is taken into account, a 0.4 (4%) casualty increase is observed.
- As with collisions on the key links, there has been a decrease in fatal casualties (0.2 per year), and no change in the number (1.6 per year) of serious casualties, although the change in fatal casualties is based on very low numbers and firm conclusions cannot be drawn.
- Post opening there has been an observed 28% decrease in slight casualties (2.9 per year) compared to pre scheme.
- Post opening, the severity of casualties has reduced.

Evaluation of Collision Severity Index

3.30 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 17.5% (based on 2000-2005 data, just looking at the area subject to the 50mph speed restrictions). A summary of the before and after opening collision severity indicies by year for the whole of the COBA modelled area, and the A14 scheme key links is shown in Table 3–5.

Table 3–5 – Collision and Casualty Severity Index

	COBA Area	Key Links
Period	**Collision Severity Index**	**Collision Severity Index**
Pre Scheme	**0.14**	**0.17**
Post Opening	**0.19**	**0.26**

3.31 The collision severity index has increased over both the COBA wider area and the scheme key links. As previously noted, there has been an increase in serious collisions over both areas, however there were savings noted for collisions categorised as slight. It is therefore likely that the increase in the severity index is mainly due to a higher reduction in slight collisions than was seen for slight or fatal severity collisions.

Fatalities & Weighted Injuries

3.32 The collision rate discussed previously and shown in Table 3–6 does not take into account the severity of collisions. To analyse this, the Fatalities and Weighted Injuries 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 3–6. To take into account the increased traffic on the A14 and for comparison with other schemes, the FWI rate per billion vehicle kilometres (bvkm) is shown. It should be noted that these figures do not account for changes in the background reduction in casualties.

Table 3–6– FWI on the A14 trunk road

Period	FWI/collision	FWI/year	FWI/bvkm
Before	0.072	0.66	12.5
After	0.064	0.44	8.1

3.33 Table 3–6 shows that the seriousness of collisions has reduced slightly post opening (11%), whilst the number of fatal and serious injuries per year, and per bvkm has also reduced by 33% and 35% respectively.

Location of Collisions

3.34 The location of collisions over the COBA area for the five years pre scheme, and the available after period (four years, 11 months) are shown in Figure 3-6. A closer look at the locations of collisions on the scheme key links is shown in Figure 3-7. Note that the mapping shows the layout existing at the time period shown.

3.35 Figure 3-6 shows that, prior to scheme opening, collisions were spread across the area, with clusters at the major junctions on the A14, as well as in the town of Stowmarket. A concentration of collisions is also seen along the scheme key links which are considered in more detail in Figure 3-7.

Figure 3-6 – COBA Collision Locations– Pre scheme (top) and Post scheme (bottom)

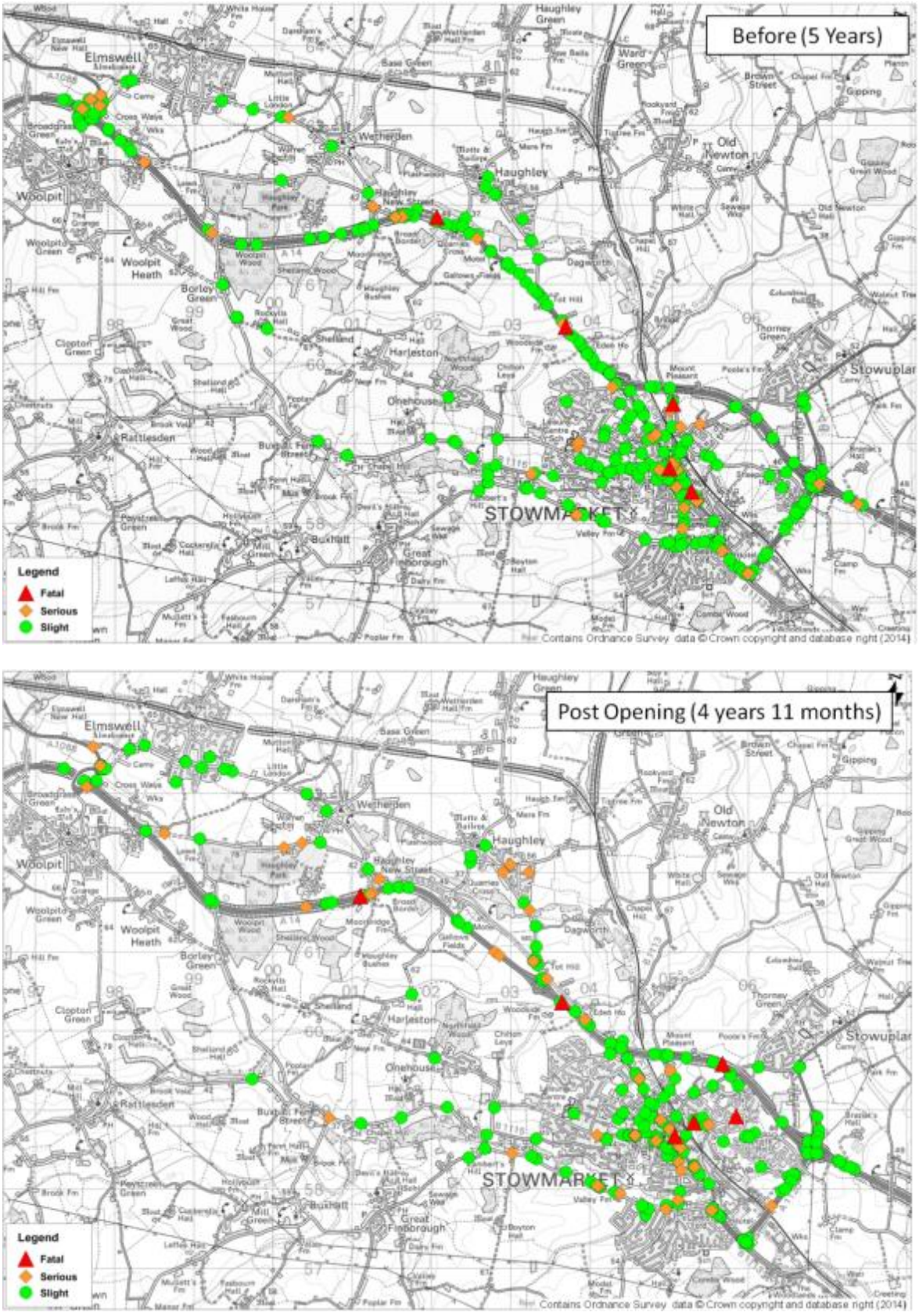
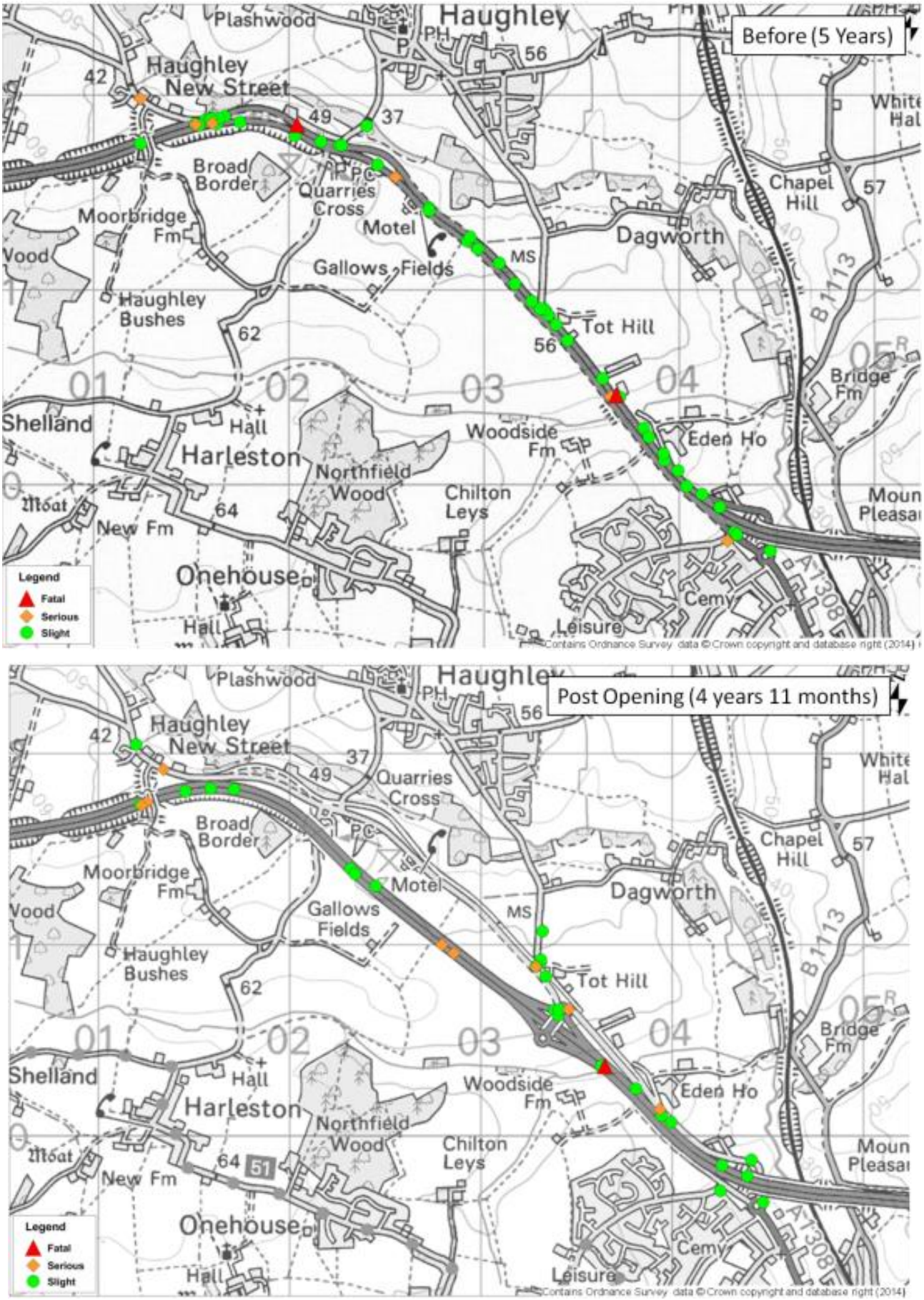


Figure 3-7 – Key Links Collision Locations– Pre scheme (top) and Post scheme (bottom)



3.36 It can be seen that pre scheme, collisions are spread along the scheme section, with a particular cluster seen at the Haughley New Street junction. Post opening, very few collisions occur on the former A14 route, as most traffic has transferred to the new route. It is noted however that there are a number of severe collisions occurring post opening on the new route. A small cluster (of 3 slights and 1 severe) is observed at the roundabout/off slip to the grade separated junction. Comprehensive information was not available for all these collisions but a causation factor for two of the collisions was noted to be 'failed to look properly' and 'junction overshoot'. As expected, no collisions are seen post opening at the former Quarries Cross junction.

Road Safety Audit Stage 4 (RSA4)

3.37 The A14 Haughley New Street RSA4 36 month montitoring report was published in March 2013. This report built on the findings of the RSA4 (12 month) report which indentified two issues; a drainage issue on this section of the A14 and an issue with overtaking on the former A14 which is now a two way single carriageway.

3.38 Work was undertaken in 2012 to provide additional drainage in the central reserve to the western end of the scheme, and additional 2 way traffic signs and arrow markings have been provided on the former A14 .

3.39 The RSA covers the period from December 2008 to November 2011. A slight reduction in collisions was noted on the A14, but a slight increase on the detrunked route.

3.40 The RSA4 indicates that between 2008-2011 38% (8 collisions) of collisions on the A14 along the scheme section were attributed to wet conditions. The drainage work undertaken in 2012 was expected to resolve 3 of these 8. The information available to POPE at this stage shows a reduction in the number of collisions recording weather as an issue, however pre scheme snow as also recorded as a causation factor in some collisions. Therefore with less than 1 year of data available post drainage scheme, no firm conclusion can be drawn as to the success of the scheme.

3.41 The only concern that the RSA4 raised was regarding the number of 'dark' collisions, mainly where weather conditions have been poor, although no remedial measures were recommended. The RSA4 recommended that monitoring of the whole scheme should continue for a further 3 years to ensure that the drainage remedial measures are adequate.

Consultation responses

3.42 Comments received from Haughley Parish Council noted '*that a poorly designed slip road and the blind spot at the point where slip road ends on the direct approach to the roundabout'* and suggested that '*80% of the accidents at this roundabout are non injury'.*

3.43 Comments received from Suffolk County Council noted that '*drivers using the eastbound offslip at the Tot Hill roundabout do not appreciate the presence of the roundabout'* and *'we have attended site to replace chevrons where drivers have not slowed in time to give way at the roundabout and have driven over the central island'.*

3.44 A small cluster of four collisions is observed at this junction from the data currently available, but as non injury collisions are not routinely recorded, the additional damage only collisions cannot be verified with data available to POPE. It is understood that the slip road conforms to design standards, but that the HA are considering a scheme at this location which may be implemented in 2015-16.

Statistical Significance of Outturn Collision Impacts

3.45 In order to determine whether the changes in collision numbers observed before and after the scheme opened are statistically significant, Chi-Square tests have been undertaken. This test used the before (counterfactual) and after numbers of collisions and traffic flows for both the wider COBA area, as well as the key links to establish whether the changes are significant or likely to have occurred by chance.

3.46 The result found that we can be 95% confident that the changes over the key links are not statistically significant, therefore the changes in the number of collisions (as well as the change in traffic flows) over the key links cannot be directly linked to the scheme.

3.47 For the number of collisions in the COBA area, the same test shows that the changes are statistically significant and could be linked to the scheme. However, it is noted that the COBA area includes a large number of roads in Stowmarket urban area which are unlikely to have been directly affected by the scheme/have experienced increases in collisions which is external to the scheme.

Forecast vs. Outturn Collision Numbers

3.48 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 (shown previously in Figure 3-2). For the outturn collisions the annual average before and after the scheme opened are used for the same area as used in the COBA appraisal.

Table 3–7– Comparison of Forecast and Outturn Collisions across the COBA Area

		Annual average Collisions
Forecast Opening Year (Most Likely Growth)	Do Minimum (without scheme)	44.3
	Do Something (with scheme)	39.7
	Saving	4.6
	% Change	**10.4%**
Outturn Annual Average	Before Opening	56.2
	Without scheme (counterfactual for same period)	54.3
	After Opening	41.0
	Saving	-13.3
	% Change	**-32%**

3.49 Table 3–7 shows:

- The COBA model for the scheme predicted a saving of 4.6 collisions in the opening year. The vast majority of this saving (63%) was forecast to occur at junctions, due to the removal of at-grade junctions which permitted across the dual carriageway.
- Post opening, the number of collisions has increased, with an additional 13.3 collisions occurring over the network, an increase of 32%, these are generally spread over the network.

Table 3–8– Comparison of Forecast and Outturn Collisions for the Key Links

Annual Collisions		Annual average Collisions
Forecast Opening Year (Most Likely Growth)	Do Minimum (without scheme)	11.6
	Do Something (with scheme)	8.5
	Saving	3.1
	% Change	**26.7%**
Outturn Annual Average	Before Opening	9.2
	Without scheme (counterfactual for same period)	6.9
	After Opening	6.5
	Saving	-0.4
	% Change	**-6.5%**

3.50 This table shows that the majority (67%) of the forecast savings over the full COBA area were forecast to occur over the scheme key links. A 27% decrease was forecast to occur, equating to a reduction of 3.1 collisions per year. The observed data shows that a small increase (0.4 collisions per year) equating to 6.5% of the 'without scheme' counterfactual number. Whilst this increase is very small, clearly the expected savings have not materialised based on the data available, especially as observed traffic levels are below forecast.

Collision Rates

3.51 The number of collisions along a length of road used together with the AADT for the same section can be used to calculate an collision rate, known as PIC/mvkm. This allows comparisons to be made which take into account traffic growth.

3.52 In this section, combined observed collision rates during the pre and post scheme periods for the key links improved by the scheme (the new dual carriageway, junctions and remaining bypassed sections of the old A14) are compared with the forecasts (from COBA) for the same links and junctions.

3.53 Table 3–9 shows the collision rate calculated for the A14 key links forecast vs. observed pre and post opening.

Table 3–9 – Forecast vs. Observed Collision Rates (PIC/mvkm) for Key Links of Scheme

Forecast (2008 Opening Year)	Do-Minimum (without scheme)	**0.139**
	Do-Something (with scheme)	0.093
	Forecast Saving	**0.046 (33%)**
Observed (Pre-scheme vs. Post-opening collision rates)	Before Opening Observed	0.173
	Without scheme (Counterfactual for same period as After opening data)[11]	0.121
	After Opening Observed	0.127
	Observed Saving	**-0.006 (-5%)**

3.54 It can be seen that the forecast improvement in collision rates across the scheme key links is not reflected in the observed situation, where a 5% change (0.006) is noted.

Security

3.55 The aim of this sub-objective is to consider both the changes in security and the likely number of users affected by the changes. For highway schemes, security includes the perception of risk from damage to or theft from vehicles, personal injury or theft of property from individuals or from vehicles. Security issues may arise from the following:

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

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

Forecast

3.57 The scheme AST stated that '*the scheme would not affect the security of vehicular travellers. There were no passenger areas to consider. Lay-bys would be provided with emergency telephone facilities. Lighting would be provided at the new grade-separated junction'.*

3.58 The overall assessment of Security in the AST was ***Moderate Beneficial.***

Evaluation

3.59 The new route is remote from the original alignment. Lay-bys are provided on both carriageways, with adequate signing to local service stations located on the former A14. However these lay-bys are not lit and do not have any emergency telephone provision, but are clearly visible from the road, providing informal surveillance. Observations during the site visit in June 2014 demonstrated that the lay-bys are well used by lorries, cars and motorcycles

[11] Background factor in collision rate for rural a roads 2004-2011 was 0.70.

(Figure 3-8). Lighting has been included at the Tot Hill junction and a short section of the detrunked former A14 route close to Tot Hill junction is also lit.

3.60 Taking all of the above into account, the scheme is considered to have an overall ***slight beneficial*** impact, slightly worse than expected.

Figure 3-8 – Lay-by on new A14

Key Points - Safety

Collisions

- Analysis of observed collision data for the scheme key links which were directly affected by the scheme shows an increase (when compared to the counterfactual) of 0.4 (6.5%) collisions per year post opening, indicating that the scheme has not had an impact on safety.
- Analysis of observed data for the scheme COBA area shows an increase in collisions of 32% (an additional 13.3 collisions per year) post opening over the full area.
- The changes in collisions seen for the scheme key links are not considered statistically significant, therefore it is considered that the scheme has not had a direct impact on safety post opening.
- When traffic flow changes are taken into account, the collision rate for the scheme key links has increased by 8% from 0.12 PIC/mvkm to 0.13 PIC/mvkm post opening.

Forecast vs. Outturn Collision Savings

- The scheme was forecast to have a saving of 4.6 (10.4%) collisions in the opening year over the whole COBA area, however post opening when background decline is taken into account, an observed 32% increase (additional 13.3 collisions per year) is seen.
- Over the scheme key links area a reduction of 3.1 (26.7) collisions per year was forecast, showing that the scheme was expected to have most impact on this area. Post opening, over the same area, a small increase of 0.4 (6.5%) collisions is observed.

Security

- Although laybys have been implemented, they do not have emergency phone facilities as detailed in the AST, therefore the overall impacts is scored as slight beneficial, slightly worse than expected.

4. Economy

Introduction

4.1 The purpose of this chapter is to evaluate how the scheme is performing against the economy objective, which consisted of the following sub-objectives at the time of the appraisal:

- Achieve good value for money in relation to impacts on **public accounts**.
- Improve **Transport Economic Efficiency** (TEE) for business users, transport providers and consumer users.
- Improve **journey reliability** (already considered in Chapter 2).
- Provide beneficial **wider economic impacts**.

