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SCOTTISH TRUNK ROAD INFRASTRUCTURE
PROJECT EVALUATION

3YA Evaluation Report for A76(T) Glenairlie



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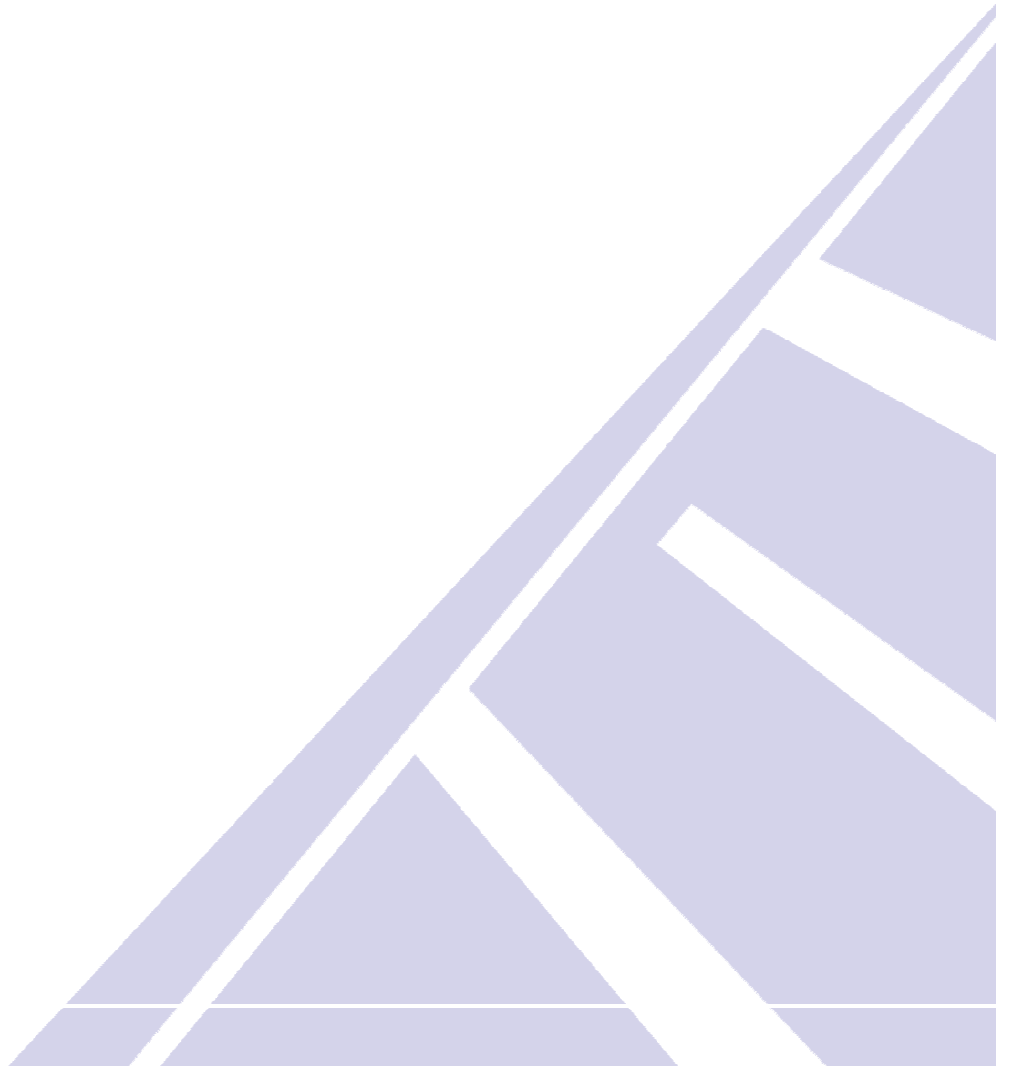
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GLOSSARY

The following abbreviations have been used in this report:

AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Counter
BCR	Benefit to Cost Ratio
DMRB	Design Manual for Roads and Bridges
ES	Environmental Statement
NPV	Net Present Value
NRTF	National Road Traffic Forecasts
RSA	Road Safety Audit
STAG	Scottish Transport Appraisal Guidance
WS2+1	Wide Single 2+1 Lane Carriageway

SUMMARY OF IMPACTS



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1 SUMMARY OF IMPACTS

This section provides a short summary of the key elements contained within this Three Year After Evaluation report of the A76(T) Glenairlie project

1.1 Operational Indicators – How is the project operating?

The project has had no significant impact on traffic volumes within the vicinity of the project. Given the improvement incorporates an upgrade of the existing carriageway from single to wide single 2+1 carriageway, this is as expected.

Post-opening surveys of speed and overtaking conditions suggest the project is operating as expected. Fewer platoons of vehicles are exiting the survey site than entering due to the improved overtaking opportunities.

The project is operating safely in the first three years of operation, with only one slight accident occurring within the vicinity of the project. The accident was not attributable to the design or layout of the project.

1.2 Process Indicators – How well was the project implemented?

Process Indicators provide evaluation across the key elements of project cost, programme and process.

Construction of the project commenced in January 2008 and the project was opened to traffic in March 2009. The cost of construction of the project was greater than that predicted during the appraisal by approximately £0.6m (22%). This was, in part, due to issues relating to the topographical survey carried out for the project.

It should be noted, however, that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

Based on the project's discounted tender cost of approximately £5m, the comparison of out-turn and tender costs suggests that the project has been delivered approximately £0.7m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

The implementation of mitigation measures committed within the Environmental Statement had been implemented to a satisfactory level.

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A Stage 5 Road Safety Audit was carried out within the vicinity of the project and confirmed that one slight accident had occurred in the period three years after opening. The RSA indicated, however, that no conclusions can be drawn that would suggest road safety deficiencies and that the project is overall operating safely.

1.3 Forecasting – How accurate were predictions?

Traffic flows on the A76(T) in the vicinity of the project are lower than forecast, and have been reducing for a number of years. The predicted 2013 flow was approximately 16% greater than the observed 2013 flow under the 60/40 traffic forecast scenario¹. It is acknowledged, however, that the economic downturn has seen a widespread reduction in traffic flows across the Scottish road network.

As noted in Section 1.2, the cost of construction of the project was greater than that predicted during the appraisal by approximately £0.6m (22%) which was in part due to issues relating to the topographical survey undertaken for the project.

1.4 Objectives – Is the project on track to meet its objectives?

The project's objectives, in relation to the operation of the project, focussed on the improvement and increase in the number of overtaking opportunities and improving the level of service and safety by reducing the effects of driver stress and journey times on this section of the A76(T).

The nature of the project (a wide single 2+1 carriageway) has provided enhanced overtaking opportunities in both directions of travel and subsequently will have helped to reduce driver frustration through the dispersion of platoons as a result of the available opportunities to overtake.

Mean vehicle speed data is used a proxy for journey time data for the project, the analysis of which suggests that mean vehicle speeds have been estimated to exceed the national speed limit in force over the extent of the survey site. There is no available evidence, however, to suggest that there are any speed related safety issues within the vicinity of the project.

The project is operating safely in the first three years of operation with only one slight accident occurring within the vicinity of the project. The Stage 5 Road Safety Audit concluded that the road layout at Glenairlie continues to operate safely and efficiently and it can therefore be judged that the project is likely to have provided an improvement in road safety.

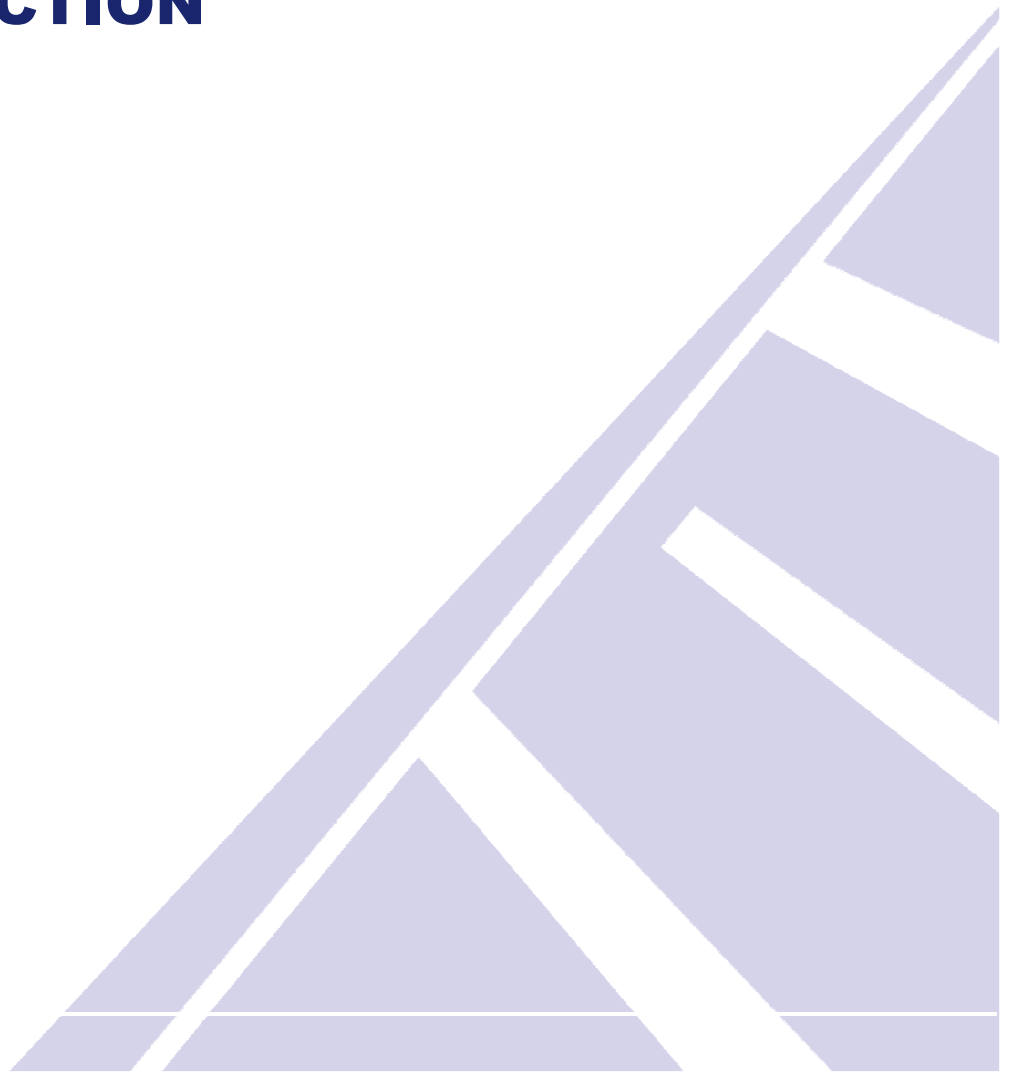
¹ 60/40 traffic forecast scenario calculated through factoring results of low and high traffic forecast scenarios by 0.6 and 0.4 respectively

1.5 **Costs to Government – Is the project delivering value for money?**

Based on the evaluation of value for money at the time of the project's 3YA Evaluation, the Net Present Value (NPV) of £0.09 and Benefit to Cost Ratio (BCR) of 1.02 for the project are likely to be less than predicted at the time of assessment. This reflects higher than predicted construction costs which will impact on the project's value for money. The project can, however, be expected to provide benefits to transport users and help encourage economic development within south west Scotland and beyond.

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INTRODUCTION



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2 INTRODUCTION

2.1 Background to Project Evaluation

Road infrastructure projects normally take a minimum of five to seven years to plan prior to the commencement of construction and it is not possible to know exactly what will happen when a project is opened, nor what would have happened had the project not been built, particularly when the project is opened a number of years after its assessment.

The aims of evaluation, as set out in the Design Manual for Roads and Bridges (DMRB), Volume 5, SH 1/97 'Traffic and Economic Assessment of Road Schemes in Scotland', are as follows:

- To satisfy the demands of good management and public accountability by providing the answers to questions about the effects of a new or improved road;
- To identify the strengths and weaknesses in the techniques used for appraising projects, so that confidence in the roads programme is maintained;
- To allow the predictive ability of the traffic or transport models used to be monitored to establish whether any particular form of model is consistently more reliable than others when applied to particular types of projects; and
- To assist in the assessment of compensation under Part 1 of the Land Compensation (Scotland) Act 1973 for depreciation due to the physical factors caused by the use of public works.

The evaluation of trunk road projects is evolving as Transport Scotland improves its process and reporting to reflect the principles of monitoring and evaluation set out in the Scottish Transport Appraisal Guidance (STAG).

STAG advocates evaluation against indicators and targets derived for the Transport Planning Objectives originally set for the project, STAG criteria (Environment, Safety, Economy, Integration and Accessibility & Social Inclusion) and relevant policy directives, the aim of which is to identify:

- Whether the project is performing as originally intended;
- Whether, and to what extent, it is contributing to established policy directives; and
- Whether the implemented project continues to represent value for money.

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Furthermore, Scottish Trunk Road Infrastructure Project Evaluation (STRIPE) by Transport Scotland sets out the requirements for evaluation which draws on DMRB and STAG. This document was finalised in 2013 and acts as a guide to evaluation for relevant projects. STRIPE states that two programmed evaluations should be carried out on relevant projects, as follows:

- A one-year after Evaluation (1YA) – prepared one year after opening, this report should “provide Transport Scotland with an early indication (as far as is practicable) that the project is operating as planned and is on-track to achieve its objectives. The 1YA evaluation also provides a Process Evaluation including an assessment of actual vs. forecast project cost, and programme together with reasons for variance”. STRIPE also states that a stand-alone report should be prepared on each individual project. Information gathering should be supported by a site visit and stakeholder interviews.
- A Detailed Evaluation – undertaken three or five years after opening. This second evaluation “considers a project’s impacts, whether it has achieved its objectives and reviews the actual impacts against forecasts and determines the causes of any variances”.

2.2 Evaluation Reporting

As recommended in STRIPE, this report constitutes a Detailed Evaluation Report at the Three Year After (3YA) Stage. It is a standalone report on the A76(T) Glenairlie Project. This project fits the criteria for evaluation at this stage, as it cost over £5m and has previously been evaluated at the One Year After (1YA) Stage. The location of the project is presented in Figure 2.1.