4.2 This section provides a comparison between the outturn costs and benefits and the forecast economic impacts. Consideration is also given to the scheme's wider economic impact. Evaluation of outturn journey time and safety economic impacts are based on the observed results at FYA reported in previous chapters of this report, and reforecast to a 60 year period.

4.3 COBA (COst Benefit Analysis) was used to forecast all the economic benefits of the scheme. The benefits were appraised over a 60 year period in line with current guidance. The study area for the scheme assessment consisted of the A14 between the A1088 junction at Elmswell to the A1038 north of Stowmarket as well as local roads through Haughley, and Elmswell. The road network in Stowmarket was also included. The full COBA appraisal area is shown previously in Figure 3-2.

Sources

4.4 The economic forecasts of the scheme benefits have been taken from the scheme AST and COBA model which are dated November 2006, which post dates the Economic Appraisal Report dated October 2006.

4.5 Forecast costs and indirect tax revenues have been taken direct from the COBA model provided which has an updated forecast cost included.

4.6 The outturn spend profile for this scheme has been obtained from the Highways Agency Regional Finance Manager in March 2014. All costs presented in this report are in 2002 prices.

Transport Economic Efficiency Benefits

4.7 Transport Economic Efficiency (TEE) is the assessment of the monetary benefits to road users resulting from the scheme over the appraisal period and consists of:

- Journey time benefits
- Vehicle Operating Costs

4.8 In the AST the TEE forecast was presented as the combined impact of both, so here the detailed breakdown from the COBA has been used to separate out the two elements.

Journey Time Benefits

Forecast Journey Time Benefits

4.9 The forecast journey time impact for this scheme monetary benefit of £105.2m total for consumers and businesses.

Evaluation of Journey Time Benefits

4.10 The change in annual vehicle hours over a wide network (including the A14 key links) was used to derive economic benefits, as these links are the key elements of economic benefits for the whole scheme.

4.11 In order to make a direct comparison against the forecast, this evaluation focuses on the routes where changes for users can be most clearly identified as being linked to the scheme. In this case it is vehicles using the A14 improved section, and local traffic using the former A14 section.

4.12 For these users, vehicle hour savings have been calculated based on changes in observed journey times. Savings were considered for the weekday peak periods, inter peak, overnight, and weekends. Additional traffic on the A14 corridor, which is the traffic attracted by the improved A14, has been attributed with half the benefits using the economic principle of rule-of-half in line with WebTAG guidance.

4.13 Detail from the COBA model output has been used to create a proxy forecast of the annual vehicle hour saving on the A14 key links, five years after opening. The observed vehicle hour savings have been calculated from the traffic counts and journey time surveys discussed in Chapter 2 of this report.

4.14 The forecast and observed vehicle hour savings calculated are shown in Table 4–1.

Table 4–1 – Forecast and Observed Vehicle Hour Savings

Forecast vehicle hour saving (key links)	Vehicle Hour savings for 2013/4	Difference
316,000	**278,000**	**-38,000 (-12%)**

4.15 Table 4–1 shows an observed saving in vehicle hours for the A14 Haughley New Street Improvement scheme of 278,000 hours per year compared to the reforecast for the same key links of 316,000 hours per year, 12% lower than forecast. This is mainly due to observed traffic flows being substantially less than forecast.

Monetised Journey Time Benefits

4.16 The evaluation focuses on key links on the A14 and local roads. The methodology below was applied to obtain POPE reforecasts for the 60 year journey time benefits:

- The total predicted vehicle hours saved in the opening year of the key links was calculated using forecast flows and journey times in the COBA.
- The predicted monetary vehicle hour benefit was taken from the AST for the whole appraisal area.
- The actual vehicle hour saving was calculated using observed before and after flows, and journey time data.
- The ratio between predicted vehicle savings and actual savings for the key kinks was applied to the total monetised benefit for the COBA area as presented in the AST. This is based on the assumption that the savings for the key links are representative of all links.

Table 4–2 – Forecast and reforecast Outturn Monetary benefits of journey time saving

Vehicle Hours on key links saved for 2013/4		Predicted Benefit over 60 years over COBA area
Forecast	**316,000**	**£105.3m**
Outturn (FYA)	**278,000**	**£92.6m**

4.17 The forecast time saving benefits for the scheme were £105.3m (2002 prices and values). Using the ratio between the reforecast model of the hours saved on the A14 key links in the current year and the observed hours saving, then comparing to the economic benefit over the whole 60 year appraisal period, gives an outturn benefit of £92.6m. This is likely to be a conservative estimate as it does not take the impact of Stowmarket traffic into account.

Evaluation of Safety Benefits

Forecast Safety Benefits

4.18 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 302 collisions was forecast, with a corresponding 60 year monetary benefit of £12.5m (2002 prices, discounted to 2002). It was also noted in the AST that an important part of the safety benefits was the reduction in KSI casualties. The monetised safety benefit represents around 13% of the total scheme benefits. These figures were based on a most likely traffic growth scenario at the time of appraisal.

Evaluation of Safety Benefits

4.19 Chapter 4 of this report demonstrated that the small increase in collisions in the post opening period was not statistically significant. Therefore as it is not possible to be confident that the change in collision numbers is directly linked to the scheme, the overall conclusion is that the scheme has had no safety benefits, with a corresponding monetary value of £0.

Indirect tax – present value cost

4.20 Indirect tax revenue is the expected change in indirect tax 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 forecast of the changes in fuel consumption over the 60 years 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

4.21 Note that at the time this scheme was originally appraised, costs were initially taken for the wider costs to public accounts and thus the impact of the scheme on indirect tax was considered within these wider costs. The current guidance[12] (AMCB, Analysis of Monetised Costs and Benefits) considers the costs in terms of the 'broad transport budget' i.e. costs and revenues which directly affect the public budget available for transport and therefore the indirect tax impact is covered within the benefits.

4.22 Forecasting of the impact of the scheme on indirect tax was done within the COBA modelling software, and was based on the whole appraisal area. This showed that the scheme was expected to increase tax revenue over the 60 year appraisal period. To assess the outturn impact, changes in fuel consumption based on observed traffic data on the A14 corridor has been calculated and compared to the forecast for the same smaller area. The ratio method has then been used between the forecast and outturn monetised impact to extrapolate the impact over the wide area and the full appraisal period.

Table 4–3 – Indirect Tax as present value

Costs in 2002 market prices, discounted	Forecast	Outturn
Impact on Indirect Tax raised	**£17.8m**	**£12.5m**

4.23 This evaluation shows that the scheme will result in an increase in indirect tax revenue, at a level lower than expected. The reduced tax revenue is due to a lower than expected increase in traffic, and slightly lower average speeds on both the new A14 and former A14 route.

[12] TAG UNIT A1.1 Cost-Benefit Analysis, October 2013

Vehicle Operating Costs (VOC)

4.1 Vehicle Operating Costs are the costs for road users. For most highway schemes including this one, the VOC and indirect tax impacts are both very closely linked to changes in fuel consumption (eg changes in speed) which has similar magnitude of impacts, but from opposite sides of the benefits balance. That is, if there is increase fuel consumption, VOC will increase due to users paying more for fuel (ie a disbenefit) and thus more indirect tax will be collected by the Treasury which is considered to be a benefit according to current guidance. For this scheme, the ratio used for the reforecast indirect tax calculation has been applied to the monetary value for VOC.

Table 4–4 – Vehicle Operating costs as present value

Costs in 2002 market prices, discounted	**Forecast)**	**Outturn**
Impact on Vehicle Operating Costs	**-£26.0m**	**-£18.2m**

4.2 This evaluation shows that the scheme will result in an increase in vehicle operating costs, however at a level lower than expected. The reduced costs are due to a lower than expected increase in traffic and speed on the new and former A14 routes.

Scheme Costs

4.3 This section compares the forecast costs of the scheme as of the start of the construction period with the actual spend at the time of this study.

4.4 Costs of the scheme are also considered for the full appraisal period of 60 years so they can be compared with the benefits over the same period. The full costs examined are made up of the following:

- Investment costs: before and during construction
- Operating costs; over the 60 years after opening

4.5 Investment costs are considered in terms of a common price base of 2002 for comparison with forecast. For comparison with the benefits overall, costs are expressed in terms of present value.

4.6 Operating costs were forecast to be less than £1million and have been omitted from this evaluation.

Investment Costs

4.7 The investment cost is the cost to the HA of the following:

- costs of construction
- land and property costs
- preparation and supervision costs
- allowance for risk and optimism bias

4.8 The EAR, dated October 2006, provides a forecast of the investment costs which was £22.576m in 2005 Q3 prices, however in order to use comparable prices, and the most up to date available information, the forecast has been taken from the figures inputted into COBA (November 2006), which is in 2002 prices, undiscounted.

4.9 The outturn spend profile for this scheme has been obtained for the purpose of this study and covers the period 2000 – 2014. For the purpose of comparison between forecast and actual, and with other major schemes, prices have been converted to 2002 prices. This figure can then be compared with the forecast cost on a comparable basis.

4.10 Comparison between the forecast and outturn is presented in Table 4–5.

Table 4–5 – Scheme Investment Costs (£m, 2002 prices, undiscounted)

Forecast Cost (COBA model input)	Outturn Cost (as of March 2014)	% difference
£25.0m	£30.3m	21%

4.11 Outturn investments costs are shown to be 21% above those forecast pre construction.

Present Value Costs (PVC)

4.12 Cost benefit analysis of a major scheme requires all 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 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 using a rate of 3.5% for the first 30 years and 3% thereafter.

Table 4–6 – Investment Costs as Present Value (£m)

Present Value £m (costs in 2002 market prices, discounted)	Forecast	Outturn
Investment Costs	£25.0m	£30.6m

Benefit Cost Ratio

4.14 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.

4.15 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 relative to the costs. It is to be noted that the BCR is insensitive to the magnitude of net benefits and therefore may favour projects with small costs and benefits over those with higher net benefits.

4.16 As noted above, when this scheme was appraised, the impact of the scheme on indirect tax revenvue was included as part of the PVC of the scheme to public accounts; as it was forecast to increase revenue, this resulted in a much lower PVC. However, in currrent guidance, the PVC is the costs to the transport budget and the impact of a scheme on indirect tax revenue is considered within the benefits.

4.17 Table 4.7 compares the predicted and outturn costs and benefits and BCR results presented with indirect tax impact as part of the costs and alternatively as a benefit.

Table 4–7 – 60 Year BCR Evaluation

All costs in 2002 market prices, discounted		Forecast (AST/COBA)	Outturn Reforecast
Costs	**PVC – investment cost**	£25.0m	£30.6m
Benefits	Journey time benefits	£105.3m	£92.6m
	Vehicle Operating Costs	-£26.0m	-£18.2m
	TEE subtotal	£79.2m	£74.4m
	Safety Benefits	£12.5m	£0
	PVB subtotal	**£91.7m**	**£74.4m**
Indirect Tax revenue		£17.8m	£12.5m
BCR (with indirect tax in PVC)		**12.7**	**4.1**
BCR (with indirect tax in PVB)		**4.4**	**2.8**

4.18 It can be seen that the outturn BCR is lower than forecast due to the lower than expected journey time benefits and safety benefits. A BCR of 2.8 represents high value for money.

4.19 It should be noted that the BCR ignores non-monetised impacts. In the former NATA assessment 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 is covered in the following sections.

Wider Economic Impacts

4.20 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 A14 route between Haughley New Street and Stowmarket may have assisted local and regional socio-economic aspirations.

Forecast

4.21 The AST for this scheme forecast that the scheme would have a ***neutral*** impact, with a comment stating that the '*scheme does not affect or pass through any regeneration areas'*.

Evaluation

4.22 As a strategically important route in the East of England the A14 provides a link to important freight interchanges such as Felixstowe. One of the main objectives of this scheme was to reduce journey times and improve reliability. As detailed in the previous chapter, journey times have improved for strategic traffic. Although overall the number of HGVs on the route has reduced slightly, this will have benefits for freight and business users due to reduced time spent on the road.

4.23 The scheme can therefore be linked to improving the wider transport network, which will have opened up development opportunities east of the scheme, including Stowmarket by reducing the time taken to reach other key urban areas.

4.24 At this stage there is no evidence to suggest that the scheme has increased enablement of employment or housebuilding, although the new development in Cedars Park (to the north of Stowmarket) is being built at a faster rate than anticipated in the original modelling but is not directly linked to the A14 improvement scheme.

4.25 The overall assessment of the impact of the scheme on the wider economy is considered ***neutral*** at this stage, as expected.

Key Points - Economy

Present Value Benefits

- The outturn journey time benefits of £92.6m are approximately 12% below that forecast. Most of this difference is due to traffic volumes being lower than expected, but is likely to be a conservative estimate, as it does not take the impact of Stowmarket traffic fully into account.
- Outturn safety benefits were calculated to be £0m compared to a forecast of £12.5m. This is due to there being no notable observed safety benefits that could be attributed to the scheme.
- The disbenefit from vehicle operating costs is less than forecast due to the observed traffic flows being lower than forecast.
- Overall the outturn PVB is 19% lower than forecast, primarily due to there being no monetary safety benefits.

Costs

- Outturn investment costs were 21% higher than forecast at £30.28m.
- The outturn impact on indirect tax revenue of £12.5m is lower than forecast due to overall traffic levels being lower than forecast, and slightly lower average speeds on both the new and former A14.

Benefit Cost Ratio

- Taking the indirect tax impact as a benefit, the scheme achieves a BCR of 2.8 which shows that the scheme has delivered high value for money.

Wider Economic Impacts

- Due to the inherent difficulty in isolating the wider economic impacts of the scheme, it has not been possible to conclude whether the scheme has had a direct on stimulating local economic activity.

5. Environment

Scheme Objective: to integrate the new section of road within the local landscape, mitigate specific landscape impacts and provide screening where visual impact assessment identified a need for mitigation.

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 Findings

The OYA evaluation identified a number of areas where further analysis was required 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:

Landscape – Wildflower establishment should be further evaluated during the FYA evaluation by timing the site visit to coincide with flowering, and the effectiveness and ongoing establishment of the planting should also be considered. It was expected that the Landscape and Ecology Management Plan (LEMP) would be available to POPE for the FYA evaluation, and it was suggested that night time lighting could also be considered at this time.

Townscape – The screening of views from the southern edge of Haughley by the additional planting that was undertaken along the new bund between the local road (old A14) and the restricted highway should be reviewed as part of the FYA evaluation.

Biodiversity – Evaluation at FYA should consider the establishment of habitat areas, and the status of the broken mammal ledge on the north side of Tot Hill culvert and the mammal tunnel exit into the Contractor's compound. Consultation to include the local badger group.

Water Quality and Drainage – Water should be reconsidered at the FYA evaluation by which time issues relating to flooding, the development of the reed bed proposed in the Environmental Statement (ES) for Pond 3, establishment of wet grassland mix and other remedial matters are likely to have been resolved.

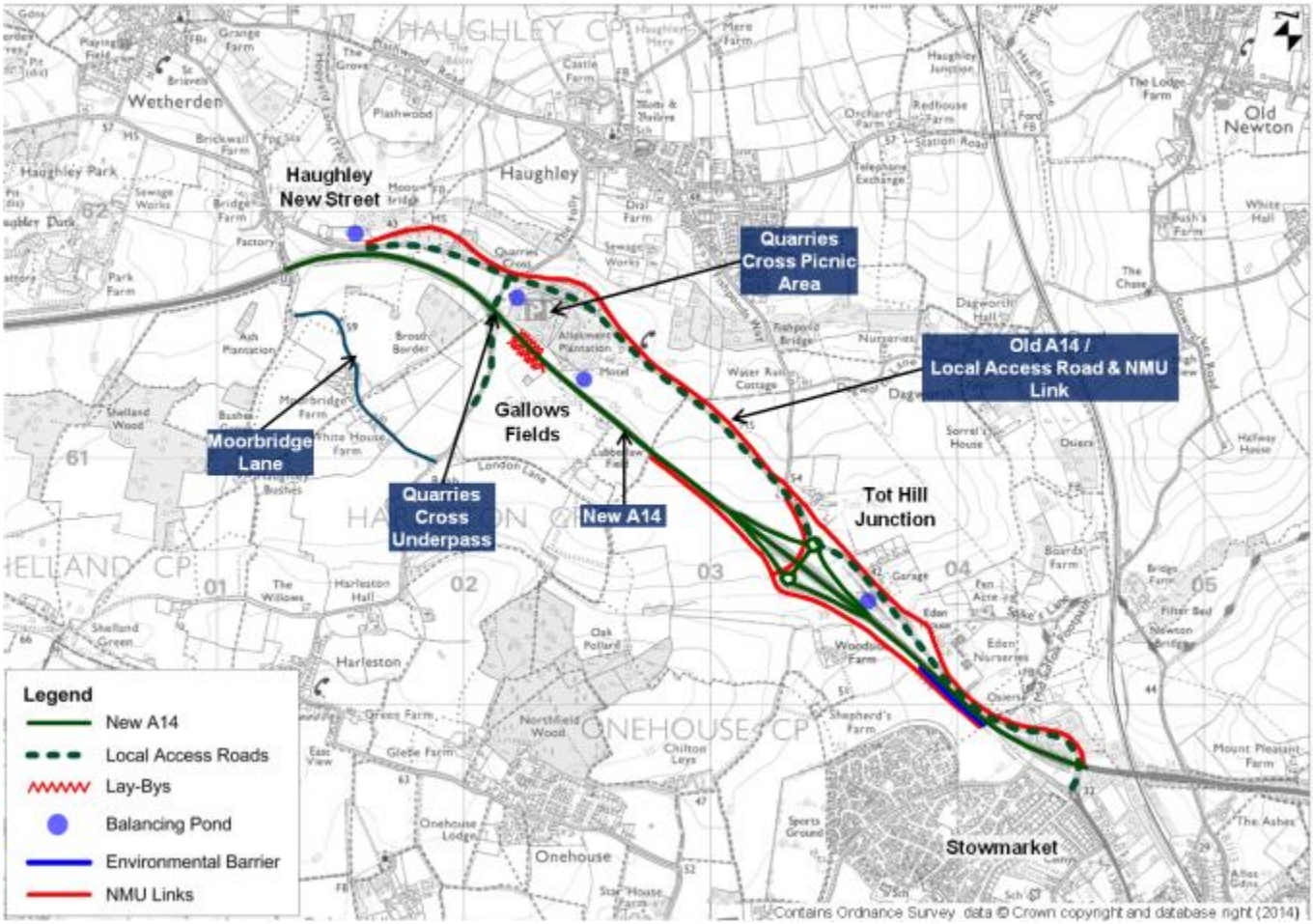
Physical Fitness – Non Motorised User (NMU) routes should be reconsidered at the FYA evaluation when local issues should have been resolved.

5.2 The scheme objectives stated in the Environmental Statement (ES) were:

- Improved safety and fewer accidents;
- Separation of long distance and local traffic;
- Improved journey times and reliability;
- Improved access for non-motorised users; and
- Achievement of the above objectives in an environmentally sustainable and sensitive way.

5.3 It is understood that no significant changes were made to the scheme since the ES.

Figure 5-1 – Key Location Plan – Scheme locations referenced in Environment Chapter



5.4 The following environmental sub-objectives were appraised in the ES and in the Appraisal Summary Table (AST) according to guidance current at that time (2006):

- Noise;
- Local Air Quality;
- Greenhouse Gases;
- Heritage;
- Landscape;
- Biodiversity;
- Water Environment;
- Physical fitness; and
- Journey Ambience.

5.5 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.

5.6 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 the assessment of sub-objectives where it was too early for conclusions to be drawn at the OYA evaluation stage; and
- Additional analysis relevant to close out issues/ areas for further study identified at the OYA stage for consideration at the FYA stage.

Methodology

5.7 This section focuses on those aspects not fully evaluated at OYA (or where at OYA, suggestions were made for further study), and also on any issues that have arisen since the OYA evaluation. Although the detail of the OYA evaluation is not repeated here, reference is made to the OYA evaluation where required and key points are incorporated into this FYA report to provide contextual understanding where appropriate.