Table 2.1: Project Summary Details

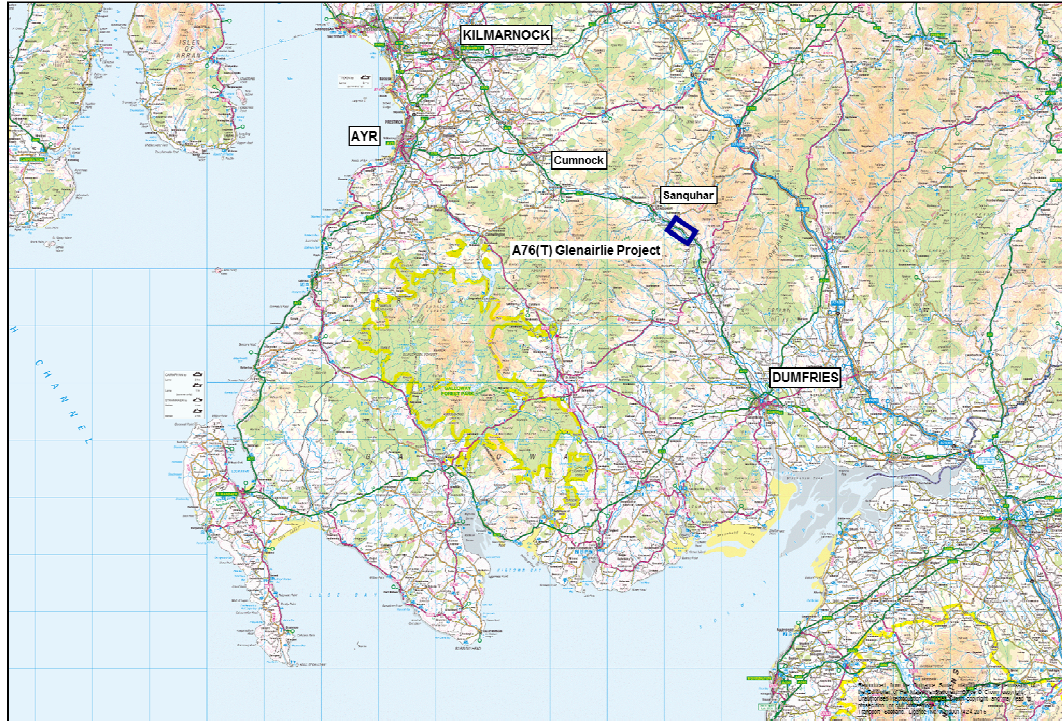
Route	Project Name	Standard	Length (km)	Open to Traffic
A76(T)	Glenairlie	WS2+1	3.0	March 09

Key: WS2+1 Wide Single 2+1 Carriageway

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Figure 2.1: Project Location Plan



2.3 Previous Evaluations

A 1YA Evaluation was carried out for the A76(T) Glenairlie project and findings reported within the *Evaluation Report for Trunk Road Projects Opened between April 2007 and March 2009* report, dated January 2013.

The key findings from the 1YA Evaluation report were as follows:

Comparison Between Pre and Post Opening Traffic Flows

The comparison between pre and post project opening traffic volumes on the A76(T) mainline east of Sanquhar indicated that traffic flows in 2010 were comparable with pre-opening levels. Traffic flows between 2010 and 2011 had reduced by approximately 300 vehicles per day (vpd), approximately 8%.

Comparison Between Predicted and Actual Traffic Flows

The comparison between predicted and actual AADT flows indicated that the predicted 2010 flow (derived by interpolating between the modelled assessment year traffic flows) indicated flows were within 4% of the observed flows.

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Post Opening Overtaking Opportunities

The comparison between pre and post opening overtaking surveys indicated that:

- Approximately 8% and 14% of vehicles travelling northbound through the survey site in the AM and PM survey periods respectively carried out an overtaking manoeuvre. This compared to approximately 28% and 33% of vehicles undertaking an overtaking manoeuvre in the AM and PM survey periods respectively following the opening of the project.
- Approximately 10% and 22% of vehicles travelling southbound through the survey site in the AM and PM survey periods respectively carried out an overtaking manoeuvre. This compared to approximately 31% and 28% of vehicles undertaking an overtaking manoeuvre in the AM and PM survey periods respectively following the opening of the project.
- As a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site post opening compared to the level of platoons dispersed during the pre opening survey.

Change in Travel Times

The comparison between mean vehicle speeds over the extents of the survey site indicated that speeds in both directions of travel had increased following the opening of the project. It can therefore be expected that journey times are likely to have reduced and become more reliable as a result of the provision of the dedicated overtaking opportunities

Environment

The implementation of mitigation measures committed within the Environmental Statement were investigated and had been implemented to a satisfactory level. The planting is continuing to thrive and is helping to ensure the scheme fits into the wider landscape overall.

Safety

An assessment of the one year post opening personal injury accidents suggested that the project is operating safely.

Economy

A difference of 4% between predicted and actual AADT flows suggested that the economic benefits of the project were likely to be realised.

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Accessibility & Social Inclusion

On site observations confirmed that a shared cycle and pedestrian facility had been provided that utilises the redundant section of the bypassed A76.

Cost to Government

The out-turn cost of the project is approximately £0.3m (11%) greater than was predicted at the time of assessment.

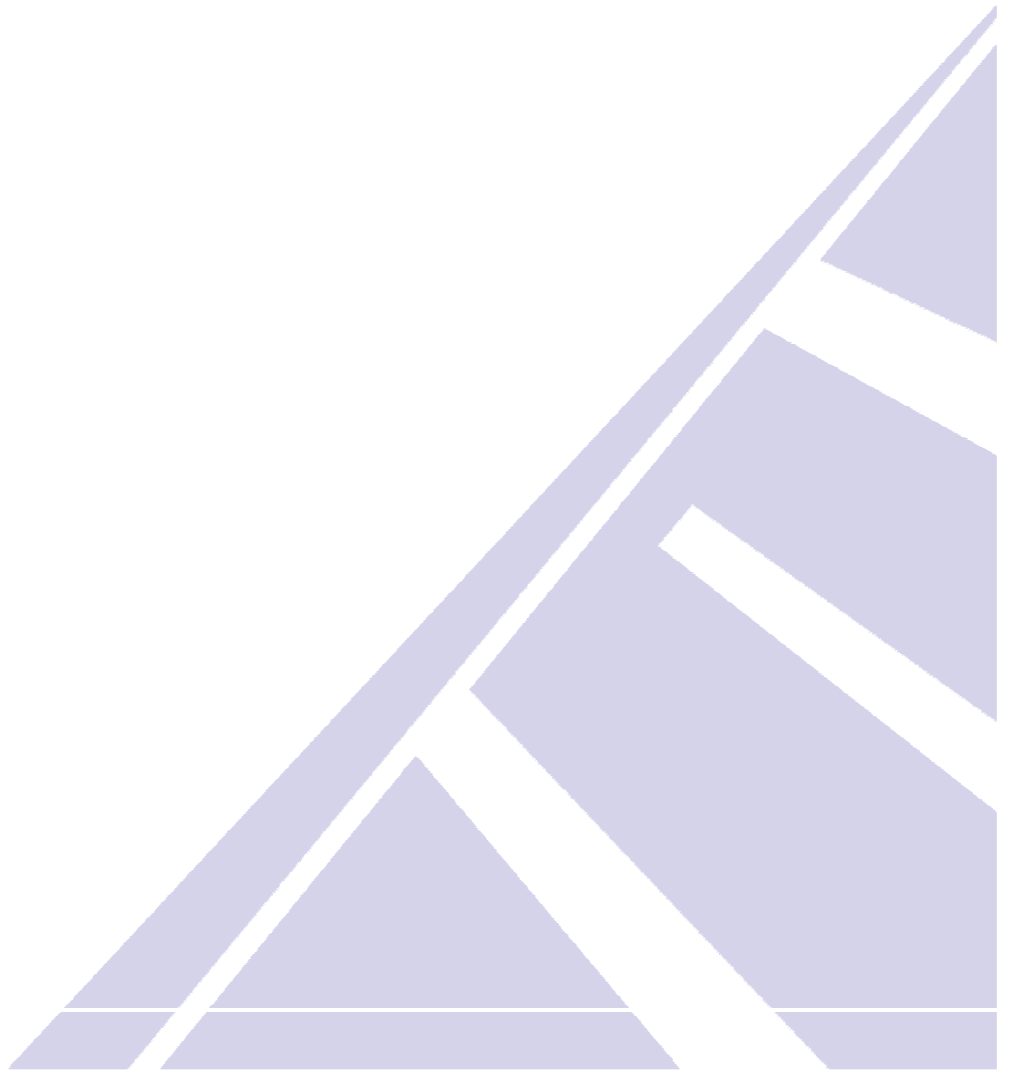
Value for Money

The NPV and BCR were unlikely to be as great as predicted at the time of assessment, although it was judged that the project would continue to provide benefits to road users.

Achievement of Objectives

The initial indications noted within the 1YA Evaluation Report suggested that the majority of the project's objectives were likely to be achieved. It was noted, however, that at the 1YA Evaluation stage it could not be confirmed whether the project would achieve good value for money. It could be expected, however, that the project would continue to provide benefits to transport users and may help to encourage economic development within south-west Scotland and beyond.

DETAIL OF EVALUATION



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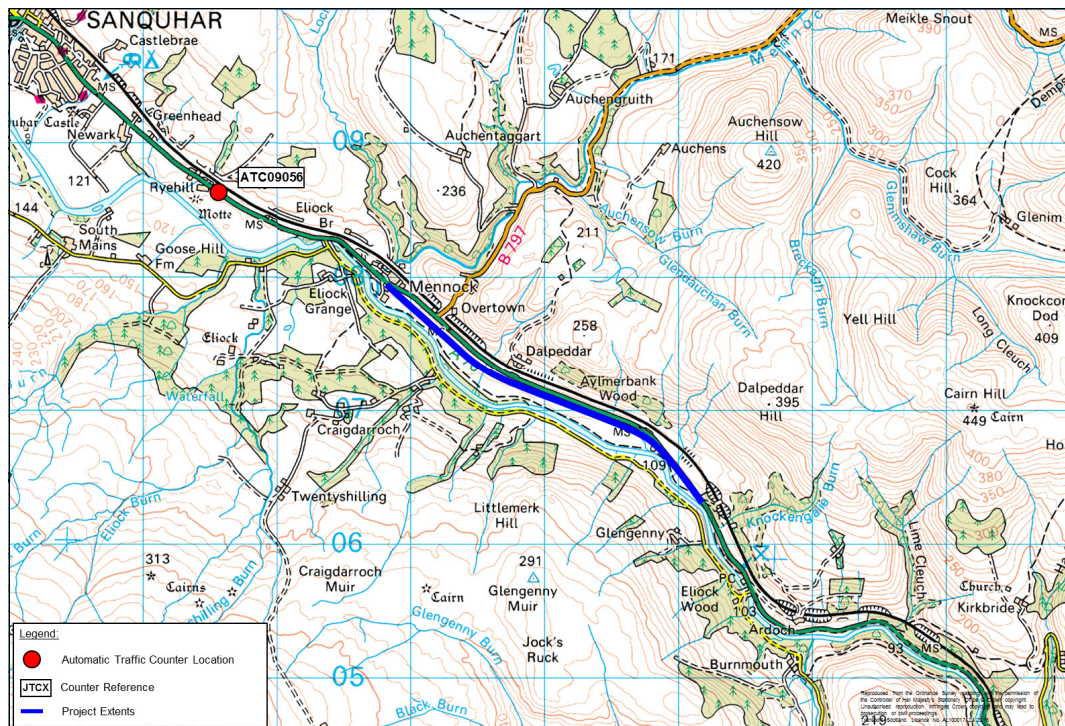
3.1 Introduction

Project Description

The project involved the construction of an off-line alternating wide single 2+1 carriageway (WS2+1) over 2.5 kilometres between Caynyen Glen and the village of Mennock and 0.5 kilometres of on-line improvements to the southern end of the project. The project was officially opened to traffic on 3rd March 2009.

The new road provides for dedicated overtaking opportunity in both directions of travel through a dedicated 1.2 kilometre northbound overtaking section and a 0.8 kilometre southbound overtaking section. The general location of the project is shown in Figure 3.1.

Figure 3.1: Project General Location Plan



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Project Objectives

The objectives of the A76(T) Glenairlie project were set as follows:

- To improve and increase the number of overtaking opportunities to reduce the conflicts between long distance users, local and agricultural traffic;
- To improve the operational performance and level of service on the A76(T) by reducing the effect of driver stress and journey times by constructing guaranteed overtaking sections designed to break up convoys/platoons;
- To incorporate measures for non-motorised users, wherever practicable. In particular, cycling proposals shall be designed in accordance with the "Trunk Road Cycling Initiative";
- To maintain the asset value of the A76(T) route;
- To mitigate the environmental impact of the new works where possible; and
- To achieve good value for money for both taxpayers and road users.

3.2 Evaluation Methodology

As set out in Section 2.1, this Three Year After report presents the results of a Three Year Evaluation of the A76(T) Glenairlie project, focusing on:

- The operation of the project: how the project is operating (in terms of traffic and safety in particular); and
- Objectives: whether the project has met or will meet its objectives.

A process evaluation has also been carried out, which considers how the project was implemented across the elements of project cost, programme and key processes. The main aspects of the process evaluation are summarised in Section 1 of this report and commentary included within this section under the appropriate criteria. For example, the RSA process is considered as part of the discussion on how the project is operating in terms of Safety.

This 3YA evaluation is informed by the analysis of survey data and supported by a site visit carried out in June 2014. External stakeholder views were also invited.. Feedback was received from one respondent, which is presented within the report.

Appendix B provides further information on the methodology employed and data sources used to inform this 3YA Evaluation.

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3.3 The operation of the project and process evaluation

Network Traffic

The evaluation involves the consideration of pre and post opening comparison of operational indicators focusing on network traffic indicators, including traffic volumes and travel times. The findings from this comparison are presented in the following section.

Traffic Volumes

The Automatic Traffic Counters (ATC) located within the study area are as follows:

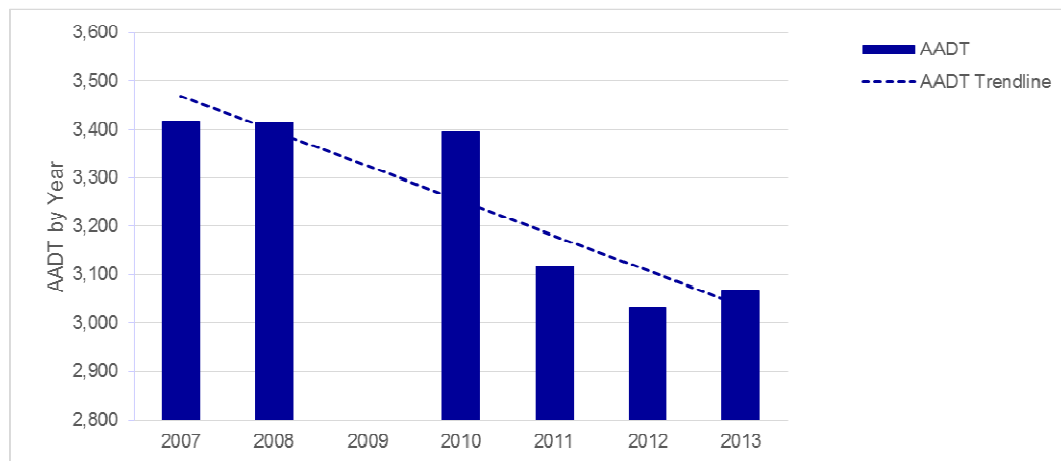
- ATC09056 A76 East of Sanquhar

The locations of the ATC used to record traffic flows within the study area are shown in Figure 3.1.

Comparison Between Pre and Post Opening Traffic Flows

The Annual Average Daily Traffic (AADT) flows pre and post project opening on the A76(T) route within the vicinity of the project are presented in Figure 3.2. The percentage of Heavy Goods Vehicles (HGVs) are not available as classified traffic data by vehicle type is not available from the ATC within the vicinity of the project.

Figure 3.2: Long Term ATC Data



The **1YA Evaluation** indicated that traffic flows in 2010 were comparable with pre-opening levels, whereas traffic flows between 2010 and 2011 reduced by approximately 300 vehicles per day (vpd) which equates to approximately 8%.