5.8 No new modelling or survey work has been undertaken for this FYA environmental evaluation.

Data Collection

5.9 The following documents/ data have been used for the FYA evaluation:

- Early Contractor Involvement, Volume 2, Works Information, September 2004;
- Environmental Statement, Volumes I, II, and III, March 2006;
- Environmental Statement Non-technical Summary (NTS), March 2006;
- Appraisal Summary Table (AST), November 2006;
- Mainline Planting Plan '*As Built*' drawings (Version A), May 2007;
- Archaeological Evaluation and Watching Brief Report, September 2007;
- NMU Context Report Phase 2, December 2007;
- Non-Motorised User Audit Report, Detailed Design Stage, Issue C, December 2007;
- Construction Environmental Management Plan (CEMP) Revision D, January 2008;
- Health and Safety File, December 2008;
- Road Safety Audit Stage 4 36-Month Monitoring Report, March 2013;
- Handover Environmental Management Plan (HEMP), Version C (without appendices), Feb 2014; and
- Scheme Newsletters.

5.10 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

5.11 As part of the FYA evaluation, a site visit was undertaken in June 2014. This included the taking of photographs to provide comparison with material produced for the ES and at OYA (Appendix D).

Consultation

5.12 Statutory environmental organisations (Natural England, English Heritage and the Environment Agency), Suffolk County Council, Mid-Suffolk District Council, Parish Councils, the British Horse Society (BHS), Suffolk Wildlife Trust, and the Suffolk Mammal Group were contacted as part of the FYA evaluation regarding their views on the impacts they perceive the scheme has had on the environment as shown in Table 5–1, below.

Table 5–1– Summary of Environmental Consultation Responses

Organisation	Field of Interest	Comments at OYA	Comments at FYA
Natural England	Biodiversity & Landscape	Generally commented positively for landscape except for the '*unsightly*' site compound and the earth bund. No knowledge of biodiversity impacts or mitigation effectiveness.	Unable to provide detailed comments regarding the scheme.

Organisation	Field of Interest	Comments at OYA	Comments at FYA
English Heritage	Heritage	No comments received.	Did not respond to the invitation to provide feedback.
Environment Agency	Water	Raised issues of high water levels and requested copies of As Built drainage drawings	Positive comments received regarding pollution control measures and drainage. Unaware of any changes to water quality in local watercourses as a result of the scheme; no adverse impacts reported. Unaware of any monitoring to target the impacts of the scheme on the local aquifers. No flood risk or surface water drainage comments made.
Suffolk County Council	General	Some negative comments received for the heritage site methodology although commented positively for specific heritage features. Some negative comments received for landscape although considered new landscape planting was well maintained. Negative and positive comments received for physical fitness. Not aware of any issues for air quality or noise.	Response received from the Highways team regarding safety, lorries parking on verge of former A14 and issues for pedestrians and cyclists on Fishponds Way. No response on other areas.
Mid Suffolk District Council	General	Positive comments received for landscape, air quality, and noise. Not aware of any water contamination issues.	Did not respond to the invitation to provide feedback.
Parish Councils	General	Negative comments were received from Harleston Parish Council for landscape, water and noise. No comments were received from Wetherden Parish Council, Old Newton with Dagworth & Gipping Parish Council, Haughley Parish Council.	Haughley Parish Council provided a comprehensive response, the full text of which has been provided to the HA. Correspondence, from a parishioner living adjacent to the A14 in Haughley New Street, expressing concerns regarding noise levels and an increase in HGV traffic in Haughley New Street was also provided. Wetherden Parish Council, Old Newton with Dagworth & Gipping Parish Council, and Harleston Parish Council did not respond to the invitation to provide feedback

Organisation	Field of Interest	Comments at OYA	Comments at FYA
British Horse Society	Equestrian issues	Negative comments received for equestrian issues	Did not respond to the invitation to provide feedback.
Suffolk Wildlife Trust	Biodiversity	Queried whether post construction protected species monitoring has been carried out.	Did not respond to the invitation to provide feedback.
Suffolk Mammal Group	Badgers	Not consulted at OYA	Although unaware of the artificial sett (confirmed as being installed as part of the scheme by the Designer at OYA), enquiries regarding sett location and use were in progress.

5.13 The Area 6 Asset Support Contractor (ASC), formerly the Area 6 Managing Agent Contractor (MAC), was also consulted with regard to animal mortality figures, but no response was received.

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 outlined the need for the scheme and included data on the Annual Average Daily Totals (AADT) for traffic flows. In Table 5–2, the predicted 2014 AADT flows have been estimated using a straight line interpolation from the 2003 and 2023 do-something ES predictions; Table 5–3, shows the number of HGV per average day on the A14 and Table 5–4, traffic speeds on the A14.

5.16 The location of traffic data collection points is shown in Figure 2-4 of the Traffic Data Evaluation Chapter of this report, where an explanation of the differences between OYA and FYA flows is also provided.

5.17 At OYA it was noted that the ES Volume 2 Appendix 4A Consolidated Traffic Data, HGV percentages calculated for the Do Nothing scenario had apparently also been applied to both the new and old A14 in the Do Something scenario, with no consideration made for the reduced HGV proportions on the local road. The predicted percentage of HGVs for the old A14 for 2008 were therefore not taken into account in the OYA evaluation and have not been considered in the FYA evaluation.

Table 5–2– Predicted vs. Observed Do-Something AADT Traffic Flows at OYA and at FYA (2014)

Location	Predicted AADT 2008	Observed AADT 2009/ 2010	% Diff. Forecast vs. Actual	Predicted AADT 2014	Observed AADT 2014	% Diff. Forecast vs. Actual
	OYA			FYA		
A14 eastbound (Haughley New Street to Tot Hill GSJ)	18,250	17,050	-7%	20,250	18,250	-10%
A14 westbound (Haughley New Street to Tot Hill GSJ)	18,200	17,400	-4%	20,200	18,600	-8%
Old A14 Haughley New Street to Quarries Cross Junction – eastbound	2,750	1,200	-55%	3,000	2,050	-32%
Old A14 Haughley New Street to Quarries Cross Junction – westbound	2,100	1,350	-37%	2,300	1,700	-28%
Old A14 Quarries Cross Junction to Fishponds Way – eastbound	3,100	2,200	-30%	3,450	1,900	-45%
Old A14 Quarries Cross Junction to Fishponds Way – westbound	2,350	2,250	-3%	2,600	1,800	-31%
Junction with Household Waste Recycling Centre (HWRC) to mini roundabout and junction with Bury Road – eastbound	6,700	6,150	-8%	7,400	6,050	-18%
Junction with HWRC to mini roundabout and junction with Bury Road – westbound	5,950	5,800	-2%	6,600	5,800	-12%

Table 5–3– Predicted vs. Observed Do-Something HGV numbers per average day at OYA and at FYA (2014) for A14

Location	Predicted HGVs 2008 (%AADT)	Observed HGVs 2009/ 2010 (%AADT)	Diff. Forecast vs. Actual	% Diff. Forecast vs. Actual	Predicted HGVs 2014 (%AADT)	Observed HGVs 2014 (%AADT)	Diff. Forecast vs. Actual	% Diff. Forecast vs. Actual
	OYA				FYA			
A14 eastbound	3,750 (21%)	3,750 (22%)	-0	0%	4,150 (20.5%)	3,350 (18.3%)	-800	-20%
A14 westbound	4,250 (23%)	3,650 (21%)	-600	-14%	4,700 (23.3%)	3,400 (18.3%)	-1,300	-28%

Table 5–4 – Predicted vs. Observed speeds on the A14 at FYA (2014)

Time Period	Predicted COBA speed Kph 2008	Observed speed Kph 2012 / 2013	Difference Kph Forecast vs. Actual
Peak	101	99	-2
Inter-peak	102	100	-2

Five Years After Environmental Evaluation

5.18 Included in this section is 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

AST

5.19 The AST stated that nine properties close to the existing A14 would benefit from a decrease in noise levels in excess of 5dB in the opening year. By 2023, it was stated that there would be a noise level increase of 1 < 3dB that would affect 54 properties in the Do Something scenario, as opposed to the 230 properties that would be affected by the Do Minimum scenario. Overall, the AST assessed that 2.74 less people would be annoyed by noise as a result of the scheme by 2023.

Environmental Statement

5.20 The ES compared the Do Minimum and Do Something scenarios for 2023 and demonstrated that with the proposed scheme in place, there would generally be a marked benefit for existing residential and commercial properties north of the existing trunk road, and no material difference in noise levels for receptors to the south of the existing and proposed roads.

5.21 Overall, the ES concluded that there would be a resultant benefit in relation to traffic related noise for sensitive receptors, but that there would be an increase in noise levels at Haughley Picnic Site. The ES further concluded that there would be fewer people newly subject to noise nuisance with the proposed scheme in place, and that that the impact of the proposed scheme would be both Moderate and Positive in terms of traffic related noise.

OYA Conclusions

5.22 The OYA noise evaluation noted that traffic had significantly reduced on the old A14 and on some sections, was less than expected; this was stated as likely to have improved the local noise climate for nearby properties. Although traffic flows were reported to be in line with expectations on the new A14, it was noted that one comment (from a resident of Harleston) had been received from Harleston Parish Council relating to noise being worse than before

the scheme. Confirmation was provided at OYA that no properties were deemed eligible for noise insulation.

5.23 Overall, the OYA evaluation concluded that the noise climate was generally as expected at the OYA stage.

FYA Consultation

5.24 Haughley Parish Council responded that requests for an environmental noise barrier be installed as part of the scheme to limit the effects of the increased speed limit along the A14 were rejected - noise levels have increased as expected.

5.25 Haughley Parish Council also forwarded correspondence from a parishioner living adjacent to the old A14 in Haughley New Street, expressing concern regarding noise levels.

FYA Evaluation

5.26 The OYA evaluation confirmed that a thin surfacing course system had been used to surface the new dual carriageway throughout the scheme, although it did not confirm the Road Surface Index (RSI) value of the installed surface; no high speed RSI values were made available for the FYA study and as such, any noise reduction properties of the installed surfacing remain unconfirmed.

5.27 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, average speed varies by at least 10kph, or percentage HGVs are different by at least 20%.

5.28 Based on Table 5–2, Table 5–3 and Table 5–4, traffic flows on the new A14 for 2014, average speeds and percentage HGVs eastbound are in line with expectations. Although percentage HGVs are lower than expected (28%) westbound, it is considered that overall, the noise climate along the new A14 is likely to be as expected.

5.29 Despite concerns received at consultation regarding noise levels adjacent to the old A14 in Haughley New Street, Table 5–2 indicates that observed traffic flows for 2014 were lower than expected in both directions (28% - 45**%**) between Haughley New Street to Quarries Cross Junction, and between Quarries Cross Junction to Fishponds Way; it is considered that the noise climate along these sections of the old A14 are likely to be marginally better than predicted.

5.30 For the remaining sections of the old A14, traffic flows for 2014 are similar to expected (12% - 18%); therefore, it is considered that the noise climate along these sections is likely to be as expected.

Table 5–5– Evaluation Summary: Noise

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Noise	Nine properties close to the existing A14 would benefit from a decrease in noise levels in excess of 5dB in the opening year. For properties in the existing 60 to <70dB LA10,18hr noise band, there would be a noise level increase of 1 to <3 dB affecting 54 properties in the Do Something scenario in 2023 compared with 230 properties in the Do Minimum scenario in 2023. **Do Something (2008): 4.8 fewer people annoyed.** **Do Something (2023): 2.7 fewer people annoyed.**	Traffic has significantly reduced on the old A14 and this will have benefited the local noise climate for nearby properties, on some sections traffic is less than expected. On the new A14 traffic flows are in line with expectations. There has been one comment received relating to noise being worse than before the scheme. Part 1 Claims will be considered at the FYA evaluation. **Generally as expected.**	New A14 Traffic flows, average speeds and percentage HGVs eastbound are in line with expectations on the new A14, although percentage HGVs are lower than expected westbound. Overall, it is considered that the noise climate along the new A14 is likely to be as expected. Old A14 Traffic flows are lower than expected in both directions between Haughley New Street to Quarries Cross Junction, and between Quarries Cross Junction to Fishponds Way; therefore, it is considered that the noise climate along these sections of the old A14 is likely to be marginally better than expected.	**As expected for the new A14 and the old A14 between the HWRC and Bury Road.** **Better than expected along the old A14 between Haughley New Street and Fishponds Way.**

Local Air Quality

AST

5.31 The AST stated that current (2006) air quality objectives for Nitrogen Dioxide (NO_2) and atmospheric particulate matter (PM_{10}) were not anticipated to be exceeded, and that no Air Quality Management Area (AQMA) would be affected by the scheme. Overall, the AST forecasted that air quality would be improved.

Environmental Statement

5.32 The ES gave detailed consideration to air quality impacts for the Do Something Scenario and predicted that the annual mean PM_{10} and NO_2 concentrations would decrease, and that predicted levels associated with both the retained local road and the new dual carriageway would both be below the Do Minimum scenario. Although the ES noted the potential for marginal increases in the predicted pollutant levels depending on wind direction, it concluded that the resultant PM_{10} and NO_2 levels arising from the scheme would remain well within the Air Quality Standards (AQS) target levels.

OYA Conclusions

5.33 The OYA evaluation stated that traffic had been significantly reduced on the old A14, and this would have improved local air quality for nearby properties. Less than expected traffic was reported south of Haughley New Street and on the new A14 westbound (HGV traffic) and as such, local air quality was also considered likely to be better than expected at these locations.

5.34 The OYA report considered that there had been the expected deterioration in air quality at the old eastbound off-slip to Stowmarket, as this had been upgraded to accept two-way traffic.

5.35 Overall, the OYA report concluded that Air Quality was likely to be generally as expected for the old A14, and slightly better than expected for the new A14.

FYA Consultation

5.36 Haughley Parish Council responded that given the rising volume of HGV's on the A14, the subjective view is that local air quality within Haughley New Street is likely to have decreased.

FYA Evaluation

5.37 An assumption is made by POPE methodology that local air quality will be as expected if observed traffic flows are within +/-1000 of those 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 lower than those forecast at all locations, both along the old A14 and the new A14. This indicates that pollutant concentrations are also likely to be lower than expected at properties near all of these road sections.

5.38 In addition, the observed number of HGVs on the new A14 is also lower than that predicted by over 2,000 HGVs per average day. This also indicates that pollutant concentrations would likely be lower than those estimated.

5.39 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 better than expected, due to observed flows and HGVs being lower than those forecast.

Table 5–6– Evaluation Summary: Local Air Quality

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Local Air Quality	There would be no anticipated exceedences of current air quality objectives for NO_2 & PM_{10}. No AQMA would be affected. The scheme would not lead to increases in NO_2 or PM_{10} concentrations in excess of 2µg/m^3 or 1 µg/m^3 respectively at 20m from the proposed road. Overall air quality would be improved. Quantitative measure; No of properties where NO_2 & PM_{10} improved: 19. No of properties where NO_2 & PM_{10} worse: 30. **NO_2 assessment score: minus 45.35.** **PM_{10} assessment score: minus 14.41.**	Traffic has significantly reduced on the old A14 and this will have benefited the local air quality for nearby properties. Traffic is less than expected south of Haughley New Street and local air quality is likely to be better than expected. As proposed, the old eastbound off-slip to Stowmarket has been upgraded to accept two-way traffic and it is likely there has been the expected deterioration in air quality at this location. On the new A14 HGV numbers westbound are lower than expected and local air quality is likely to be better than expected. **Generally as expected for old A14 and slightly better than expected on new A14.**	Comparison of both the predicted and observed AADT flows indicates that the observed flows are lower than those forecast at all locations, both along the old A14 and the new A14. This indicates that pollutant concentrations are also likely to be lower than expected at properties near all of these road sections. The observed number of HGVs on the new A14 is also lower than predicted by over 2,000 HGVs per average day. This also indicates that pollutant concentrations would likely be lower than those estimated.	**Better than expected.**

Greenhouse Gases

5.40 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_2) 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_2 levels are expressed in terms of equivalent tonnes of carbon released as a result of the scheme.

Forecast

5.41 The AST stated that '*the proposed scheme would result in an increase in traffic related CO_2 emissions in the opening year and design year. The increase would primarily arise as a result of the increased design speed of 70mph for the proposed scheme when compared with the existing speed restriction of 50mph for the existing section of the trunk road'.* The forecast in the AST was that there would be an overall increase of 1,431 tonnes of CO_2 (390 tonnes of Carbon). It is unclear what calculation method was used, as the ES for this scheme does not include any estimates of the change in CO_2 or carbon as a result of the scheme.

Evaluation

5.42 As a comparison with this forecast is not possible, the forecast traffic flows/speeds presented in COBA/the ES have been entered into the DMRB screening method to create a reforecast to then compare to the observed. Observed traffic flows and speeds for the same links have been entered into the DMRB screening spreadsheet to provide a comparable value. The main A14 and former A14 through Haughley New Street have been compared. A wider comparison is not possible as no observed speeds are available.

Table 5–7– Change in Greenhouse Gases

Tonnes of Carbon	Do Minimum/Pre Scheme	Do Something/Post Scheme	Difference
Re-Forecast	9,652	10,766	1,137 (14%)
Observed	8,295	9,432	1,114 (12%)

5.43 It can be seen that there has been a 12% increase in carbon emissions post opening, compared to a 14% equivalent reforecast increase. This is mainly due to increased speeds post opening both on the A14 and former A14 route in both cases, although overall there is less traffic in the observed scenario, resulting in overall lower values. Overall impact at FYA is as expected.

Landscape

AST

5.44 The AST stated that the principal impact on landscape character would relate to the introduction of a second road corridor close to the existing route, and the impact of a lit, grade separated junction at the crossing of the Tot Hill Ridge. The AST also stated that although that the scheme proposals would involve small areas of scrub loss (about 1ha), and sections of hedgerow (totalling approximately 1km), the landscape proposals would offset these losses and extend woodland as a component in the landscape.

5.45 The AST also noted the proposals for the local road would establish a character appropriate to local use, and would integrate the existing road corridor with the landscape of an unspecified valley to the north.

5.46 Overall, the AST assessed the landscape impact as Moderate Adverse.

Environmental Statement

5.47 The ES predicted that in terms of landscape impact, the proposed scheme would:

- Have a Moderate Adverse impact on two local character areas;
- Be Slightly Beneficial in relation to two neighbouring character areas to the north of the proposed scheme corridor; and

- Be Neutral in relation to two character areas to the south of the proposed scheme corridor.

5.48 The ES concluded that impacts on landscape character would be limited to the local landscape, and would be Moderate and Adverse.

5.49 In terms of visual impact, the ES predicted that:

- Most receptors would be subject to Adverse impact during construction, but that there would be a significant reduction in Adverse impacts in the year of opening and further reduction as the Proposed scheme planting established and matured in the design year; and
- Although receptors would remain subject to Adverse impact, no receptor would be subject to Substantial impact.

5.50 The ES concluded that the scheme would be Moderate Adverse in relation to visual impact.

5.51 In terms of Non Motorised Users (NMU's) the ES stated that there would be near balance between Beneficial and Adverse impacts for users of Public Rights of Way (PRoW), and concluded that the scheme would be Neutral in relation to visual impacts for NMUs.

5.52 Overall, the ES concluded that the landscape and visual effects of the proposed scheme would be Moderate and Negative.

OYA Conclusions

5.53 The OYA evaluation stated that mitigation measures had generally been provided in line with proposals and that the planting appeared to be establishing well. Subject to successful continued plant establishment, the design changes agreed at the detailed design stage were not considered to be particularly significant within the overall scheme and it was suggested that plant establishment should be evaluated at FYA.

5.54 The OYA evaluation received negative comments from Natural England regarding the Contractor's compound area and partial removal of a topsoil mound located adjacent to Quarries Cross Junction, and noted potential Adverse visual impacts for a property on Moorbridge Lane that were not predicted by the ES.