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A comparison between the latest available pre and post opening traffic volumes on the A76(T) within the vicinity of the project indicates that traffic flows in 2013 were approximately 350 vehicles per day (vpd) lower than 2007 flow levels. Analysis, however, of the long-term trends in annual traffic flows suggest that the volume of traffic on this section of the A76(T) had been falling for a number of years prior to the opening of the project. Traffic volumes between 2010 and 2013 decreased by approximately 330 vpd (10%).

Given the nature of the project, changes in traffic are not likely to be a consequence of changes to the carriageway standard and may reflect the reductions in traffic volumes observed across the wider trunk road network due to the economic downturn which coincided during the evaluation period.

Comparison Between Predicted and Actual Traffic Flows

The latest flow comparisons for the project are based on AADT flows from 2013 as this was the latest full year of reliable traffic data available from Transport Scotland's traffic counters within the vicinity of the project.

As part of the project's appraisal, National Road Traffic Forecasts (NRTF) low and high growth factors were applied to the observed 2003 base year traffic flows to derive opening and future modelled assessment year traffic flows. Predicted traffic flows for 2013 were derived by interpolating between the 2007 and 2027 modelled assessment year design network flows. A summary of the actual and predicted traffic data is shown in Table 3.1.

Table 3.1: Traffic Analysis Summary

ATC Ref	Actual AADT*	Predicted AADT			% Difference (Predicted – Actual) / Actual		
		Low	60/40	High	Low	60/40	High
A76(T) East of Sanquhar							
ATC09056	3,067	3,465	3,571	3,729	13.0%	16.4%	21.6%

* 2013 flows (latest full year of ATC data available)

The comparison between the predicted and actual AADT flows in Table 3.1 indicates that the predicted 2013 flow (derived by interpolating between the modelled assessment year traffic flows) was 13% and 22% greater than the observed 2013 flow under low and high traffic forecast scenarios respectively.

The **1YA Evaluation** indicated that the predicted 2010 flow (derived by interpolating between the modelled assessment year traffic flows) was up to 4% higher than the observed 2010 flow under the high traffic forecast scenario.

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Whilst the latest comparison indicates that traffic growth on the A76(T) has fallen significantly short of the assumed NRTF forecasts, it is recognised that there has been a general fall in traffic volumes across the wider trunk road network in recent years due to the economic downturn which may in part account for the difference.

Traffic Volumes: Key Findings

Observed traffic flows are on average 16% lower than forecast flows. This is in part attributed to the overall decline in traffic observed across the trunk road network during the economic downturn which coincided with the project opening in 2009.

A comparison between the 1YA and 3YA after evaluation shows increasing variation between forecast and predicted traffic flows.

Overtaking Opportunities

Comparison Between Pre and Post Opening Overtaking Opportunities

A post opening overtaking survey was undertaken on the A76(T) in October 2011 to provide an indication of conditions at Glenairlie as part of the project's **1YA Evaluation**. The results from the post opening survey were compared against the results from a pre opening survey undertaken in April 2004 to provide an indication of the effect that the project has had on overtaking conditions.

Analysis of the results from the post opening survey undertaken as part of the **1YA Evaluation** indicated that the percentage of northbound vehicles that carried out an overtaking manoeuvre during the pre opening AM and PM survey periods was 8% and 14% respectively. This compares to 28% and 33% during the post opening AM and PM survey periods respectively. The difference in level of overtaking observed suggests that the project has facilitated increased overtaking in the northbound direction of travel.

In the southbound direction, 10% and 22% of all southbound vehicles that travelled through the survey site during the pre opening AM and PM survey periods respectively carried out an overtaking manoeuvre. This compares against 31% and 28% during the post opening AM and PM survey periods respectively. Similar to northbound traffic, the difference in the level of overtaking observed suggests the project has also facilitated increased overtaking in the southbound direction of travel.

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A further post opening overtaking survey was undertaken on the A76(T) in June 2014 to provide an indication of any changes in conditions as part of the project's 3YA Evaluation. Analysis of the results from the post opening survey completed in June 2014 indicates that approximately 30% and 28% of vehicles that travelled through the survey site in the two-lane northbound direction during the AM and PM survey periods respectively carried out an overtaking manoeuvre. In the two-lane southbound direction of travel, approximately 19% and 26% of vehicles which travelled through the survey site during the AM and PM survey periods respectively carried out an overtaking manoeuvre.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in October 2011 to provide an indication of the effect that the project has had on overtaking conditions and any changes in overtaking levels that may have occurred during the period following opening of the project in March 2009. The comparison of the results from the pre and post opening surveys, undertaken in October 2011 and June 2014, is presented in Table 3.2.

Table 3.2: Level of Overtaking

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Pre Opening (2004)	8%	10%	14%	22%
Post Opening (2011)	28%	31%	33%	28%
Post Opening (2014)	30%	19%	28%	26%

The level of overtaking observed during the post opening surveys in October 2011 and June 2014 is broadly comparable and higher compared to the post opening survey. The variation in the level of overtaking undertaken by southbound traffic in the AM period may reflect an isolated one-off variation. The lower flows observed during the June 2014 survey, particularly during the AM survey period, in the southbound direction of travel, may have influenced the lower levels of overtaking. It is not possible, however, to draw any significant conclusion from one data set.

Stakeholder feedback

One respondent stated that overtaking opportunities had been improved.



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Comparison Between Pre and Post Opening Vehicle Platoons

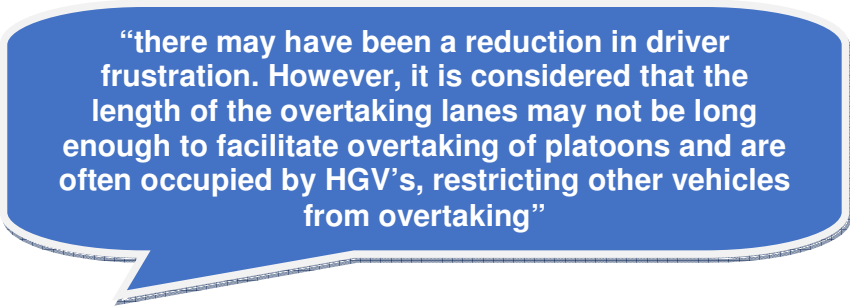
Post opening platooning data, collected as part of the post opening overtaking surveys, was available for the AM and PM survey periods. The **1YA Evaluation** indicated that, as a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site post opening compared to the level of platoons dispersed during the pre opening survey.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in October 2011 to provide an indication of the effect that the project has had on platooning conditions and any changes in platooning levels that may have occurred during the period following opening of the project in March 2009. The comparison of the results from the post opening surveys undertaken in October 2011 and June 2014 is presented in Figure 3.3a and Figure 3.3b. “Enter” indicates the point at which vehicles enter the survey site whereas “Exit” indicates the point at which vehicles leave the survey site.

Analysis of the results presented in Figures 3.3a and 3.3b indicates that the platooning conditions recorded in June 2014 are broadly comparable with those recorded in October 2011 and suggests that as a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site. A comparison between the total number of platoons that entered and exited the survey site during the post opening surveys compared to the pre opening survey suggests that, overall, while greater numbers of ‘smaller’ platoons (i.e. containing three vehicles or less) were observed exiting than entering the survey site, the project has an overall positive effect on the dispersion of vehicles in platoon over the extents of the survey site.

Stakeholder feedback

One respondent stated that there may have been a reduction in driver frustration. However, it is considered that the length of the overtaking lanes may not be long enough to facilitate overtaking of platoons and are often occupied by HGV’s, restricting other vehicles from overtaking.