5.55 Overall, the OYA evaluation considered that the landscape effects of the scheme were slightly worse than expected, and suggested that the Landscape and Ecology Aftercare Plan (LEAP) produced at the end of the five year aftercare period should be provided to POPE for the FYA evaluation.

FYA Consultation

5.56 Haughley Parish Council responded that;

- The substantial increase in the height of the carriageway at its closest point to the Parish has resulted in a significant reduction in visual amenity; and
- The verges on the old Bury Road (i.e. the old A14/ local access road) are a popular parking place for HGV's and have consequently been significantly eroded. SCC have been made aware of this, but no action to address this issue has been taken to date.

FYA Evaluation

5.57 The landscape proposals were stated by the ES as principally comprising earthworks, hedgerow, scrub and woodland planting, and amenity/ wildflower grassland establishment.

5.58 It should be noted that in terms of the landscape proposals, As-Built drawings were provided for the mainline (new A14) section only, and so a full assessment of the planting along the old A14 (local access road) was not able to be undertaken as part of this study.

5.59 Comparison views with ES photomontages and OYA photographs are shown in Appendix D.

Handover Environmental Management Plan (2013)

5.60 Although no LEAP was produced at the end of the five year aftercare period, a Handover Environmental Management Plan (HEMP) was provided to POPE for the FYA evaluation.

5.61 The HEMP stated that appropriate mitigation measures, including the retention of existing planting and the use of earth mounding and planting, had been applied throughout the scheme to provide landscape integration and the same mitigation measures, in conjunction with environmental fencing, had also been applied to protect visual amenity.

5.62 The HEMP also confirmed that the road had been designed to avoid existing vegetation where possible, and that the landscape strategy had sought to tie into the existing structural vegetation to enhance the local landscape framework where appropriate.

5.63 In terms of modifications to the landscape design, the HEMP provided the following commentary;

- Standard trees were omitted from the roundabouts due to conflicts with required sightlines;
- Blocks of shrub planting were replaced with hedgerow between the NMU and the old A14 carriageway due to conflicts with proposed cabling runs;
- Small blocks of planting along the environmental barrier were omitted due to a lack of available space;
- Feathered trees were omitted from the '*Proposed Woodland Planting*' and '*Mixed Plantation and Screen Planting'* to allow for the targeted planting of feathered nursery stock and to extend the areas of planting; better establishment rates were also anticipated by using smaller transplants/ whips;
- Standard trees were replaced by feathered nursery stock to give a more natural appearance and provide a better fit with the landscape; and
- Two significant mature trees indicated on the ES planting strategy as to be retained were removed by persons unknown.

5.64 In terms of specific issues arising during the establishment phase of the planting, the HEMP recorded the following;

- Establishment of wildflower areas on the roundabouts – The HEMP stated that inspections by the landscape contractor and the overseeing organisation considered wildflower establishment to be in line with expectations.

5.65 No target plant coverage within a specific time period was stated by the HEMP.

Contractor's compound area/ topsoil mound

5.66 Regarding the negative comments received at OYA from Natural England (NE) regarding the Contractor's compound area and partial removal of the topsoil mound located adjacent to Quarries Cross Junction, the FYA site visit observed that the compound area has not yet been restored to agriculture as stated by the ES; this is shown in Figure 5-19 of the Biodiversity section of this report. As such, it is therefore considered that this element of mitigation has not been realised, and the landscape impact of this aspect of the scheme is not as expected.

5.67 In terms of the topsoil mound, the OYA report confirmed that this comprised surplus topsoil from the A14 improvement scheme, and that a private agreement between the Contractor and landowner was in place to leave the topsoil in a mound at this location. Although this was potentially only a temporary situation, the OYA evaluation considered that the disposal of this surplus material should have been covered by the ES.

5.68 The FYA site visit observed that although the topsoil mound remains within the Contractor's compound, the eastern section of the mound where the Contractor's compound is slightly below the level of the road has been removed and it is now partially screened by the hedgerow which is establishing well (Figure 5-2, below), with the hedgerow now visible above the topsoil mound where the contractors compound is slightly raised above the level of the road (Figure 5-2, also below). It is not considered that landscape impacts of the mound are significant but as noted at OYA, the disposal of surplus soil should have been fully considered in the ES.

Figure 5-2 – The topsoil mound within Contractor's compound (left) that has been partially removed (right).

Adverse visual impacts

5.69 The FYA site visit observed that the planting approaching new Quarries Cross underpass from the south to be establishing and developing in line with expectations, and this is illustrated by Figure 5-3, below.

Figure 5-3 – Established planting performing screening function approaching Quarries Cross underpass from the south.

5.70 With regard to potential adverse visual impacts for a property on Moorbridge Lane noted at OYA, the FYA site visit also observed a significant degree of intervening vegetation between the properties on Moorbridge Lane and the Quarries Cross underpass; this is illustrated in Figure 5-4 and Figure 5-5.

Figure 5-4 – View from Moorbridge Lane to Quarries Cross underpass (approximate location indicated), showing intervening vegetation.

Figure 5-5 – View from Moorbridge Lane to Quarries Cross underpass (approximate location indicated), showing high sided vehicular traffic visible on the A14 overbridge.

5.71 Although it can be seen that high sided vehicular movements (indicated in Figure 5-5, above) may remain visible from the eastern edge of the properties on Moorbridge Lane, it is considered likely that in conjunction with the intervening vegetation, the new planting in the vicinity of the Quarries Cross underpass has now screened, or at least has partially screened, the concrete structure of the underpass.

5.72 The consultation response received from Suffolk County Council (SCC) at OYA indicated that the scheme had greater than expected visual impact when viewed from the southern edge of Haughley, and noted that extra planting had been undertaken along a new bund located between the local road (old A14) and the restricted highway at the request of SCC; when established, this planting was expected to mitigate the shrubby vegetation lost as a consequence of the scheme.

5.73 The FYA site visit observed that the planting along this bund was not establishing well; this is shown by Figure 5-6.

Figure 5-6 – The left picture shows the new bund and planting between the restricted highway (left) and local access road (right); the right picture is representative of the individual plant stations on the bund.

5.74 It is therefore considered that unless this planting is subject to ongoing management and maintenance, the greater than expected visual impact of the scheme reported as affecting the southern edge of Haughley at OYA may be not be fully mitigated by Design Year.

5.75 The HEMP stated that in conjunction with earthworks and planting, environmental fencing had also been installed to protect visual amenity, i.e. to perform a screening function. The OYA report noted that planting along the environmental fencing had been omitted and the barrier was visible to nearby properties; the HEMP confirmed that planting was omitted due to lack of available space; this is illustrated by Figure 5-7, below.

Figure 5-7 – The environmental barrier (left) is clearly visible from the properties on the northern boundary of Stowmarket (right).

5.76 Omission of the originally proposed planting along the environmental barrier notwithstanding, it is considered that the severity of the impact of the environmental barrier on the visual amenity of the properties at the northern edge of Stowmarket would likely be less than was observed at the time of the FYA site visit had alternative planting proposals been considered, such as climbers or a single row of hedging plants; as such, the visual impact of the barrier is considered worse than expected.

Wet grassland

5.77 The OYA report noted that the wet grassland mix appeared to be slow to establish on the sides of the balancing ponds, and that wildflower species were not observed along the local road.

5.78 In terms of the establishment of the wet grassland mix on the sides of the balancing ponds, the HEMP also identified this as an issue and that sowing/ re-sowing was undertaken where necessary by the Contractor.

5.79 The FYA site visit observed that although establishment is considered to be as expected at the balancing pond to the east of the new grade separated junction at Tot Hill (see Figure 5-11, below), the grassland at the other three balancing ponds continues to be slow; see Figure 5-8, Figure 5-9, Figure 5-10 also below.

Figure 5-8 – Wet grassland struggling to establish around the balancing pond at Haughley New Street

Figure 5-9 – Wet grassland struggling to establish around the balancing pond at Quarries Cross junction

Figure 5-10 – Wet grassland struggling to establish around the balancing pond opposite Gallows Field

Figure 5-11 – At the pond to the east of Tot Hill junction, grassland establishment is as expected.

5.80 In terms of maintenance required to achieve the wet grassland objective of enhancing biodiversity and promoting wildlife interest, the HEMP indicated that areas should be annually cut in September to a height of 50mm, and the arisings should be removed; the FYA site visit observed that there was approximately one seasons growth in areas where wet grassland had established successfully, and no evidence was observed to suggest that this management regime was not being adhered to.

Wildflower grassland

5.81 The FYA site visit noted that wildflowers had successfully established along sections of the scheme adjacent to the old A14, and this establishment is illustrated by Figure 5-12 below.

Figure 5-12 – Wildflower planting performing as expected on the new bund adjacent to the old A14 immediately west of Tot Hill Junction (left), and adjacent to the old A14 along the north side of Quarries Cross underpass (right).

5.82 Wildflower species along the new A14 were observed to be located as indicated by the As-Built planting drawings during the FYA site visit, specifically between the new NMU route and the old A14 at Haughley New Street, and along the verge of the new A14 adjacent to the environmental barrier near Stowmarket.

5.83 Regarding maintenance required to achieve the wildflower objective of enhancing biodiversity and promoting wildlife interest, the HEMP indicated that areas should be annually cut in September to a height of 50mm, and the arisings should be removed; the FYA site visit observed that there was approximately one seasons growth in areas where wildflowers had established successfully, and no evidence was observed to suggest that wildflower management operations were not being undertaken as expected.

5.84 Consequently, it is considered that wildflowers have generally established and are performing in line with expectations throughout the scheme.

Amenity grassland

5.85 The FYA site visit observed that in general, areas of amenity grassland appeared to have established well and were generally free of significant scrub cover.

5.86 However, three areas of amenity grass within the verge were observed to be bare and rutted. These areas are located along the eastbound carriageway of the old A14 local access road, and are illustrated by Figure 5-13.

Figure 5-13 – Bare and rutted areas of verge along the eastbound carriageway of the old A14/ local access road; just east of Haughley New Street (upper), directly west of Fishponds Way (centre), and on the approach to Tot Hill junction (lower).

5.87 Given the width of the tyre tracks observed at these locations, it is considered that these may be the eroded verges and HGV parking places referred to by Haughley Parish Council in their response to consultation.

5.88 The HEMP also identified that (unspecified) verges were bare and rutted, but commented that paving or re-grading/ re-seeding of verges was not within the scope of the contract.

5.89 In terms of maintenance operations required to achieve the amenity grassland objective of low maintenance, 2.5m wide verges along the main carriageway and side roads, the HEMP indicated that areas of amenity grassland should be cut twice annually in April and July to a height of no more than 150mm; the FYA site visit observed no evidence to suggest that amenity grassland was not being managed as expected.

Trees and shrubs

5.90 Tree and shrub planting was generally considered by the HEMP to be acceptable at Handover, with the majority of issues noted as either having been addressed by the Contractor, or having been undertaken as part of routine maintenance operations.

5.91 The HEMP also stated that although action should be taken to replace and maintain missing/ dead plants within the tree and shrub plots as per the planting specification requirements, it was noted that agreements had been made with the HA such that all but three areas would not have replacement planting undertaken; the locations of these three areas were not identified, but HEMP did state that replacement planting had been undertaken at these locations during 2012.

5.92 Throughout the scheme, the surviving plants within the tree and shrub plots were observed by the FYA site to be reasonably well established, although it was noted that few plants could be considered to be thriving.

5.93 Although the reasons for this are unclear, it was observed throughout the FYA site visit that one potential contributing factor (other than other possible unknown factors such as poor soil, bad handling of plant stock, exposure etc) could be the effects of resource competition from the under-planted sward, the vigour and density of which could be considered to be inhibiting the natural growth patterns of the plant stock; illustrative examples are shown in Figure 5-14, below.

Figure 5-14 – Planting along the A14 westbound entry slip-road (left), and to the north east of the Tot Hill junction and overbridge (right).

5.94 However, given the timings of the FYA site visit (June) and the under planted grassland sward cut specified by the HEMP (August), there is no evidence to suggest that management and maintenance is not being carried out as specified in the HEMP.

5.95 In terms of other maintenance operations, the HEMP indicated operations throughout all woodland and shrub plots in years 1 to 5; the FYA site visit observed nothing to suggest that the other maintenance operations had not been undertaken as specified; no tree stakes or ties were observed (although plant guard tubes/ spirals remain), and the plots were generally free of noxious weeds and litter.

5.96 Ongoing maintenance operations and reasonable establishment of the surviving plant stock notwithstanding, there are locations where planting plot performance was observed by the FYA site visit to be significantly less than expected at the FYA stage. The most notable of these are along the new bund between the restricted highway and local access road (as discussed and illustrated by Figure 5-6, above), along the new A14 at the Tot Hill junction (both east and westbound), and at the Quarries Cross underpass; see Figure 5-15, below.

Figure 5-15 – Planting along the A14 eastbound carriageway either side of the Quarries Hill underpass (left), and directly east of the Tot Hill overbridge (right).

5.97 Although the exact cause remains unclear, obvious gaps exist within the planting matrix, and surviving plants are stunted and likely to be less developed than would be reasonably expected at the FYA stage.

Hedges

5.98 Hedgerows appear to have established well, and maintenance recommendations outlined by the HEMP appear to have been adhered to where the established plant stock has matured sufficiently.

5.99 It is therefore considered that the Landscape objective of maintaining re-established former field boundaries within the context of the existing hedgerow structure is on target to be realised by the Design Year.

Weed control

5.100 In terms of weed control, the FYA site visit found the road corridor to be generally free of noxious weeds. Occasional Ragwort and thistle were observed throughout the scheme during the FYA site visit, although these infestations are not considered to be significant.

5.101 An issue regarding an unidentified species of floating pond weed in the balancing ponds was considered by the HEMP to have been addressed by the Contractor and removed; the FYA site visit observed that although no pond weed was present within the pond at Quarries Cross junction, pond weed was present within the balancing pond at Haughley New Street and in the pond opposite Gallows Field. However, the quantity of pond weed within these ponds was such that it is not considered to constitute an issue at this time.

5.102 Although the balancing pond to the east of Tot Hill junction was observed to contain a significant amount of pond weed, the levels of pond weed growth did not appear to be having a significantly detrimental effect on the reed and marginal planting at the time of the FYA site visit, as is illustrated by Figure 5-16, below. However, it should be noted that continued ongoing maintenance and management of pond weed will be required to prevent any such problems arising in the future.

Figure 5-16 – The balancing pond to the east of Tot Hill junction contains a significant quantity of pond weed, but reed and marginal planting is well established.

Pests and diseases

5.103 Most planting plots were observed to be free of pests and diseases, although evidence of a potentially significant Brown Tailed Moth infestation was observed within the planting along both carriageways on the west side of Tot Hill junction; the characteristic "*tents*" of this species are shown below, in Figure 5-17.

Figure 5-17 – Characteristic Brown Tailed Moth "*tent*" within the planting plots on the A14 east and westbound carriageways to the west side of Tot Hill junction.

5.104 Large infestations of Brown tailed moths can cause total defoliation of small or young plants, and can severely affect mature plants; however, providing attacks are not sustained for more than two successive years, infected plants will usually recover from infestation.

5.105 It should also be noted that these infestations are directly adjacent to the footway crossing the overbridge and there is the potential for NMU's of this footway to come into direct contact with this species, and that contact can cause rashes, skin irritation, headaches and breathing difficulties.

5.106 It is therefore considered that unless corrective action is undertaken to remove this pest, the effects of any plant damage already caused are unlikely to be reversed, and there is the possibility of NMU contact with the species - ongoing monitoring for the presence of Brown Tailed Moths is required to ensure that corrective action may be taken as appropriate.

5.107 Regarding other pests, the HEMP stated that an unspecified number of pine trees along the old A14 eastbound (north side verge) were affected by white markings, believed to be caused by Pine Bark Adelgids[13]; infestations were not identified as part of the planting inspections undertaken in 2013, and the HEMP considered that no further action was appropriate.

[13] Small insects, often known as "*woolly conifer aphids*".

5.108 No signs of Pine Bark Adelgid infestation were observed during the FYA site visit.

Lighting

5.109 Although suggested at OYA that lighting could be considered further at FYA, no night time assessment of the effects of the scheme in terms of lighting was undertaken as no outstanding or further issues were identified during the FYA study.

FYA Landscape Conclusion

5.110 There is no evidence to suggest that the landscape proposals are not being maintained as specified by the HEMP; hedgerows, along with wildflower and amenity grassland areas, have generally established and are performing in line with expectations throughout the scheme.

5.111 With a few exceptions however, the same cannot be said of the remainder of the planting; although no target plant coverage within a specific time period was stated by the HEMP, it is considered that the current levels of growth, coverage, establishment, and condition of the wet grassland areas, woodland, and shrub planting is such that the visual screening, landscape integration, and visual amenity functions of these landscape mitigation measures are not generally developing as would be expected; obvious gaps exist within the planting matrix, and although broadly established, the plant stock in general cannot be said to be maturing or thriving in line with reasonable expectations at this FYA stage.

5.112 It is suggested that unless the agreement with the HA not to undertake any replacement planting is reviewed and that the timing and cutting frequency of the under-planted sward in the woodland and scrub plots amended, it is possible that the objectives of the landscape mitigation measures will not be fully realised by the Design Year.

5.113 It is therefore concluded that the adverse landscape and visual impacts of the scheme are likely to be greater, i.e. worse, than expected.

Table 5–8– Evaluation Summary: Landscape

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Landscape	The principal impact on landscape character would relate to the introduction of a second road corridor close to the existing route and the impact of a lit, grade-separated junction at the crossing of the Tot Hill Ridge. The proposals would involve the loss of small areas of scrub totalling about 1 ha and sections of hedgerow totalling about 1 km. The landscape proposals associated with the proposed scheme would offset the losses and extend woodland as a component in the landscape. The proposals associated with the proposed local road would establish a character appropriate to local use and integrate the existing corridor with the landscape of the valley to the north. **Moderate adverse.**	Mitigation measures generally provided in line with proposals and planting is establishing well. Some changes were agreed at the detailed design stage although these are not considered particularly significant within the overall scheme subject to successful continued plant establishment which should be considered at FYA. Natural England has commented negatively about the compound area and topsoil mound. It would appear that there could be adverse visual impacts for Moorbridge Lane which were not expected in the ES. **Slightly worse than expected.**	The landscape proposals are being maintained as specified by the HEMP; hedgerows, along with wildflower and amenity grassland areas, have generally established and are performing in line with expectations throughout the scheme. However, wet grassland areas, woodland, and shrub planting plots are not generally developing as would be expected; exceptions aside, obvious gaps exist within the planting matrix, and although broadly established, the plant stock in general cannot be said to be maturing or thriving in line with reasonable expectations at this FYA stage.	**Worse than expected.**

Townscape

AST

5.114 The AST stated that impacts on Townscape would be Neutral, as there would be no direct impact on Stowmarket or any of the villages neighbouring the road corridor. It was also stated that there would be no indirect influence on the urban qualities of the settlements.

Environmental Statement

5.115 The ES did not specifically mention Townscape but did note that for Landscape Character Area 6, the relationship of Stowmarket with the existing road and the proposed scheme would be similar. Although the new grade-separated junction was stated to initially appear as a new

and prominent feature in views from housing on the northern and western margins of the town, the impact was stated as being highly localised and would not change the wider perception of the town for the substantial majority of residents and visitors. The ES concluded that the scheme would have a Neutral impact on the character of Stowmarket.

OYA Conclusions

5.116 The OYA evaluation considered that views from Stowmarket to the new road were localised, and that although the junction is a prominent feature (particularly as it is lit), the new landscape planting would, in time, help integrate it into the local landscape. However, the evaluation noted that no planting was present adjacent to the environmental barrier at the eastern end of the scheme and as such, the environmental barrier was visible from nearby properties in Stowmarket.

5.117 Although the OYA evaluation considered that the visual impacts of the scheme on the southern edge of Haughley to be greater than expected due to the loss of shrubby vegetation along the old A14, the evaluation noted that these views would likely be screened in the long term by the provision of additional planting.

5.118 Overall, the OYA evaluation concluded the effects of the scheme on Townscape were as expected for Stowmarket, and slightly worse than expected (in the short term) for Haughley.

FYA Consultation

5.119 Haughley Parish Council responded that as noted in the comments regarding Heritage, HGVs are using Station Road, Haughley, as a shortcut/ rat run.

5.120 Haughley Parish Council also forwarded correspondence from a parishioner living adjacent to the A14 in Haughley New Street, expressing concerns regarding the volume of HGVs and container lorries using the old A14.

FYA Evaluation

5.121 No HGV traffic data was collected from Station Road, Haughley, for this evaluation and consequently the comment about the shortcut/ rat run received from Haughley Parish Council is unable to be confirmed with observed figures. However, it is understood that Suffolk County Council has implemented a new signing strategy to route HGVs to Bacton via Haughley.

5.122 Regarding the comments made by a parishioner regarding the volume of HGVs in Haughley New Street; although HGV data is not presented for the old A14, Table 5–3, above, indicates that the observed traffic flows are lower than those forecast at all locations along the old A14 and the new A14.

5.123 The following Townscape issues relate to the performance of the planting, and are applicable to both Landscape and Townscape sub-objectives; planting performance is discussed in detail in the Landscape sub-objective, above, although the Townscape impacts arising from the planting are noted as follows:

- Although the wider perception of Stowmarket has likely remained Neutral for the majority of residents and visitors, localised views of the Tot Hill Junction are likely to remain where the junction has not been integrated into the local landscape as well as would be expected at this stage; and
- The impact of the scheme on the southern edge of Haughley may not be fully mitigated by the planting on the bund between the restricted highway and the old A14 by Design Year.

5.124 No further evaluation has been undertaken, as no further changes regarding Townscape were been identified during the FYA site visit.

5.125 Based on the information presented in this evaluation, it is concluded that the overall effects of the scheme on Townscape are Slight Adverse, and worse than expected overall.

Table 5–9– Evaluation Summary: Townscape

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Townscape	There would be no direct impact on Stowmarket or any of the villages neighbouring the corridor. There would be no indirect influence on the urban qualities of the settlements. **Neutral.**	Impact on townscape generally as expected except there was no planting present adjacent to the environmental barrier at the eastern end of the scheme, and therefore the environmental barrier is visible to nearby properties in Stowmarket. The scheme has had greater visual impact than expected when viewed from the southern edge of Haughley due to loss of shrubby vegetation along the old A14 although in the long term these views will be screened by the additional planting provided. **As expected for Stowmarket, and slightly worse than expected in the short term for Haughley.**	Although the wider perception of Stowmarket has likely remained Neutral for the majority of residents and visitors, localised views of the Tot Hill Junction are likely to remain where the junction has not been integrated into the local landscape as well as would be expected at this stage. The impact of the scheme on the southern edge of Haughley may not be fully mitigated by the planting on the bund between the restricted highway and the old A14 by Design Year.	**Slightly worse than expected.**

Heritage

AST

5.126 The AST stated that an unproven site at Gallows Field had the potential to be impacted by the scheme, and that there would be a slight beneficial impact on the landscape setting of Tot Hill House, a Grade II Listed Building. A potential impact on turnpike milestone was also noted. Overall, the impact of the scheme was assessed by the AST as Slight Adverse.

Environmental Statement

5.127 The ES noted that the proposed scheme crossed an area where no major archaeological surveys had been undertaken previously, and that the understanding of the cultural resource was therefore limited. It was also stated that there would be no direct impact on any known cultural heritage resources, although non-intrusive surveys within the proposed scheme extents had suggested the presence of at least one archaeological site within Gallows Fields.

5.128 The ES concluded that based on current (2006) evidence, the proposed scheme would have a Neutral to Minor Adverse effect on potential archaeological remains of low importance that were likely to be located in Gallows Fields. No known features of national or regional importance were stated as being affected by the proposed scheme, but a Minor Beneficial effect on the setting of Tot Hill House was noted.

OYA Conclusions

5.129 The OYA evaluation noted that archaeological work had been fully reported but confirmation of archaeological archiving and deposition was not confirmed.

5.130 With regard to listed buildings, the OYA evaluation stated that although there had been a positive impact on the setting of Tot Hill House (Grade II listed) as traffic had largely been removed from the vicinity, the new lighting at the junction would continue to have an impact on the setting of the listed building until such time as the planting had matured enough to provide some visual screening.

5.131 With regard to turnpike milestone (referred to in the AST), it was understood by the OYA evaluation that this had disappeared prior to construction of the scheme.

5.132 Overall, the OYA evaluation considered that the impact of the scheme on known cultural heritage features was generally as expected.

FYA Consultation

5.133 Haughley Parish Council responded that listed buildings along Station Road, Haughley, are suffering from the vibrational effects of HGVs using the road as a shortcut/ rat run. Requests from the council for measures to limit HGV access have not proved successful, and signage continues to encourage HGVs to use Station Road as part of the Suffolk County Council HGV signing strategy.

FYA Evaluation

5.134 No traffic data was available for Station Road, Haughley for this evaluation and consequently the comment about the shortcut/ rat run received from Haughley Parish Council is unable to be confirmed. SCC confirmed that they have introduced a new HGV routing strategy which directs lorries to Bacton via Haughley.

5.135 POPE methodology also assumes that by the FYA evaluation, all archaeological reports should have been published and deposited in the agreed archive for future reference.

5.136 Consultation comments received at OYA indicated that although it had been agreed that publication of the Archaeological Evaluation and Watching Brief (AEWB) was not necessary, digital copies were requested by Suffolk County Council (SCC) to be provided to both SCC and the Archaeological Data Service (ADS); at the time of the OYA evaluation, it was understood that neither organisation had received a digital copy of this document.

5.137 The ADS were contacted as part of this FYA evaluation and subsequently confirmed that a digital copy of the AEWB has been lodged with the ADS. POPE is unaware whether a digital copy of the AEWB has been provided to SCC but at the time of writing, a digital copy of the AEWB is publically available as a free download from the ADS website.

5.138 The Colchester and Ipswich Museum Service were also contacted as part of this FYA evaluation and have confirmed that the scheme archive has been deposited with the Ipswich Museum.

5.139 Regarding impact of the new lighting at Tot Hill on the setting of Tot Hill House, the OYA evaluation considered that the lighting would likely continue to have an impact on the setting of Tot Hill House until such time as the planting had matured enough to provide some visual screening; the new lighting in relation to Tot Hill House is illustrated in Figure 5-18, below. At FYA planting has continued to establish satisfactorily.

Figure 5-18 – Lighting at the new roundabout comprising part of the Tot Hill junction in relation to the Grade II listed Tot Hill House (centre left).

5.140 No further evaluation has been undertaken, as no changes regarding Cultural Heritage were identified during the FYA evaluation and the effects of the scheme remain Slight Adverse, as expected.

Table 5–10– Evaluation Summary: Heritage

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Heritage	There would be potential impacts on an unproven site at Gallows Field. There would be a slight beneficial impact on the setting of Tot Hill House (Grade 2 Listed Building). There would be a potential impact on a turnpike milestone. **Slight Adverse**	Impacts on known cultural heritage features are generally as expected. Suffolk County Council raised concerns about the failure to put the archaeological work in place before the project started and the absence from the appraisal and pre-construction phases of information about secondary or related works (Contractor's compound, balancing ponds etc). Tot Hill House Grade II listed building has benefited by the reduction in traffic, as expected. However, the lighting of the junction will impact on the setting of the listed building until the planting has matured enough to provide some visual screening. It would appear that the milestone disappeared prior to the scheme starting. **As expected**	Archaeological work was thoroughly reported in the Archaeological Evaluation and Watching Brief (AWEB), and has been submitted to the Archaeological Data Service (ADS), where a digital copy of the AEWB is publically available as a free download from the ADS website; the scheme archive has also been deposited in the Ipswich Museum for future reference. The planting at Tot Hill junction is establishing satisfactorily.	**As expected.**

Biodiversity

AST

5.141 The AST stated that there would be a direct impact on a single County Wildlife Site (CWS) designated as a buffer to protect a species of wildflower (cornflower) in an unspecified field margin adjacent to the scheme. However, mitigation proposals were stated as safeguarding the extent of the interest in the local area, and that there would be no other impacts on designated sites.

5.142 Potential impacts on faunal species (bats, badgers and ground nesting birds) were stated by the AST as having been identified and appropriately mitigated, and that there would be a Slight Beneficial impact on habitats resulting from a net increase in habitat types favourable to ecological interests. Overall, the impact of the scheme on biodiversity was assessed as Slight Beneficial.

Environmental Statement

5.143 The ES stated that although there would be no impact on any designated site of nature conservation, some habitats would be directly lost as a result of the proposed scheme; these habitat losses were stated as being of limited type, local value, and small in extent. However, this loss would be offset by the significant extents of the habitats created by the proposed planting, and the proposed scheme would provide a slight benefit in terms of habit diversity overall.

5.144 Regarding fauna, the ES highlighted the presence of badgers, and potential impacts relating to severance and small scale loss of foraging areas. However, it was concluded that although

there would be a marginal increase in the risk of badger-vehicle collisions, proposed mitigation in the form of new crossing points and fencing would benefit the species.

5.145 Overall, the ES concluded that the impacts of the proposed scheme on biodiversity would be Minor and Positive.

OYA Conclusions

5.146 The OYA evaluation confirmed that the new planting was establishing and was more extensive than before the scheme, and that the scheme had not had an impact on the native cornflowers or the County Wildlife Site.

5.147 The OYA evaluation concluded that although mitigation measures had generally been implemented in line with the scheme proposals, the impacts of the scheme on Biodiversity were slightly worse than expected and as such, the FYA Biodiversity evaluation should consider;

- The establishment of habitat areas;
- The status of the mammal tunnel exit into the former contractor's compound and the mammal ledge at Tot Hill culvert; and
- Extending Consultation to include the local badger group.

FYA Consultation

5.148 Natural England responded that they were currently unable to provide detailed comments regarding the scheme.

5.149 Suffolk Wildlife Trust (SWT) responded that at OYA, their consultation response had focused on the proximity of two County Wildlife Sites (ensuring that the development did not impact upon them), and the requirement for two underpasses to facilitate faunal (animal) movements. The response noted the initial involvement of Suffolk Badger Group (SBG) regarding a badger sett that required closure as a consequence of the scheme, and stated that although SBG undertook a site visit with the scheme's ecological consultant, there was no further involvement by SBG.

5.150 The SWT response also noted their comment made at OYA as to whether there had been any post-construction monitoring and again, queried whether this had taken place. Attention was also drawn to the issues associated with the mammal underpasses noted at OYA, and it was asked whether these had now been addressed.

5.151 Finally, the SWT response "*strongly*" recommended that if no ecological monitoring had taken place, this should be undertaken to better assess the impact of the scheme on biodiversity.

5.152 Suffolk Mammal Group (SMG) responded that although they were unaware of the artificial sett confirmed as being installed as part of the scheme by the Designer at OYA, enquiries regarding sett location and occupation were in progress; no further response was received.

5.153 Haughley Parish Council responded that the wildflower planting on the roundabouts at the new Tot Hill junction is not proving to be attractive, even during the spring, and that a request by the Parish Council for a list of the species planted had not been forthcoming.

FYA Evaluation: Species

5.154 The OYA evaluation confirmed that protected species monitoring following construction of the scheme was not part of the contract requirements.

5.155 In terms of reptile monitoring, the OYA evaluation stated that although this was identified as a requirement by the CEMP, no post-construction monitoring had taken place, despite the fact that small numbers of common lizard and grass snake had been translocated from the scheme area to adjacent sections of the A14 verge habitat.

5.156 The HEMP provided for the FYA evaluation noted that in a modification to the design, the proposed monitoring of reptiles was no longer considered to be appropriate as during habitat clearance, only a "*very few*" number of reptiles were found and subsequently translocated.

5.157 Badger fencing was observed during the FYA site visit to generally be in a good state of repair, and is therefore considered likely to be providing a positive contribution towards

achieving the HEMP's objective of encouraging protected species to use the two identified crossing points.

5.158 However, regarding the mammal tunnel exit into the contractor's compound (see landscape section above), the FYA site visit observed that despite the completion of the HA communications works, the contractor's compound area has not yet been returned to agriculture (see Figure 5-19, below), and that although the tunnel was observed to be in a good state of repair (see Figure 5-19, also below), no evidence of its use by protected species (or otherwise) was noted.

Figure 5-19 – The mammal tunnel exit (left) into the contractors compound (right).

5.159 Although the lack of monitoring information precludes any firm conclusions to be drawn regarding the success or otherwise of the mammal tunnel, it is considered likely that the former contractor's compound remains an unsuitable foraging environment for mammals and as such, the full potential of this mitigation measure is unlikely to have been realised.

5.160 In terms of the broken mammal ledge at Tot Hill Culvert, the OYA evaluation stated that the Area 6 MAC had confirmed that the broken ledge would be added to list of Contractors Defects to be repaired. The Area 6 ASC (formerly the Area 6 MAC) was contacted to verify whether this defect had been rectified, and responded that an assumption had been made that the defect had been repaired. However, the response also noted that a General Inspection (undertaken in July 2013) reported the ledge to be in a state of disrepair.

5.161 The FYA site visit observed that the mammal ledge remains in a state of disrepair and as illustrated by Figure 5-20 (below), does not provide a viable route for mammals; without repair this aspect of ecological mitigation is unable to perform as intended.

Figure 5-20 – The broken mammal ledge at Tot Hill culvert (north).

5.162 Regarding of the impact of the scheme on other species:

- Birds: The OYA report confirmed that existing vegetation had generally been retained in accordance with the ES proposals, and that planting had generally been carried out in accordance with the mitigation proposals. The impact on birds is therefore considered likely to be as expected at this stage;
- Bats: The OYA report stated that the Contractor had confirmed that no mitigation measures were required; and
- Invertebrates: Although not considered in the ES, the Construction Environmental Management Plan (CEMP) stated that habitat piles resulting from vegetation removal would be retained within the HA boundary; although a log pile was noted adjacent to the Haughley road picnic site by the OYA report, this was not observed during the FYA site visit.

5.163 No animal mortality data has been made available for the purposes of this study; as such, no firm conclusions can be drawn regarding the effects of the scheme on this aspect of the biodiversity sub-objective.

FYA Evaluation: Habitat

5.164 Ecological mitigation measures in the form of habitat implementation confirmed during the FYA site visit include 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 and performance of these habitats are described and evaluated in the Landscape sub-objective, above.

5.165 As confirmed by the FYA site visit, each balancing pond throughout the scheme provides a varied wetland habitat for a range of wildlife, and the land surrounding each pond has been engineered to provide a range of habitats where possible, thus maximising wildlife potential.

5.166 In terms of the comments made by Haughley Parish Council that the wildflower planting on the roundabouts at the new Tot Hill junction is not proving to be attractive, this is considered to be an aesthetic issue. That said, the establishment of these wildflower areas was noted as being an issue by the HEMP, although the HEMP went on to state that inspections by the landscape Contractor and the overseeing organisation considered wildflower establishment at these locations to be in line with expectations.

5.167 Elsewhere though the scheme, wildflowers appear to have established well and appear to be contributing to species diversity; see Figure 5-21, below.

Figure 5-21 – Wildflower plots to the west of Tot Hill junction supporting populations of butterflies (left) and Cinnabar Moths (right) along the new bund between the old A14 and the new NMU link.

Summary

5.168 Although no ecological monitoring has been undertaken for the scheme, it is considered that the effects of the scheme on species are likely to be broadly as expected.

5.169 However, although the badger fencing is likely to be encouraging the use of the identified crossing points, the crossing points themselves are unlikely to be functioning as would be expected as the former contractor's compound remains an unsuitable environment for mammals, and the mammal ledge at Tot Hill culvert remains in a state of disrepair.

5.170 In terms of habitat, it is considered that although the proposals have been implemented broadly in line with the ecological mitigation proposals as stated in the ES, as noted in the landscape sub-objective, the establishment and maintenance of the woodland and shrub planting plots is such that the full potential of these plots has likely not been realised resulting in localised ecological effects that are worse than expected.

5.171 Consequently, it is considered that the overall effects of the scheme on Biodiversity are likely to be Neutral, rather than Slight Beneficial.

Table 5–11– Evaluation Summary: Biodiversity

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Biodiversity	There would be a direct impact on one County Wildlife Site designated as a buffer to protect a species of wildflower (cornflower) in an adjacent field margin. Mitigation has been proposed which would safeguard the extent of the interest in the local area. There would be no other impacts on any designated sites. Potential impacts on faunal species (bats, badgers and ground nesting birds) have been identified and appropriately mitigated. There would be a slight beneficial impact on habitats resulting from a net increase in habitat types favourable to ecological interests. **Slight Beneficial.**	Mitigation measures generally implemented in line with the proposals, however the mammal ledge on the north side of Tot Hill Culvert was broken and therefore did not provide a viable route for mammals and the badger tunnel exits on the north side into a Contractor's compound. The scheme did not impact on native cornflower or the County Wildlife Site. It is too soon to evaluate habitat types which should be considered at FYA. **Slightly worse than expected.**	Regarding species, the mammal crossing points are unlikely to be functioning as would be expected as the former contractor's compound remains an unsuitable foraging environment for mammals, and the mammal ledge at Tot Hill culvert remains in a state of disrepair In terms of habitat, the establishment and maintenance of the woodland and shrub planting plots is such that the full potential of these plots has not been realised and is likely to have resulted in localised ecological effects that are worse than expected. Consequently, it is considered that the overall effects of the scheme on Biodiversity are likely to be Neutral, rather than Slight Beneficial	**Worse than expected.**

Water Quality and Drainage

AST

5.172 The AST stated that the proposals would reduce the risk of impacts from accidental spillages by providing pollution control measures where none currently existed, and that there would be no impact on flood prevention or water quality along Tot Hill Brook. Overall, the AST assessed the impact of the scheme as Slight Beneficial.

Environmental Statement

5.173 The ES stated that the proposed scheme would require the extension of an existing culvert on the Tot Hill Stream, would further require the construction of four new discharges into existing watercourses, and would involve encroachment into the floodplain of Tot Hill Stream.

5.174 The ES also stated that positive collection and discharge of surface water run-off would be provided in the form of new balancing ponds to regulate flows and intercept pollution associated with surface water run-off and accidental spillage, and noted that the transfer of substantial volumes of traffic from the existing road to the proposed new dual carriageway would constitute an improvement on the existing situation.

5.175 Overall, the ES stated that there would be long term benefits associated with the improved control and protection of watercourses resulting from the drainage measures incorporated in the proposed scheme, and concluded that the impact of the proposed scheme would be Minor and Positive.

OYA Conclusions

5.176 The OYA evaluation stated that mitigation measures generally appeared to have been provided as proposed, but noted that the westbound carriageway at the western end of the scheme was prone to flooding as a result of a pre-scheme drainage issue that had been exposed by the scheme. Solutions were reported as being proposed to resolve the flooding problem, although these solutions were not specified; a flooding issue on the Haughley Road was also noted as being raised by a local resident.

5.177 Overall, the OYA evaluation concluded that the impact of the scheme in terms of Water Quality and Drainage was slightly worse than expected.