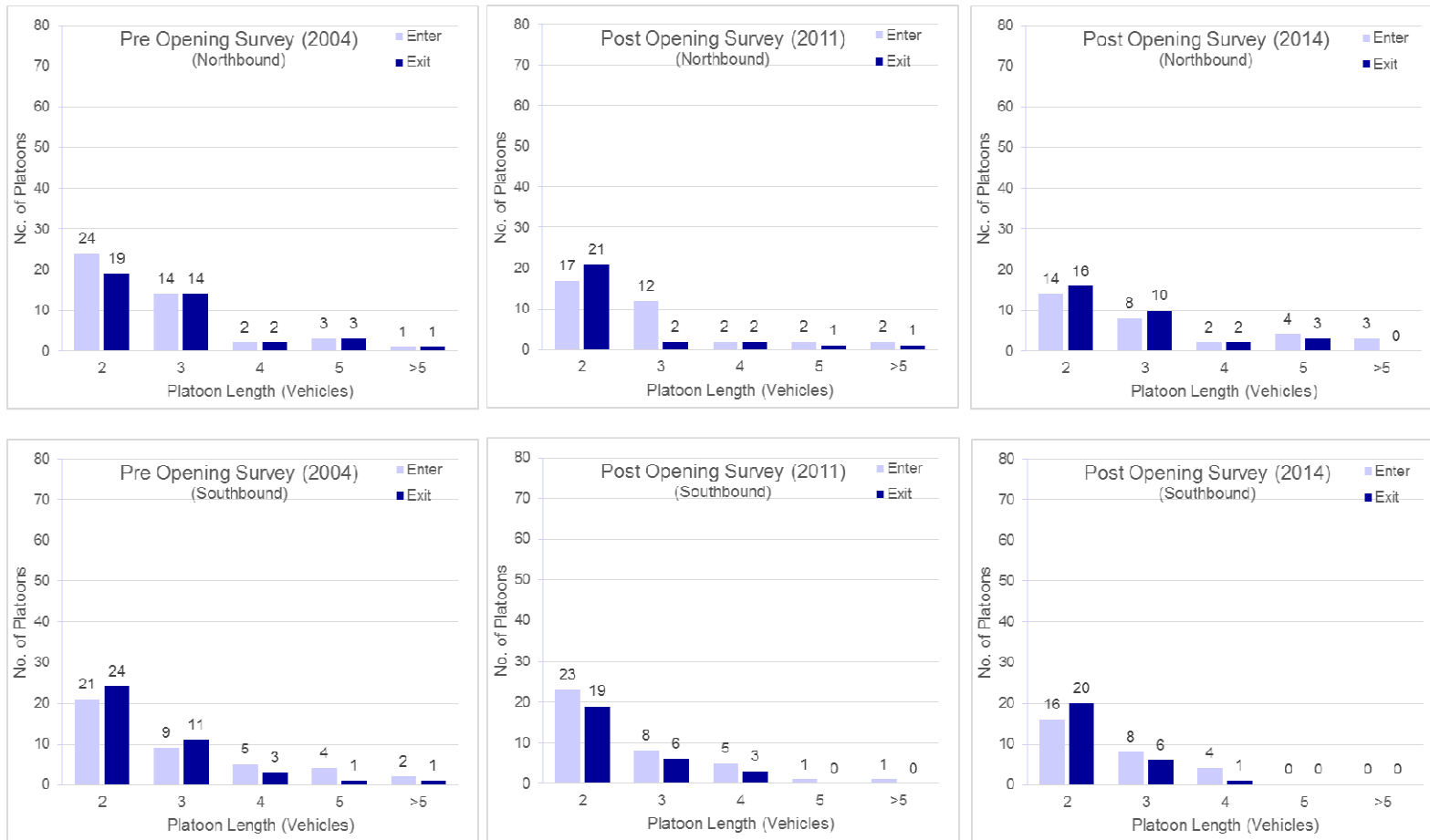


“there may have been a reduction in driver frustration. However, it is considered that the length of the overtaking lanes may not be long enough to facilitate overtaking of platoons and are often occupied by HGV’s, restricting other vehicles from overtaking”

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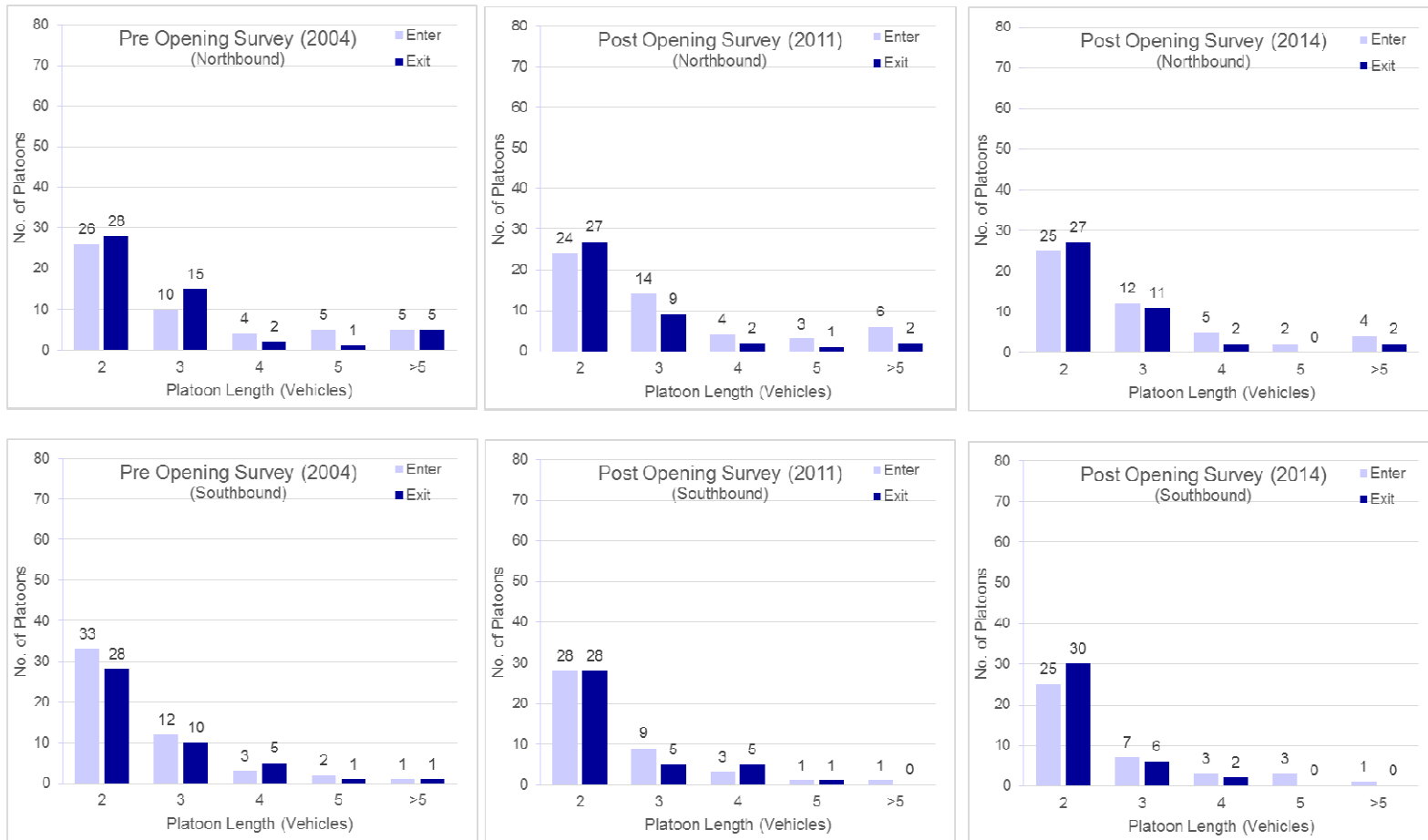
Figure 3.3a: Number of Platoons (AM Survey Period)



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Figure 3.3b: Number of Platoons (PM Survey Period)



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Overtaking Opportunities: Key Findings

The project has facilitated northbound overtaking with approximately 28% and 30% of vehicles travelling through the survey site in this direction in the AM and PM survey periods respectively observed to carry out an overtaking manoeuvre during the post project surveys. In the two-lane southbound direction of travel, approximately 19% and 26% of vehicles which travelled through the survey site carried out an overtaking manoeuvre in the AM and PM survey periods respectively.