FYA Consultation

5.178 The Environment Agency (EA) provided the following comments as follows:

- *"The pollution traps have provided much better protection to both surface and ground waters. These along with the improved drainage allow any spillages to be retained and removed. We believe that the significant reduction of accidents on this stretch has resulted in fewer pollution incidents and lessened environmental impact.*
- *We believe that the pollution control measures have been effective. When the new road opened there was a Road Traffic Accident and the spilt oils were retained within the pollution control pond which was a very result [sic]. An officer accompanied Area 6 MAC and inspected the structures early on. The structures have been mapped and information made available in the event of incident response.*
- *We are not aware of any changes to water quality in local watercourses as a result of the improvement scheme because these watercourses are not routinely monitored so changes can be identified. We have not had any adverse impacts reported to us.*
- *We are not aware of any monitoring to target the impacts of the scheme on the local aquifers. If such monitoring and evaluation were to be carried out then the location of targeted monitoring points should have been considered at the design stage, and a monitoring plan built into the scheme.*
- *We have no flood risk or surface water drainage comments to make".*

5.179 Haughley Parish Council responded that;

- Measures to prevent public access to the balancing ponds is generally effective; and
- Fly tipping has occurred at the balancing pond to the north of the new Quarries Cross underpass (west of Gallows Field Wood at the Haughley Road/ old A14 junction – see Figure 5-23, below)

FYA Evaluation

5.180 The OYA report confirmed that no pollution or sedimentation incidents in relation to watercourses were identified during construction.

5.181 The OYA evaluation reported that the EA had provided comments regarding a flooding issue and temporary flood warning signs at the western end of the scheme. The evaluation noted

that solutions were currently (2011) being proposed to resolve the flooding problem; the Road Safety Audit (RSA) Stage 4 noted that the A14 Haughley Bushes Drainage scheme was completed in 2012, and was implemented to address this issue. The RSA also stated that monitoring should be undertaken for a further 3 years to determine whether the performance of the A14 carriageway in poor conditions had been adequately addressed by the Haughley Bushes Drainage scheme.

5.182 In light of the positive consultation response received from the EA for this FYA evaluation, it is considered that the flooding issue at the western end of the scheme has possibly been resolved, and that the drainage system and pollution control measures may be performing as expected; however, this remains unconfirmed at this stage, and is subject to further monitoring.

5.183 The OYA site visit highlighted that a number of sandbags forming part of the carrier pipe headwall at the southern end of Balancing Pond 3 had become detached and were located in Tot Hill Stream; The OYA report stated that the Area 6 MAC considered this to be a defect, and that any remedial works should be undertaken by the Contractor. The Area 6 ASC (formerly the Area 6 MAC) was contacted as part of the FYA evaluation to ascertain whether any remedial works had been undertaken by the Contractor, but no response has been forthcoming.

5.184 The FYA site visit observed that these sandbags remain missing from the headwall at the Tot Hill culvert/ Balancing Pond 3, although their presence in Tot Hill Stream was not noted; the FYA site visit also observed that sandbags had also detached from an inlet/ outlet within the balancing pond opposite Gallows Field; see Figure 5-22, below.

Figure 5-22 – Detached sandbags in the balancing pond opposite Gallows Field (left), and missing sandbags at the Tot Hill culvert/ Balancing Pond 3 (right).

5.185 Although the loss of these sandbags is not considered to be significant under normal conditions, the potential exists for problems to arise if the structures are unable to perform to their design specifications during a significant flood or pollution event.

5.186 The OYA evaluation observed that the reed bed proposed by the ES for Balancing Pond 3 east of Tot Hill junction was not evident on the As Built drawings, the site visit noting the reeds in the centre of the pond to be sparse; the OYA report stated that it was understood that this failed reed bed would be rectified during remedial works.

5.187 The FYA site visit found that the vegetative treatment systems (reeds & rushes) appeared to have established successfully at Balancing Pond 3, and also at the ponds near Haughley New Street and opposite Gallows Field.

5.188 The OYA evaluation also noted that the wet grassland mix was struggling to establish around the balancing ponds; this is discussed in the landscape sub-objective, above.

5.189 Balancing pond inlets and outlets were observed during the FYA site visit to be generally clear and appearing able to operate as would be expected, although vegetation was observed to be

encroaching on the Tot Hill culvert, and potential partial blockages were observed at the balancing ponds at Quarries Cross and to the east of Tot Hill (Figure 5-23 below).

Figure 5-23 – Potential partially blocked inlets/ outlets at the Quarries Cross junction balancing pond (left), and Balancing Pond 3 to the east of Tot Hill junction (right).

5.190 Although these potential partial blockages are not yet considered to be significant, the potential exists for problems to arise should vegetation and detritus not be cleared from the inlets/ outlets, and litter removed from the protective grilles on a regular basis.

5.191 All other drainage facilities within the scheme noted during the FYA site visit were observed to be relatively clear of vegetation and/ or maintained and able to function as would be expected.

5.192 No further information was received at FYA to indicate whether any incidents had occurred that may have affected the drainage system, and no information regarding water quality monitoring has been made available for this report. However, based on the FYA site visit, the positive Consultation comments received from the EA, and the RSA Stage 4, it is considered likely that the overall the effects of the scheme on water quality and drainage are broadly as expected, although the performance of the A14 carriageway under poor conditions has yet to be confirmed.

Table 5–12– Evaluation Summary: Water Quality and Drainage

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Water	There would be a reduced risk of impacts from accidental spillage due to provision of pollution control measures where none currently exist. There would be no impact on flood prevention or water quality along Tot Hill Brook. **Slight Beneficial.**	Mitigation measures generally appear to have been provided as proposed. The westbound carriageway at the western end of the scheme is prone to flooding as a result of a pre scheme drainage issue which has been exposed by the scheme. Solutions are currently being proposed to resolve the flooding problem. A flooding issue on Haughley Road has also been raised by a local resident. **Slightly worse than expected.**	Based on the FYA site visit, the positive Consultation comments received from the EA, and the RSA Stage4, it is considered likely that the overall the effects of the scheme on water quality and drainage are broadly as expected, although the performance of the A14 carriageway under poor conditions has yet to be confirmed.	**As expected.**

Physical Fitness

AST

5.193 The AST stated the relief of existing severance issues associated with the existing A14, the provision of a safe north-south local access via Haughley Road underpass, and the provision of extensive new bridleway/ cycleway links would be of moderate benefit for walkers, cyclists and horse riders at a local level. The AST also stated that a 1.5km diversion was required for Public Footpath No.37, noting that current usage of this footpath was low. Overall, the impact was assessed by the AST as Moderate Beneficial.

Environmental Statement

5.194 The ES identified that the proposed scheme would have the following impacts on NMUs and the community during operation:

- A single existing public footpath (Footpath No. 37) would be severed, but provision would made for continuity of access via sections of proposed highway, bridleway and footpath, such that the resulting impact would be Slight and Adverse;
- The modification of the existing eastbound carriageway would result in a Moderate Beneficial impact for NMUs; and
- There would be a Moderate Beneficial impact associated with the reduced degree of severance of local communities from existing facilities.

5.195 Overall, the ES concluded that the proposed scheme would have a Moderate and Positive impact on NMUs and access to local community facilities.

OYA Conclusions

5.196 Overall, the OYA evaluation concluded that the impact of the scheme on Physical Fitness was as expected, but noted that the British Horse Society (BHS) had raised an issue relating to detail; A short metal bar, approximately one foot high, extending from the gate at the Quarries Cross Junction has created a trip hazard for horses.

FYA Consultation

5.197 Haughley Parish Council responded that the benefits of the Non-Motorised User (NMU) route would be greatly enhanced if it could be safely accessed from Fishponds Way; as no such access route/ point formally exists, the NMU route remains underused and its full potential unrealised.

FYA Evaluation

5.198 Non-Motorised User (NMU) audits or Vulnerable User (VU) studies have not been undertaken specifically for this study.

5.199 Although no NMU's were observed to be using the NMU link adjacent to the environmental barrier near Stowmarket during the FYA site visit, cyclists, joggers and pedestrians were all observed throughout the length of the NMU route along the old A14, and evidence of equestrian use was also noted.

5.200 Safe passageway over the A14 at the Tot Hill junction has been provided as expected, and the NMU links along the old A14 and adjacent to the environmental barrier near Stowmarket provide a route away from the trunk road for cyclists, equestrians, and pedestrians.

5.201 Generally, all footpaths, bridleways and cycleways viewed during the FYA site visit appeared to be maintained and capable of performing as expected, although a section of the footway along the Tot Hill overbridge is exhibiting signs of cracking (see Figure 5-24, below) and pot holes were noted in the bridleway adjacent to the environmental barrier near Stowmarket (see Figure 5-25, also below).

Figure 5-24 – Section of cracking along the northern NMU approach to the new Tot Hill overbridge

Figure 5-25 – Pot holes in the bridleway adjacent to the environmental barrier near Stowmarket

5.202 The sign indicating the extinguished Public Right of Way (PRoW) adjacent to the old A14 was not able to be located during the FYA site visit, which suggests that it has been removed as suggested by the OYA report.

5.203 The OYA evaluation noted that the BHS considered that gate and stile arrangements along the NMU links had created a trip hazard for horses (illustrated in Figure 5-26, below); It was the understanding of the OYA report that gate and stile arrangements were installed to the requirements of SCC (to discourage motorcycles whilst still allowing equestrian access), and that SCC had been informed of the trip hazard but had not confirmed what, if any, action would be taken. No further information regarding this matter has been provided for this report and the situation remains unchanged from the time of the OYA evaluation.

Figure 5-26 – Gate and stile arrangements constituting a trip hazard for horses at the end of the NMU link near Haughley New Street.

5.204 The FYA site visit also observed that the access gate on the bridleway at Shepherds Lane, at the end of the environmental barrier near Stowmarket, has suffered significant damage and has now been rendered inoperable; this is illustrated by Figure 5-27, below.

Figure 5-27 – Damaged access gate on the bridleway at the western end of the environmental barrier near Stowmarket.

5.205 Although some details may be considered to be worse than expected, the issues observed during the FYA site visit do not preclude use of the NMU facilities; it is therefore considered that the effects of the scheme on physical fitness are likely to remain generally as expected, as the NMU links successfully segregate NMUs from the main A14 carriageway and the A14 is able to be safely crossed at the new Tot Hill junction.

Table 5–13– Evaluation Summary: Physical Fitness

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Physical Fitness	The relief of existing severance associated with the existing A14, provision of safe north-south local access via the Haughley Road underpass and provision of extensive new bridleway/cycleway links would be of moderate benefit for walkers, cyclists and horse riders at a local level. A 1.5km diversion would be required for public footpath 37 (current levels of use were low). **Moderate Beneficial.**	Mitigation measures generally appear to have been provided as proposed providing safe access under and over the new A14 and NMU facilities on the old A14 route. Suffolk County Council commented that some details were worse than expected and some were better than expected. The British Horse Society commented on a trip hazard for horses at Quarries Cross Junction and the surface of the bridleway along the restricted road. **Overall as expected although Consultees raised some issues relating to detail.**	Although some details may be considered to be worse than expected, the issues observed during the FYA site visit do not preclude use of the NMU facilities; it is therefore considered that the effects of the scheme on physical fitness are likely to remain generally as expected, as the NMU links successfully segregate NMUs from the main A14 carriageway and the A14 is able to be safely crossed at the new Tot Hill junction.	**As expected**

Journey Ambience

AST

5.206 The journey ambience sub-objective considers traveller care (facilities and information), traveller views, and traveller stress (frustration, fear of potential collisions, and route uncertainty).

5.207 The AST stated that the separation of local traffic from strategic traffic and restricted access onto the trunk road via a grade-separated junction with clear signage, forward visibility, and exit/ merging slip roads designed to current standards, would serve to remove current levels of driver uncertainty, fear, frustration, and stress. The overall impact of the scheme was assessed by the AST as Moderate Beneficial.

Environmental Statement

5.208 Although Traveller Care was not specifically considered by the ES, two lay-bys comprised a part of the proposed scheme.

5.209 With regard to Traveller Views/ Traveller Stress, the ES stated the following;

- Traveller Views: The proposed improvement would form a small part of generally long distance journeys being undertaken by most users of the proposed road. In this context, there would be no significant change in the traveller views along the A14. There would, however, be an improved experience for users of the local road. As such, the impact of the proposed scheme on Traveller Views was stated as Slight and Beneficial.
- Traveller Stress: Although the levels of use and average speed on the proposed road would result in a high level of driver stress when compared to the existing, moderate level

of driver stress on the existing road, fear would be markedly reduced due to the improved road alignment, and access onto the A14 being restricted to the new grade-separated junction. There would no longer be a need for a localised restriction in journey speed for users of the trunk road, which would result in reduced driver frustration. As such, the impact of the proposed scheme on Traveller Stress was stated as Moderate and Beneficial.

5.210 Overall, the ES concluded that given the improvement for local road travellers, the similar nature of the view from the road for traffic using the existing A14 and the proposed scheme, and the reduction in driver stress, the impact of the proposed scheme would be Moderate and Positive.

OYA Conclusions

5.211 In terms of Traveller care, the OYA evaluation noted that although two lay-bys had been provided as proposed, SCC had raised concerns regarding unauthorised access from the A14 lay-by to the Haughley picnic site.

5.212 The OYA evaluation considered that the effects of the scheme on Traveller Views along the new A14 were similar to those predicted in the ES, with most of the views being focused on the road corridor.

5.213 Regarding Traveller Stress, the OYA evaluation stated that fear of collisions should have been reduced due to the improved road alignment, and access onto the A14 being restricted to the new grade-separated junction. Driver frustration was also considered to have been reduced, due to the lifting of the speed restrictions.

FYA Consultation

5.214 Haughley Parish Council responded that;

- Given the closure of the Little Chef and Petrol Station on the old A14, the subjective view is that the Travel Lodge is also likely to be in decline;
- There are no facilities for comfort breaks/ refuelling on the A14 between Newmarket and the A14/ A140 junction at Needham Market, a distance of 40 miles; whilst this does not affect the Parish, it may affect users of the A14; and
- At the new Tot Hill junction, it is felt that better warning signage and traffic calming measures should be provided on the approach to the roundabouts, and that visibility splays and sightlines could be improved.

FYA Evaluation

5.215 Regarding Traveller Care, the lay-by on the westbound carriageway is illustrated in Figure 5-28, below.

Figure 5-28 – The lay-by on the westbound carriageway of the new A14 is well used, tidy, and litter free.

5.216 The OYA evaluation noted that one petrol station on the old A14 had closed as the scheme opened, and this was reported to be a decision that was made by the owner prior to the scheme opening. The FYA site visit observed that access to this service area from the local road remains open and although the Little Chef at this location has closed, the Travelodge remains open as does a truck and coach repair facility that was not reported at OYA.

5.217 Concerning the comment made by SCC at OYA regarding potential access to the Quarries Cross picnic site from the eastbound lay-by of the new A14, no evidence was observed during the FYA site visit to suggest that the lay-by was being used as a parking area for picnic site visitors.

Traveller Views

5.218 At the time of the FYA site visit, both the new A14 and the old A14 Local Access Road were generally tidy and litter free, although as discussed in the landscape sub-objective, the performance of certain woodland and shrub planting plots may be considered to be less than expected.

5.219 However the scheme forms a small part of the generally long distance journeys undertaken along the A14 and as such there are no significant changes in Traveller Views along this route when taken as a whole; Traveller Views through the new section of the A14 are consequently considered to be as expected, as are views from the old A14/ Local access road, where traffic has been significantly reduced.

5.220 It is therefore considered that the effect of the scheme on Traveller Views is Slight Beneficial, as expected.

Traveller Stress

5.221 Regarding the comments made by Haughley Parish Council concerning the signage at the new Tot Hill junction, the FYA site visit observed that a directional sign on the approach to the northern roundabout from the overbridge had been damaged; see Figure 5-29, below.

Figure 5-29 – Damaged directional sign adjacent to the footway approaching the northern roundabout at Tot Hill junction from the new overbridge; the mounting post remains in situ (left), with the plate at its base (right).

5.222 As Built signage drawings for the scheme were not available for this study; however, it is considered likely that route uncertainty and the degree of frustration at this point are not as predicted and as such, the degree of Traveller Stress is considered likely to be greater than expected at this location.

5.223 Elsewhere, along the new A14, sign posts and road markings were observed to be clear and intact; on the old A14/ Local Access Road, several instances of signposts/ road markings indicating two way traffic were present, and middle white lines were also observed.

5.224 Notwithstanding that the comments made by Haughley Parish Council concerning visibility splays and sightlines comprising a safety issue, no evidence has been provided for this report

indicating departures from DMRB[14] standards and in the absence of such evidence, there is no reason to suggest that visibility is anything other than what would be expected.

5.225 However, the "*Blind spot*" referred to by Haughley Parish Council is considered to constitute a safety issue and has been discussed further in the Safety Chapter of this report.

5.226 It is therefore considered that Traveller Stress is likely to be generally as expected along the new A14 and the local access road, but is likely to be worse than expected at Tot Hill junction; overall, it is considered that the effect of the scheme on Traveller Stress is Slight Beneficial, rather than Moderate Beneficial.

5.227 No further evaluation was undertaken, as no other changes regarding Journey Ambiance were identified during the FYA site visit and there are 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 are Slight Beneficial, rather than Moderate Beneficial. Table 5–14, below, summarises the evaluation of the scheme's impact on journey ambience.

Table 5–14– Summary of Journey Ambience Evaluation

Sub Objective	AST (Forecast)	EST (OYA Evaluation)	EST (FYA Evaluation)	
			Summary	Assessment
Journey Ambience	The separation of local traffic and strategic traffic and restriction of access onto the trunk road via a grade-separated junction with clear signage, forward visibility and exit and merging slip roads designed to current standards would serve to remove current uncertainty, fear, frustration and stress. **Moderate Beneficial.**	Traveller views along the new A14 are similar to those predicted in the ES with most of the views being focused on the road corridor. Fear of collisions should be reduced due to improved alignment and access onto the road being restricted to the new grade separated junction. Driver frustration has reduced because there is no longer a speed restriction in place. Suffolk County Council (SCC) raised concerns regarding the design of the safety barrier at the east end of the scheme. Two lay-bys have been provided as proposed. SCC raised concerns regarding unauthorised access from the A14 lay-by to Haughley picnic site. **Traveller views, driver stress and traveller care as expected.**	<u>Traveller Care</u> Two lay-bys have been provided along the new A14, and were found to be clearly signed, well used, and generally tidy and litter free at the time of the FYA site visit. This is considered to be a Slight Beneficial impact, as Traveller Care was not considered by the ES. <u>Traveller Views</u> The scheme forms a small part of the generally long distance journeys undertaken along the A14 and as such there are no significant changes in Traveller Views along this route when taken as a whole; Traveller Views through the new section of the A14 are consequently considered to be as expected, as are views from the old A14/ Local access road, where traffic has been significantly reduced. <u>Traveller Stress</u> Traveller Stress is likely to be as expected along the new A14 and the old A14/ Local access road, but likely to be worse than expected at Tot Hill junction.	**Traveller Stress likely to be worse than expected at Tot Hill junction.**

[14] Design Manual for Roads and Bridges - a comprehensive manual system which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways).

Key Points – Environment

Noise

- Traffic flows, average speeds and percentage HGVs eastbound are in line with expectations on the new A14, although percentage HGVs are lower than expected westbound. Overall, it is considered that the noise climate along the new A14 is likely to be as expected.
- Traffic flows are significantly lower than expected in both directions between Haughley New Street to Quarries Cross Junction, and between Quarries Cross Junction to Fishponds Way; therefore, it is considered that the noise climate along these sections of the old A14 is likely to be better than expected.

Local air quality

- Comparison of both the predicted and observed AADT flows indicates that the observed flows are lower than those forecast at all locations, both along the old A14 and the new A14. This indicates that pollutant concentrations are also likely to be lower than expected at properties near all of these road sections.
- The observed number of HGVs on the new A14 is also lower than predicted by over 2,000 HGVs per average day. This also indicates that pollutant concentrations would likely be lower than those estimated.

Greenhouse gases

- A 12% net increase in carbon emissions from traffic on the A14 has been observed on the scheme section, slightly lower than the re-forecast 14% increase.

Landscape

- There is no evidence to suggest that the landscape measures are not being maintained as specified by the HEMP; hedgerows, along with wildflower and amenity grassland areas, have generally established and are performing in line with expectations throughout the scheme.
- Wet grassland areas, woodland, and shrub planting plots are not generally developing as would be expected; exceptions aside, obvious gaps exist within the planting matrix, and although broadly established, the plant stock in general cannot be said to be maturing or thriving in line with reasonable expectations at this FYA stage.

Townscape

- Although the wider perception of Stowmarket has likely remained Neutral for the majority of residents and visitors, localised views of the Tot Hill Junction are likely to remain where the junction has not been integrated into the local landscape as well as would be expected at this stage.
- The impact of the scheme on the southern edge of Haughley may not be fully mitigated by the planting on the bund between the restricted highway and the old A14 by Design Year.

Biodiversity

- Regarding species, the mammal crossing points are unlikely to be functioning as would be expected as the former contractor's compound remains an unsuitable foraging environment for mammals, and the mammal ledge at Tot Hill culvert remains in a state of disrepair.
- In terms of habitat, the establishment and maintenance of the woodland and shrub planting plots is such that the full potential of these plots has not been realised and is likely to have resulted in localised ecological effects that are worse than expected.

Cultural Heritage

- Archaeological work was thoroughly reported in the Archaeological Evaluation and Watching Brief (AWEB), and has been submitted to the Archaeological Data Service (ADS), where a digital copy of the AEWB is publically available as a free download from the ADS website; the scheme archive has also been deposited in the Ipswich Museum for future reference.
- The planting at Tot Hill junction is establishing satisfactorily.

Water

- Based on the FYA site visit, the positive consultation comments received from the EA, and the RSA Stage 4, it is considered likely that the overall the effects of the scheme on water quality and drainage are broadly as expected, although the performance of the A14 carriageway under poor conditions has yet to be confirmed.

Physical Fitness

- Although some details may be considered to be worse than expected, the issues observed during the FYA site visit do not preclude use of the NMU facilities; the effects of the scheme on physical fitness are likely to remain generally as expected, as the NMU links successfully segregate NMUs from the main A14 carriageway and the A14 is able to be safely crossed at the new Tot Hill junction.

Journey Ambience

- Traveller Care: Two lay-bys have been provided along the new A14, and were found to be clearly signed, well used, and generally tidy and litter free at the time of the FYA site visit. This is considered to be a Slight Beneficial impact, as Traveller Care was not considered by the ES.
- Traveller Views: The scheme forms a small part of the generally long distance journeys undertaken along the A14 and as such there are no significant changes in Traveller Views along this route when taken as a whole; Traveller Views through the new section of the A14 are consequently considered to be as expected, as are views from the old A14/ Local access road, where traffic has been significantly reduced.
- Traveller Stress: Traveller Stress is likely to be as expected along the new A14 and the old A14/ Local access road, but likely to be worse than expected at Tot Hill junction.

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 with post-opening findings and analysis of policy objectives.

Accessibility

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

Option Values

Forecast

6.3 Option Values, as defined in webTAG relate to the availability of different transport modes within the study area, even if they are not used. For example, a car user may value a bus service along their route even if they never use it, because they have the option of another mode should their car become unavailable.

6.4 The AST for this scheme states that the scheme would have no impact on the options for travelling, forecasting a ***neutral*** impact.

Evaluation

6.5 Post opening, the former A14 is used by two bus services, Service 384 and 385 which link Bury St Edmunds to Stowmarket. These stop in Haughley and Haughley New Street once an hour Monday-Saturday, between approximately 7am-6pm. The routes use short sections of the former A14 route, with both benefiting from the revised layout allowing the routes to no longer require access to the A14 to travel towards Stowmarket. These routes should therefore be more reliable for users.

6.6 As the scheme has not impacted on the options available for residents, the overall assessment post opening is ***neutral***, as expected.

Access to the Transport System

6.7 This sub-objective assesses 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 For this objective, the AST states that '*the proximity of public transport facilities is unchanged. The local public transport will be able to use the local road network without accessing the trunk road.'*

6.9 Given the anticipated impact, the AST forecast a score of ***neutral*** for this objective.

Evaluation

6.10 The separation of trunk road traffic and local traffic will have benefitted local transport users. Bus services will have increased journey time reliability and reduced journey times. In addition, the removal of through traffic from the former A14 route will have improved the waiting environment for users. However, as proximity to bus services has not been altered as a result of the scheme, the overall assessment post opening is ***neutral,*** as expected.

Severance

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

Forecast

6.12 The AST stated that '*the existing footpath and footway crossings are at-grade, seldom used and unsafe. Grade separation of the junction at Tot Hill, underpass facilities at Haughley Road and a segregated NMU facility on the eastbound carriageway will provide a safer vulnerable user network linking the existing footpaths together'.*

6.13 The overall forecast impact of the scheme on severance was expected to be ***slight positive.***

Evaluation

6.14 NMU surveys were undertaken as part of the OYA evaluation of this scheme. These showed that, compared to the pre scheme situation, the number of users (both pedestrians and cyclists) in Haughley New Street (the eastern end of the scheme), the new NMU route on the old A14 carriageway, and the route close to Tot Hill had increased post opening, although were relatively low in numbers. It was noted however that no equestrian users were seen on the day of the survey post opening.

6.15 During the FYA site visit, approximately 10 cyclists were observed using the route at times (Figure 6-1), along with 7 individual/groups of walkers, some with dogs. Whilst no equestrian users were observed, there was evidence along the route that they did use it. It was, however, noted that due to no footway provision pedestrians were walking on the road along The Folly to reach Haughley.

Figure 6-1 – NMU Route

6.16 Overall the scheme has improved links for NMUs between the villages, as well as assisting with longer distance routes into Stowmarket. The overall assessment evaluation of the scheme on severance is ***slight positive,*** as expected.

Integration

6.17 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

6.18 The transport interchange objective relates to the extent to which the scheme contributes towards the Government objective of improving transport interchange for passengers and freight. The AST forecast for this scheme was '*the scheme is a single mode facility and will have no impact on passenger interchange'.* As such, the AST forecast a ***neutral*** impact for transport interchange.

Evaluation

6.19 No freight or passenger transport interchanges were included within the scope of the scheme, however it is noted that the reduction in traffic volumes along the former A14 route has indirectly facilitated improvements for public transport interchange due to:

- The separation of local traffic has allowed buses to stop and pull out with minimal disruption to the flow of traffic.
- Reduced traffic has created a more pleasant waiting environment for bus users by improving air quality and reducing noise.
- The reduction in traffic along the former A14 route has resulted in an improvement in the accessibility of bus stops for users (including schoolchildren) and in the safety of NMUs along the former A14 route.

6.20 As there is no evidence to suggest that the A14 Haughley New Street to Stowmarket has led to any changes in option values, this sub-objective has been evaluated as ***neutral***, as expected.

Land Use Policy

6.21 This section looks at the scheme in relation to national, regional and local level land use and development policies from a transport perspective.

Forecast

6.22 For the land use policy objective, the AST stated that '*the proposed scheme would be in support of policies related to an improved transport system and provision for NMU's. It would generally accord with policies related to safeguarding environmental assets and minimising pollution and environmental impacts.'*

6.23 Overall, the AST judged the scheme to have a ***beneficial*** impact in respect of national, regional and local planning policies.

Evaluation

6.24 An evaluation of the scheme in relation to policy has been undertaken and summarised in Table 6–1 on the following page. Given the findings presented, it is considered that the overall impact of the scheme on land use policy integration is ***neutral,*** worse than forecast in the AST.

Table 6–1 – Scheme Alignment with National, Regional and Local Policy

	Policy/Document	Relevant Policy Objective/Reference	Relevant Scheme Impacts	Alignment
Sub Regional Policies	**Suffolk Structure Plan (2004)**	The structure plan contained a number of transport policies which placed high priority on an approach which would result in: • Improvement of environmental conditions • Safer travel • Efficient and effective use of existing infrastructures • Encouragement of walking and cycling by creating footpaths, bridleways and cycle routes for recreational purposes. The plan also stated that steps should be taken to minimise the adverse impact of new road schemes and alterations to existing roads, on the landscape, built environment, ecology, archaeology and natural resources of the county.	• The removal of traffic from close to communities has facilitated an improvement in the local environment. • The NMU route encourages active travel, and site observations indicate that it is well used by a mix of modes. • Expected safety benefits have not materialised. • Environmental mitigation measures may not reach full potential for landscape and ecology.	Partial
Regional Policy	**East of England Plan (2008)**	The plan covers the period up to 2021 and outlines a number of objectives. Ones of relevance here include: • To reduce the regions impact on, and exposure to, the effects of climate change by encouraging public transport use, as well as walking and cycling. • To realise the economic potential of the region and its people by ensuring adequate and sustainable transport infrastructure. • To improve the quality of life for the people of the region. • To improve and conserve the region's environment by protecting, and where possible encouraging, biodiversity through the protection of habitats and species.	• The implementation of a segregated NMU route encourages walking and cycling. • The removal of traffic from close to communities has improved quality of life. •	✓
National Policy	**A New Deal for Trunk Roads in England (1998)**	The Government's overarching objectives for transport at the time of the appraisals were set out in this document: • To protect and enhance the built and natural environment. • To improve safety for all travellers • To contribute to an efficient economy, and to support sustainable economic growth in appropriate locations. • To promote accessibility to everyday facilities for all, especially those without a car. • To promote the integration of all forms of transport and land use planning, leading to a better, more efficient transport system	• Expected safety benefits have not materialised. • Improved journey times contribute to an efficient economy. • The scheme improved accessibility by non car modes by provision of NMU route • The scheme has had limited impact on land use planning	Partial
	Transport 2010: The Ten Year Plan (2000)	The strategy for transport aims to tackle congestion and pollution by improving all types of transport -rail and road, public and private - in ways that increase choice. It is a strategy for investment in the future to create prosperity and a better environment.	• The scheme has improved journey times, and reduced a partially congested section of the network. • No impact on buses or rail network.	Partial
	The Future of Transport: A Network for 2030 (2004)	The Strategy builds on the progress that had already been made since the implementation of the 10 year plan for transport. This plan extended out to 2014-2015 but strategy also looks even further ahead, at the challenges faced over the next 20-30years. The Strategy is built around three themes • Sustained investment • Improvements in transport management • Planning ahead	• The scheme has improved journey times and improved problem junctions. The anticipated increase in development in Stowmarket is unlikely to cause capacity problems along this section of the network in the near future	✓

Key Points – Accessibility and Integration

Accessibility

- The removal of strategic traffic from the former A14 route has reduced severance and improved the quality of the environment for residents. The conversion of the former A14 eastbound carriageway to an NMU route has a positive effect on local users. The impact of the scheme on severance is evaluated as beneficial, as expected.
- The scheme has had no discernible impact on option values or access to the transport system and is therefore evaluated as neutral, as expected for these sub-objectives.

Integration

- The scheme has not made any changes to public transport interchanges. However, the reduction in traffic on the former A14 route has indirectly facilitated public transport interchange improvements in terms of noise, air quality and safety. Overall the evaluation for transport interchange is neutral, as expected.
- The scheme is partially aligned with local, regional and national policies related to transport impacts on land use and development, although as the scheme has not delivered any safety benefits, it is considered to have an overall neutral impact on policy, worse than expected.

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 A14 Haughley New Street to Stowmarket 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 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.
- **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 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	Nine properties close to the existing A14 would benefit from a decrease in noise levels in excess of 5dB in the opening year. For properties on the existing 60 < 70dB, noise band, there would be a noise level increase of 1 < 3 dB affecting 54 properties in the Do Something scenario in 2023 compared to 230 properties in the Do Minimum scenario in 2023	2008 Do Something – 4.8 people less annoyed 2023 Do Something – 2.7 people less annoyed	-2.74 additional people annoyed in 2023
	Local Air Quality	There would be no anticipated exceedences of current air quality objectives for NO_2 and PM_{10}. No AQMA would be affected. The proposals would lead to a change in annual mean NO_2 concentrations at 20m from the road centre in excess of 2ug/$m^{3.}$ Overall air quality would be improved.	NO_2 and PM_{10} 19 improved 30 deteriorated	NO_2 assessment score - 45.35 PM_{10} assessment score - 14.41
	Greenhouse Gases	The proposed scheme would result in an increase in traffic related CO_2 emissions in the opening year and design year. The increase would primarily arise as a result of the increased design speed of 70mph for the proposed scheme when compared with the existing speed restriction of 50mph for the existing section of trunk road.	Do minimum 2009 – 15,882 tonnes per annum Do Something – 17.313 tonnes per annum	Increase of 1431 tonnes
	Landscape	The principal impact on landscape character would relate to the introduction of a second road corridor close to the existing route and the impact of a lit , grade separated junction at the crossing of the Tot Hill Ridge. The proposals would involve the loss of small areas of scrub totalling about 1ha and sections of hedgerow totalling 1km. The landscape proposals associated with the proposed scheme would offset the losses and extend woodland as a component in the landscape. The proposals associated with the proposed local road would establish a character appropriate to local use and integrate the existing corridor with the landscape of the valley to the north.	Not applicable	Moderate Adverse
	Townscape	There would be no direct impact on Stowmarket or any of the villages neighbouring the corridor. There would be no indirect influence on the urban qualities of the settlements.	Not applicable	Neutral
	Heritage of Historic Resources	Potential impacts on unproven site at Gallows Field. Slight beneficial impact on setting of Tot Hill House (Grade 2 Listed Building). Potential impact on turnpike milestone.	Not applicable	Slight Adverse
	Biodiversity	There would be a direct impact on one County Wildlife Site designated as a buffer to protect a species of wildflower (cornflower) in an adjacent field margin. Mitigation has been proposed which would safeguard the extent of the interest in the local area. There would be no impacts on any designated sites. Potential impacts on faunal species (bats, badgers and ground nesting birds) have been identified and appropriately mitigated. There would be a slight beneficial impact on habitats resulting from net increase in habitat types favourable to ecological interests.	Not applicable	Slight Beneficial
	Water Environment	Reduce risk impacts from accidental spillage due to provision of pollution control measures where none currently exist. No impact on flood prevention or water quality along Tot Hill Brook	Not applicable	Slight Beneficial
	Physical Fitness	The relief of existing severance associated with the existing A14, provision of safe north-south local access via the Haughley Road underpass and provision of extensive new bridleway / cycleway links would be of moderate benefit for walkers, cyclists and horse riders at a local level. 1.5km diversion required for public footpath 37 (current levels of use are low)	Not applicable	Moderate Beneficial
	Journey Ambience	The separation of local traffic and strategic traffic and restriction of access onto the trunk road via a grade-separated junction with clear signage, forward visibility and exit and merging slip roads designed to current standards would serve to remove current uncertainty, fear, frustration and stress.	Not applicable	Moderate Beneficial
Safety	Accidents	Accident benefits over 60 years, particularly KSI, due to improved alignment and removal of at-grade junctions and crossings.	302 PIA saved	PVB £12.5 million
	Security	The scheme will not affect the security of the vehicular travellers. There are no passenger areas to consider. Lay-bys will be provided with emergency telephone facilities. Lighting will be provided at the new grade separated junction.	10 – 100 freight users per day using lay-by facilities	Moderate Beneficial
Economy	Public Accounts	Investment costs including indirect taxes	Central Govt PVC £6.6 million, Local Govt PVC nil	PVC £6.6 million
	TEE	There are no significant public sector revenues	Business Users and providers PVB £42.3 million	PVB £42.3 million Most likely growth scenario
	TEE	The journey time changes for the low number of vulnerable users are likely to be small. Therefore the assessment of Neutral is scored in economy for vulnerable users	Consumer Users PVB £36.9 million	PVB £36.9 million Most likely growth scenario
	Reliability	The scheme will provide improved segregated journeys for both trunk and local road traffic thus improving journey time reliability	Not applicable	Moderate Beneficial
	Wider Economic Impacts	The scheme does not affect or pass through and regeneration areas.	No	Neutral
Accessibility	Option Values	The scheme will have no impact in the options available for travelling	No Impact	Neutral
	Severance	The existing footpath and footway crossings are at-grade, seldom used and unsafe. Grade separation of the junction at Tot Hill, underpass facilities at Haughley Road and a segregated NMU facility on Eastbound Carriageway will provide a safer vulnerable user network linking the existing footpaths together	0 – 200 people	Slight Positive
	Access to the Transport System	Proximity of the public transport facilities is unchanged. The local public transport will be able to use the local road network without accessing the trunk road	-1% to 1%	Neutral
Integration	Transport Interchange	The scheme is a single mode facility and will have no impact on passenger interchange	0 people	Neutral
	Land Use Policy & Other Gov't Policies	The proposed scheme would be in support of policies related to an improved transport system and provision for NMU's. It would generally accord with policies related to safeguarding environmental assets, and minimising pollution and environmental impacts. The proposed scheme is limited in scope to a relatively short section of the existing trunk road to be improved in the interests of safety. There would be a small increase in CO_2 emissions. There would be improvements in local air quality and facilities for NMUs would support health policy.	Not applicable	Beneficial

Table 7–2 Evaluation Summary Table (EST)