Overall, the project has had a positive effect on the dispersion of vehicles travelling in platoon in both directions of travel over the extents of the survey site.

Travel Times

Vehicle Speeds

Mean vehicle speeds, estimated from the information collected as part of the pre and post opening overtaking surveys, have been used as a proxy for changes in travel times.

The **1YA Evaluation** indicated that speeds in both directions of travel have increased following the opening of the project. It can therefore be expected that journey times are likely to have reduced and become more reliable as a result of the provision of the dedicated overtaking opportunities.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in October 2011 to provide an indication of the effect that the project has had on mean vehicle speeds. The comparison of the results from the post opening surveys undertaken in October 2011 and June 2014 is presented in Table 3.3.

Table 3.3: Assessment of Mean Vehicle Speeds (mph)

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Pre Opening (2004)	44	48	48	51
Post Opening (2011)	63	59	64	60
Post Opening (2014)	64	59	66	59

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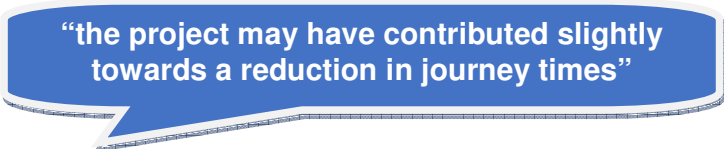
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Analysis of the results presented in Table 3.3 indicates that the mean vehicle speeds recorded in June 2014 are broadly comparable with those recorded in October 2011. The results suggest that mean vehicle speeds in the two-lane northbound direction during both the AM and PM survey periods are slightly greater than the mean vehicle speeds in the two-lane southbound direction. This may be due to the nature of the route to the south of the project which is constrained by the prevailing topography with few opportunities to overtake slower moving vehicles.

Based on the distances between the cameras used for the post opening surveys, mean northbound vehicle speeds have been estimated to exceed the national speed limit in force over the extent of the survey site. There is, however, no evidence to suggest that there are any speed related safety issues within the vicinity of the project.

Stakeholder feedback

One respondent affirmed that the project may have contributed slightly towards a reduction in journey times.



“the project may have contributed slightly towards a reduction in journey times”

Travel Times: Key Findings

Overall, the project is considered to have had a positive impact on journey times over the extent of the project with higher mean speeds observed post opening compared to pre opening.

Analysis of the speed data indicates mean speeds to be broadly comparable between the survey periods and, as such, the project is considered not to have had a material impact on speed related safety issues.

Stakeholder feedback received suggests that the project may have contributed slightly towards improved journey times.

3.4 Environment

The following section provides a summary of the assessment of environmental mitigation measures proposed for the A76(T) Glenairlie project. A fuller report is provided in Appendix A.

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Review of Environmental Mitigation Measures

The environmental mitigation measures originally proposed for the project were obtained from the project's Environmental Statement and the findings of the project's 1YA Evaluation completed in 2010 were reviewed (see Section 2.3). As part of the 3YA Evaluation, a site visit was carried out in June 2014 to confirm the implementation and condition of the environmental mitigation measures and review any comments raised in the 1YA Evaluation about the environmental mitigation.

The key environmental mitigation issues to be reviewed during the 3YA evaluation as determined by the comments from the 1YA report, included:

- Ecology;
- Landscape;
- Water quality and drainage; and
- Pedestrians, cyclists and community effects.

Findings

The observations made during the 3YA site visit found that the environmental mitigation measures implemented ensured that overall the project fits well into the wider landscape and are helping to screen the road. The rapid response planting included as part of the project's landscape mitigation has been successful. Both native and non-native (rapid response) species are well established and provide some screening of the road, particularly on the east side embankment. Non-native planting will need thinning as appropriate to ensure a mix of species more in keeping with the local area and to increase benefits to biodiversity.

Throughout the project there is a good mix of wildflower planting, natural regeneration and native tree planting such as oak, ash, rowan, beech and willow. This provides a diverse mosaic of grassland, scrub and woodland habitats to support a variety of fauna such as invertebrates, mammals and birds.

During the site visit the area of wetland proposed at Ritchie's Cleuch could not be accessed directly, although there was a line of rushes visible, which could indicate wetland species are present.

Mammal tunnels and fencing appeared to be in good condition when inspected, although there was no clear evidence (such as mammal trails, hairs or footprints) to indicate that the tunnel is in current use.

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Environment: Key Findings

Planting is establishing well across the project and both native and non-native tree planting has been successful and help the project to fit well into the wider landscape. Non-native fast growing (rapid response) trees were used to provide a degree of screening whilst the native species became better established. It is normal practice to then thin these non-native trees out to allow a good mix of trees to thrive. Mammal tunnels and fencing was found to be in good condition, although there was no clear evidence the tunnels are in use.

The issues that have been identified as part of the environmental evaluation process have been provided to Transport Scotland's operating companies for actioning.

3.5 Safety

Accidents

Comparison Between Pre and Post Opening Personal Injury Accident Numbers

The locations and severities of accidents occurring within the vicinity of the project three years before and three year after project completion are shown in Figure 3.4a and Figure 3.4b. A summary of the personal injury accident data is shown in Table 3.4.

Table 3.4: Accident Data Summary

Period	Fatal	Serious	Slight	Total Accidents
3 Years Before				
A76(T)	1	1	2	4
1 Year After				
A76(T)	0	0	1	1
3 Years After				
A76(T)	0	0	1	1

As can be seen from Table 3.4, one personal injury accident (one slight) occurred in the three year period following the opening of the project in comparison to four personal injury accidents (one fatal, one serious and two slight) in the three years before opening suggesting a significant improvement in road safety.

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Figure 3.4a: 3 Years Before Opening Personal Injury Accident Numbers