OBJ	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE IMPACT	ASSESSMENT
Environment	**Noise**	New A14 Traffic flows, average speeds and percentage HGVs eastbound are in line with expectations on the new A14, although percentage HGVs are lower than expected westbound. Overall, it is considered that the noise climate along the new A14 is likely to be as expected. Old A14 Traffic flows are lower than expected in both directions between Haughley New Street to Quarries Cross Junction, and between Quarries Cross Junction to Fishponds Way; therefore, it is considered that the noise climate along these sections of the old A14 is likely to be marginally better than expected.		**As expected for the new A14 and the old A14 between the HWRC and Bury Road. Better than expected along the old A14 between Haughley New Street and Fishponds Way.**
	Local Air Quality	Comparison of both the predicted and observed AADT flows indicates that the observed flows are lower than those forecast at all locations, both along the old A14 and the new A14. This indicates that pollutant concentrations are also likely to be lower than expected at properties near all of these road sections. The observed number of HGVs on the new A14 is also lower than predicted by over 2,000 HGVs per average day. This also indicates that pollutant concentrations would likely be lower than those estimated.		**Better than expected.**
	Greenhouse Gases	Carbon output from vehicles using the A14 scheme section has increased post opening, a 12%increase slightly lower than the forecast 14% increase.	Reforecast carbon emissions predicted an increase to 10,766 tonnes (14% increase) Observed increase is lower at 9,432 tonnes (12% increase)	**As expected.**
	Landscape	The landscape proposals are being maintained as specified by the HEMP; hedgerows, along with wildflower and amenity grassland areas, have generally established and are performing in line with expectations throughout the scheme. However, wet grassland areas, woodland, and shrub planting plots are not generally developing as would be expected; exceptions aside, obvious gaps exist within the planting matrix, and although broadly established, the plant stock in general cannot be said to be maturing or thriving in line with reasonable expectations at this FYA stage.		**Large Adverse, (worse than expected).**
	Townscape	Although the wider perception of Stowmarket has likely remained Neutral for the majority of residents and visitors, localised views of the Tot Hill Junction are likely to remain where the junction has not been integrated into the local landscape as well as would be expected at this stage. The impact of the scheme on the southern edge of Haughley may not be fully mitigated by the planting on the bund between the restricted highway and the old A14 by Design Year.		**Slight Adverse, (slightly worse than expected).**
	Heritage of Historic Resources	Archaeological work was thoroughly reported in the Archaeological Evaluation and Watching Brief (AWEB), and has been submitted to the Archaeological Data Service (ADS), where a digital copy of the AEWB is publically available as a free download from the ADS website; the scheme archive has also been deposited in the Ipswich Museum for future reference. The planting at Tot Hill junction is establishing satisfactorily.		**Slight Adverse, (as expected).**
	Biodiversity	Regarding species, the mammal crossing points are unlikely to be functioning as would be expected as the former contractor's compound remains an unsuitable foraging environment for mammals, and the mammal ledge at Tot Hill culvert remains in a state of disrepair In terms of habitat, the establishment and maintenance of the woodland and shrub planting plots is such that the full potential of these plots has not been realised and is likely to have resulted in localised ecological effects that are worse than expected. Consequently, it is considered that the overall effects of the scheme on Biodiversity are likely to be Neutral, rather than Slight Beneficial		**Neutral, (worse than expected).**
	Water Environment	Based on the FYA site visit, the positive Consultation comments received from the EA, and the RSA Stage4, it is considered likely that the overall the effects of the scheme on water quality and drainage are broadly as expected, although the performance of the A14 carriageway under poor conditions has yet to be confirmed.		**Slight Beneficial, (as expected).**
	Physical Fitness	Although some details may be considered to be worse than expected, the issues observed during the FYA site visit do not preclude use of the NMU facilities; it is therefore considered that the effects of the scheme on physical fitness are likely to remain generally as expected, as the NMU links successfully segregate NMUs from the main A14 carriageway and the A14 is able to be safely crossed at the new Tot Hill junction.		**Moderate Beneficial, (as expected).**
	Journey Ambience	Traveller Care Two lay-bys have been provided along the new A14, and were found to be clearly signed, well used, and generally tidy and litter free at the time of the FYA site visit. This is considered to be a Slight Beneficial impact, as Traveller Care was not considered by the ES. Traveller Views The scheme forms a small part of the generally long distance journeys undertaken along the A14 and as such there are no significant changes in Traveller Views along this route when taken as a whole; Traveller Views through the new section of the A14 are consequently considered to be as expected, as are views from the old A14/ Local access road, where traffic has been significantly reduced. Traveller Stress Traveller Stress is likely to be as expected along the new A14 and the old A14/ Local access road, but likely to be worse than expected at Tot Hill junction.		**Traveller Stress likely to be worse than expected at Tot Hill junction.**
Safety	**Collisions**	The number of collisions across the wider COBA modelled area has increased post opening, with an additional 13.3 collisions per year. Over the scheme key links, a small increase of 0.4 collisions per year is noted, suggesting that the scheme has not resulted in an improvement in safety.	COBA area savings: -13.3 (increase), key links savings: -0.4 (increase) per year	**£0 (worse than expected)**
	Security	Despite the implementation of secure lay-by facilities on the realigned A14, the overall impact of the scheme has been scored down slightly as there are no emergency phone facilities located in the lay-bys.		**Slight beneficial (worse than expected)**
Economy	**Public Accounts**		Forecast PVC £25.02m Outturn PVC £30.62m	**As expected**
	TEE	Travel times using the A14 along this section have reduced when compared to those seen before the scheme opened. Benefits are seen in all time periods, and in both directions. Benefits are also seen for local traffic.	Journey time benefits £92.62m, VOC -£18.22m Indirect Tax £12.46m	**As expected**
	Reliability	Post opening travel times for local traffic has improved with the removal of poor quality junctions. Journey times on the A14 have reduced, and are consistent in all time periods.	Route Stress: 75% (adjusted) post opening	**Moderate Beneficial (as expected)**
	Wider Economic Impacts	Improvements in journey times for strategic traffic is likely to have improved access to the east, particularly to the port of Felixstowe. The improvement in journey times also reduces the time to travel to other urban areas, aiding access to job opportunities for local communities, but does not directly affect any development.		**Neutral, (as expected)**
Accessibility	**Option Values**	No impact on option values		**Neutral (as expected)**
	Severance	The new NMU route appears to be well used by all modes. Removal of traffic from the old A14 route has improved the local environment.		**Slight positive (as expected)**
	Access to the Transport System	No impact on access to the transport system.		**Neutral (as expected)**
Integ	**Transport Interchange**	No impact on transport interchange		**Neutral (as expected)**
	Land Use Policy & Other Gov't Policies	The scheme aligns with most national and local policies, improving journey times and promoting a more efficient transport system. However, this scheme was designed as a safety scheme, and it has not delivered, therefore not supporting these measures.		**Neutral (worse than expected)**

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?	
To improve safety, fewer accidents	Since scheme opening there has been an annual average increase of 13.3 collisions a year over the wider COBA area, and an average increase of 0.4 collisions per year over the scheme key links. This shows that the scheme has not delivered the expected improvement in safety. Concerns over visibility of the Tot Hill roundabout from the A14 off slip have also been raised by local stakeholders.	✗
To separate long distance and local traffic	The scheme has successfully separated long distance and local traffic, enabling strategic traffic to not be interrupted by numerous junctions.	✓
To improve journey times and reliability	The scheme has resulted in a reduction in journey times along this section of the A14 in both directions. This is mainly due to the raising of the speed limit on the A14 to the national speed limit as expected for a high standard road.	✓
To improve access for non motorised users (NMUs)	The conversion of one carriageway of the former A14 route to an NMU route has improved access. Observations on a site visit indicated that the route is used, although it is noted that NMU improvements could be made on the local roads towards Haughley (although not part of the scheme) to fully integrate it with the villages.	✓
To achieve the above objectives in an environmentally sustainable and sensitive way	Most sub objectives are considered to be as expected. Air quality is considered to be better than expected due to lower than forecast traffic volumes. Landscape and biodiversity are considered to be worse than expected as plant stock is not considered to be maturing in line with reasonable expectations at this FYA stage. Due to the concerns raised regarding safety at the Tot Hill roundabout junction, journey ambience is also considered to be worse than expected.	Partial

Appendices

Appendix A. Tables and Figures in this Report

Tables

Figures

Appendix B. Glossary

Terms	Definition
AADT	**Annual Average Daily Traffic**. 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	**Average Daily Traffic**. Average daily flows across a given period.
AQMA	**Air Quality Management Area.**
AST	**Appraisal Summary Table**. This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG.
ATC	**Automatic Traffic Count**
AAWT	**Annual Average Weekday Traffic**. As AADT but for five days (Monday to Friday) only.
AWT	**Average Weekday Traffic**. As ADT but for five days (Monday to Friday) only.
BCR	**Benefit Cost Ratio**. This is the ratio of benefits to costs when both are expressed in terms of present value i.e. PVB divided by PVC.
Bvkm	**Billion Vehicle Kilometres**
CEMP	**Construction Environmental Management Plan**
CO_2	**Carbon dioxide**
COBA	**Cost Benefit Analysis**. A computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and 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	**Congestion Reference Flow**
DfT	**Department for Transport**
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	**Do Minimum**. In scheme modelling, this is the scenario which comprises the existing road network plus improvement schemes that have already been committed.
DMRB	**Design Manual for Roads and Bridges**
DS	**Do Something**. In scheme modelling, this is the scenario detailing the planned scheme plus improvement schemes that have already been committed.
EA	**Environment Agency**
EH	**English Heritage**
ES	**Environmental Statement**
EST	**Evaluation Summary Table**. In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST.
FYA	**Five Years After**
GCN	**Great crested newt**
HA	**Highways Agency**. An Executive Agency of the DfT, responsible for operating, maintaining and improving the strategic road network in England.

Terms	Definition
HEMP	**Handover environmental management plan**
HGV	**Heavy Goods Vehicle**
KSI	**Killed or Seriously Injured**. KSI is the proportion of casualties who are killed or seriously injured and is used as a measure of collision severity.
$L_{a10\ 18h}$	Noise level exceeded 10% of the time, over an 18 hour measurement period.
Laeq	Equivalent continuous noise level
LCA	**Landscape character area**
LEAP	**Landscape Environmental Management Plan**
LNS	**Low Noise Surfacing**
MAC	**Managing Area Contractor** Organisation normally contracted in 5-year terms for undertaking the management of the road network within a HA area.
Mph	**Miles per hour**
MVKM	**Million Vehicle Kilometres**
NATA	**New Approach to Appraisal**. The basis of the standard DfT appraisal approach when this scheme was appraised.
NE	**Natural England**
NMU	**Non-Motorised User**. A generic term covering pedestrians, cyclists and equestrians.
NRTF	**National Road Traffic Forecasts**. 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.
ONS	**Office for National Statistics**
OYA	**One Year After**
PIC	**Personal Injury Collisions**
PM_{10}	Particulate matter less than 10 micrometres in size
POPE	**Post Opening Project Evaluation**. The before and after monitoring of all major highway schemes in England.
Present Value	**Present Value**. 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.
PROW	**Public right of way**
PVB	**Present Value Benefits**. Value of a stream of benefits accruing over the appraisal period of a scheme expressed in the value of a present value.
PVC	**Present Value Costs**. As for PVB but for a stream of costs associated with a project
RSI	**Road Surface Influence**
STATS19	A database of injury collision statistics recorded by police officers attending collisions.
TAR	**Transport Appraisal Report**
TEE	**Transport Economic Efficiency**
TRADS	**Traffic Flow Data System**. Database holding information on traffic flows at sites on the strategic network.
UK	**United Kingdom**
webTAG	DfT's website for guidance on the conduct of transport studies at http://www.webtag.org.uk/

Appendix C. Information requested for Environmental section

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.	A14 Haughley New Street to Stowmarket Improvement Environmental Statement and Drawings, March 2006.	Received at OYA.
AST.	AST November 2006	Received at OYA.
Any amendments / updates, additional surveys or reports since the ES / SAR / EAR.	No significant changes to the scheme since the ES	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.	No significant changes to the scheme since the ES	No additional information received at FYA
As built drawings for landscape/ biodiversity/ environmental mitigation measures/ drainage/ fencing/ earthworks etc.	Electronic versions provided of 'As Built' drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc	Received at OYA as noted.
Construction Environment Management Plan (CEMP), Landscape and Ecology Aftercare Plan (LEAP), Landscape Management Plan (LMP) or Handover Environmental Management Plan (HEMP).	The Landscape Management Plan will be produced at the end of the five year aftercare period and therefore was not available. The Handover Environmental Management Plan was not available.	CEMP received at OYA. HEMP (Nov 2013) received at FYA.
Health and Safety File – Environment sections (to include all environment As-Built reports).	A14 Haughley New Street to Stowmarket Improvement, Scheme Handover File Rev B, January 2010 – documents in the Scheme Handover File included Health and Safety File.	Received at OYA.
Relevant Contact Names for consultation.	Suffolk County Council provided contact names for Suffolk County Council Consultees. Most of the other contact names were sourced by POPE team.	Sourced by POPE.
Archaeological Reports (popular and academic).	A14 Haughley Bends Improvement Archaeological Evaluation and Watching Brief Report, September 2007.	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).	-	N/ A.
List of properties eligible for noise insulation.	No properties are eligible for noise insulation.	None – as confirmed at OYA.
Employers Requirements Works Information - Environment sections.	A14 Haughley New Street to Stowmarket Improvement, Scheme Handover File Rev B, January 2010 – documents in the Scheme Handover File included Employer's Requirements Works Information.	Received at OYA.
Reports for any pre/ post opening survey and monitoring work e.g. for noise, biodiversity, water quality).	The Designer confirmed that no post opening survey or monitoring had been carried out.	No additional information received at FYA.
Animal mortality data.	Provided by MAC	None received.
Pre or Post opening Non-motorised User (NMU) Audits or Vulnerable User Surveys.	Results of the post opening Non Motorised User Survey undertaken for the POPE OYA evaluation were provided.	Non-Motorised User Audit Report 2007.
Information may be available regarding environmental enhancements to streetscape/ townscape for bypassed settlements	-	Aside from surface dressing of former A14, no measures implemented.
Scheme Newsletters / publicity material/ Award information for the scheme.	-	Received.

Appendix D. Photographic Record of Scheme

OYA Figure 5.1: The wet grassland mix has been slow to establish on the slopes of Balancing Pond 1.

OYA (April 2010)

FYA (June 2014)

The balancing pond at Haughley New Street, where although the marginal planting has established well, the wet grassland mix on the slopes continues to be slow to establish. No significant erosion was noted during the FYA site visit.

OYA Figure 5.2: Good plant establishment to the south of Haughley Road Bridge.

OYA (April 2010)

FYA (June 2014)

Although high sided vehicular movements may remain visible, it is considered that in conjunction with the intervening vegetation, the new planting to the south of the Quarries Cross underpass has now screened, or at least has partially screened, the concrete structure of the underpass from the (unspecified) property on Moorbridge Lane.

OYA Figure 5.3: View looking west towards Little Chef along local road and restricted highway illustrating bare earth on the bridleway part of the restricted highway and planting on top of the mounding, additional planting provided at the request of Suffolk County Council

OYA (April 2010)

FYA (June 2014)

The planting along the new bund between the restricted highway (NMU route) and old A14 (local access road) is not well established and is not providing the degree of visual screening expected. Unless planting is subject to ongoing management and maintenance, the greater than expected visual impact of the scheme reported as affecting the southern edge of Haughley at OYA may be not be fully mitigated by Design Year.

OYA Figure 5.4: A14 looking west towards the former Contractors compound and earth mound near Quarries Cross Junction.

OYA (April 2010)

FYA (June 2014)

The former Contractors compound has not yet been restored to agriculture as stated by the ES and as such, it is considered that this element of mitigation has not been realised and the landscape impact of this aspect of the scheme is not as expected. The topsoil mound remains within the Contractor's compound, but the eastern section of the mound where the Contractor's compound is in cut has been removed and it is now partially screened by the hedgerow which is establishing well, with the hedgerow now visible above the topsoil mound where the Contractor's compound is slightly raised above the level of the road. It is not considered that landscape impacts of the mound are significant but as noted at OYA, the disposal of surplus soil should have been fully considered in the ES.

OYA Figure 5.6: The Badger tunnel exit into Contractor's compound.

OYA (April 2010)

FYA (June 2014)

Although the badger fencing is likely to encouraging the use the identified crossing points, the crossing points themselves are unlikely to be functioning as would be expected as the former contractor's compound remains an unsuitable foraging environment for mammals (refer also to Figure 5-19 in the Biodiversity sub-objective)

OYA Figure 5.8: Visual impact of lighting for Grade II listed Tot Hill House located on the left of the photograph.

OYA (April 2010)

FYA (June 2014)

It can be seen that the planting at this location is establishing and providing a degree of visual screening and as such, is performing the function for which it was intended. It is therefore considered that although the lighting continues to have an impact on the setting of Tot Hill House, it is unlikely to be significantly adverse.

OYA Figure 5.11: Footpath detour around safety barrier.

OYA (April 2010)

FYA (June 2014)

The positioning of the vehicle restraining system is such that any direct link between the overbridge footway (left) and the bridleway (right) has been curtailed. No further information regarding this matter has been provided for this report and as such, the situation remains unchanged from the time of the OYA evaluation.

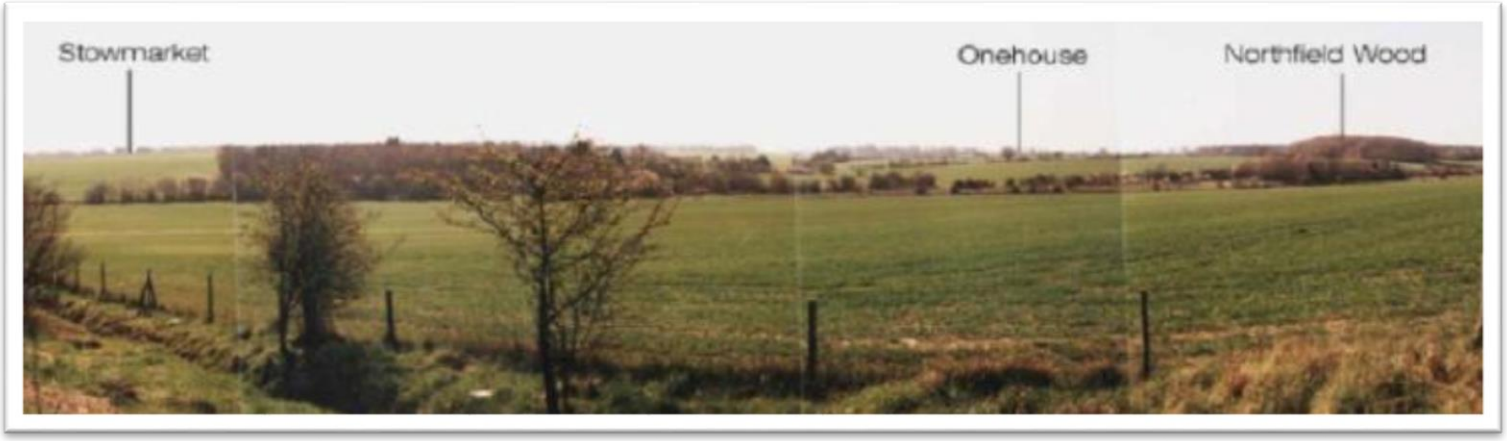
ES Figure 9.5 – Landscape Photos: Photo A (Looking north west to Tot Hill).

ES (March 2006)

FYA (June 2014)

Although changes to the alignment of the road are perceptible, the changes do not alter the overall balance of features or elements that comprise the view from this location.

ES Figure 9.5 – Landscape Photos: Photo B (Looking south east from A14 towards Stowmarket and Northfield Wood).



ES (March 2006)

FYA (June 2014)

Although high-sided vehicular movement is visible, the screening effects of the earthworks provided along the north side of the new A14 (opposite Gallows Fields) are clearly visible.

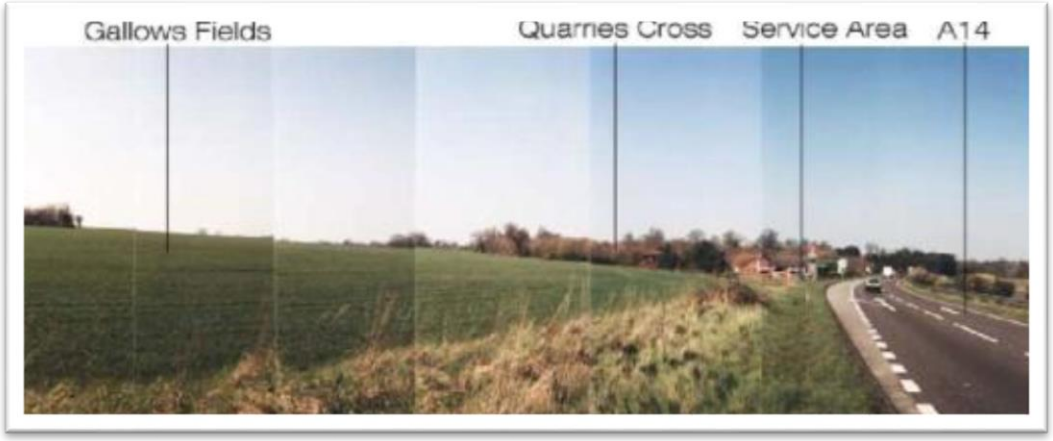
ES Figure 9.6 – Landscape Photos: Photo F (Looking north east from the over bridge at the western extents of the scheme to Character Area 2).

ES (March 2006)

FYA (June 2014)

Woodland and shrub planting plots adjacent to the eastbound carriageway of the A14 (centre right) at the western end of the scheme; gaps are clearly visible within the planting matrix and surviving plants are stunted and likely to be less developed than would be reasonably expected at the FYA stage.

ES Figure 9.7 – Landscape Photos: Photo H (Looking west along the old A14 to the service station and Quarries Cross).



ES (March 2006)

FYA (June 2014)

Vehicular movement on the new A14 (centre left) is visible at a level above that of the old A14 (right). Planting along the new bund between the restricted highway (NMU route) and old A14/ Local access road is not establishing well (far right), and the unexpected adverse visual impact on the southern edge of Haughley reported at OYA may not be fully mitigated by Design Year.

ES Figure 9.7 – Landscape Photos: Photo J (Looking north east from London Lane over Character Area 3).

ES (March 2006)

FYA (June 2014)

High-sided vehicular movement (indicated on the FYA photo) is visible from London Lane.

ES Figure 9.7 – Landscape Photos: Photo K (Quarries Cross picnic area).

ES (March 2006)

FYA (June 2014)

A comment was made by Suffolk County Council at OYA regarding potential access to the Quarries Cross picnic site from the eastbound lay-by of the new A14. Despite the fact that direct vehicular access to the picnic site parking area has been curtailed, no evidence was observed during the FYA site visit to suggest that the lay-by on the A14 was being used as a parking area for picnic site visitors.