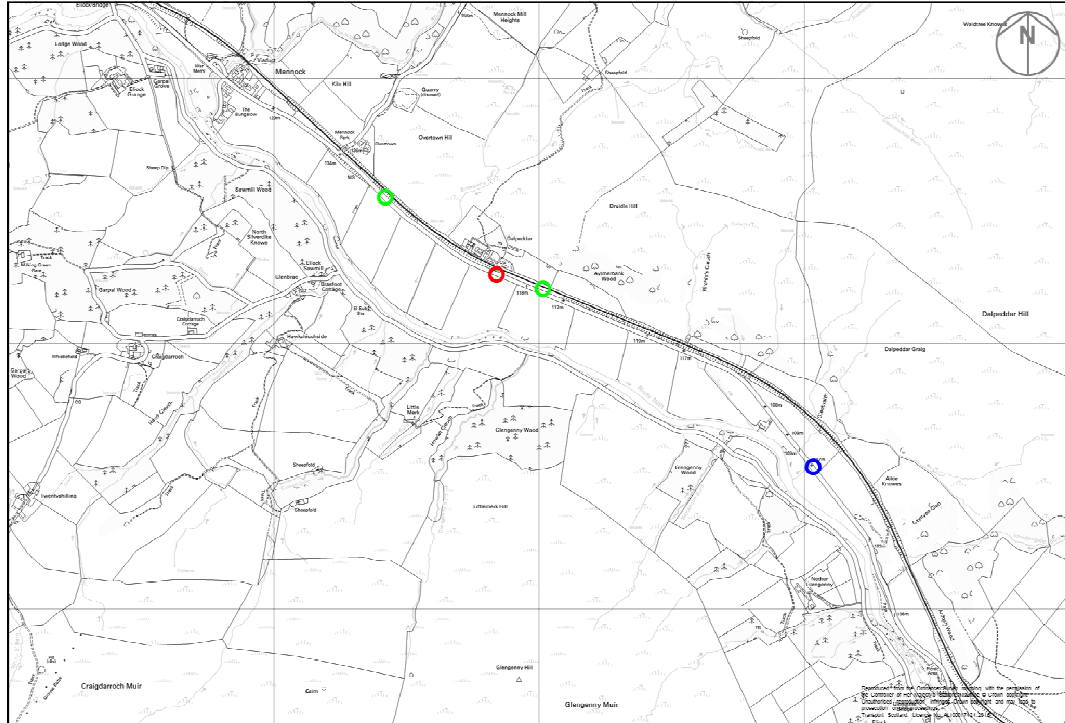
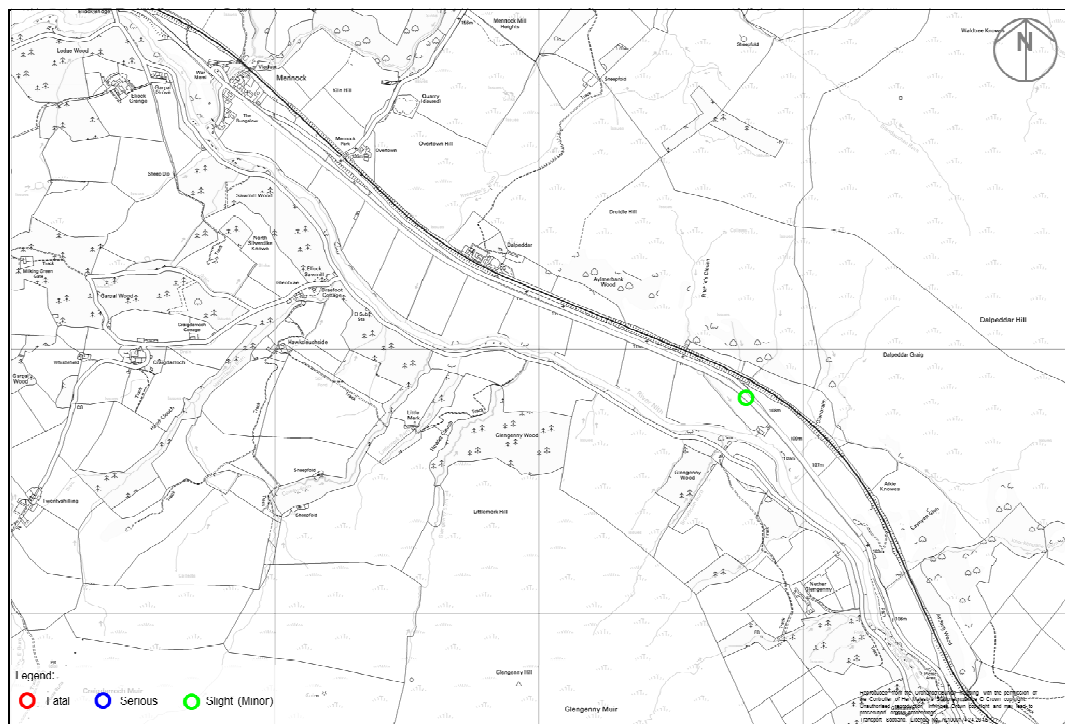


Figure 3.4b: 3 Years After Opening Personal Injury Accident Numbers



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Road Safety Audits

The RSA process has been followed, with Stage 1, 2, 3, 4 and 5 Audits carried out. The Stage 5 RSA, undertaken in December 2012, confirmed that one accident had occurred within the vicinity of the project within the period three years after opening. The cause of the accident appeared to have been due to an animal in the carriageway which resulted in the driver swerving to avoid a collision and losing control on icy road surface conditions. There was no evidence to suggest that the design or layout of the project played any factor

The Stage 5 Audit did, however, note that a number of recommendations made within the previous audit had not been implemented. This included the provision of countdown markers and 50 mph roundel road markings on the northbound approach to the 50 mph speed limit at Mennock, improvements in visibility for cyclists at the southern tie in of the project, provision of warning signs and relocation of 'cyclist' warning signs on the northbound B979 approach to the A76(T) and the relocation of 40 mph HGV speed limit signs from the old A76 to the new road. A further recommendation was made within the Stage 5 RSA regarding the provision of repeater 'shared use' signs on the cycle path on the west side of the B797. At the time of the project's 3YA evaluation, implementation of the warning signs relating to cyclists and improvements in the visibility for cyclists at the project's southern tie in (through trimming of vegetation) had been undertaken.

Stakeholder feedback

One respondent questioned the extension of the 50mph speed limit southwards of Mennock to a rural section as a part of the project. Frequent non-compliance of the speed limit by users has been recorded raising safety concerns. Another respondent noted that many drivers fail to recognise the red chevron areas and overtake anyway and that the completed works have left a bad corner at the southern end of the project. There is however no evidence to suggest that there is a safety problem as a result of the project.

“the extension of the 50mph speed limit southwards of Mennock to a rural section was questioned as a part of the project. Frequent non-compliance of the speed limit by users has been recorded raising safety concerns.”

“many drivers fail to recognise the red chevron areas and overtake anyway.”

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“the completed works have left a bad corner at the southern end of the project.”

Safety: Key Findings

An assessment of the three year post opening personal injury accidents and a review of the Stage 5 RSA suggests that the project is operating safely.

The Stage 5 RSA concluded that the accident which occurred in the period three years after opening was unrelated to any specific issues of the project design. The audit identified, however, that a number of recommendations had been made at the previous audit which have not been implemented and also made a further recommendation with regard to provision of signs on the cycle path.

Stakeholder feedback received noted concerns with regard to the extension of the 50mph speed limit along a rural section of road and the breach of the speed limit being observed. Additionally, it was noted that many drivers ignore the chevron areas and overtake anyway and that the completed works have left a bad corner at the southern end of the project. There is however no evidence to suggest that there is a safety problem as a result of the project.

3.6 Economy

Transport Economic Efficiency

The comparisons between predicted and actual traffic flows, presented in Section 3.3, can be considered a proxy for whether the predicted economic benefits of the project are likely to be realised.

Comparison Between Predicted and Actual Traffic Flows

The comparison undertaken at the **1YA Evaluation** stage indicated that the predicted 2010 flow was within 4% of the observed 2010 flow on the A76(T).

The latest comparison indicates that the predicted 2013 flows were up to 22% greater than the observed 2013 flows on the A76(T) within the vicinity of the Glenairlie project. This over estimation is likely due to the general economic downturn.

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This comparison suggests that traffic growth on the A76(T) has and continues to fall significantly short of the assumed NRTF forecasts applied as part of the project's appraisal. It is recognised, however, that there has been a general fall in traffic volumes across the wider trunk road network in recent years due to the economic downturn that could not have been accounted for during the project's assessment and this may in part account for the difference.

Economy: Key Findings

The difference between predicted and actual AADT flows observed suggests that the economic benefits of the project will have been over estimated due to external factors that could not have readily been foreseen at the time of assessment.

3.7 Accessibility & Social Inclusion

Cycle Audits

The **1YA Evaluation** noted that an update to the Stage 2 Cycle Audit was carried out in August 2009 due to alignment changes to the cycleway route along the B797 at the northern end of the project.

A Cycle Audit for the project was carried out in December 2012, as part of the RSA. The audit report noted some signage issues relating to the shared use cycleway. There were, however, no major issues noted concerning the operation of the cycleway.

Accessibility & Social Inclusion: Key Findings

On site observations have confirmed that a shared cycle and pedestrian facility has been provided that utilises the redundant section of the bypassed A76.

The Cycle Audit undertaken for the project confirmed that, while there were some issues relating to the signage of the shared use cycleway, there were no major issues noted relating to the operation of the facilities provided for cyclists.

3.8 Cost to Government

Investment Costs

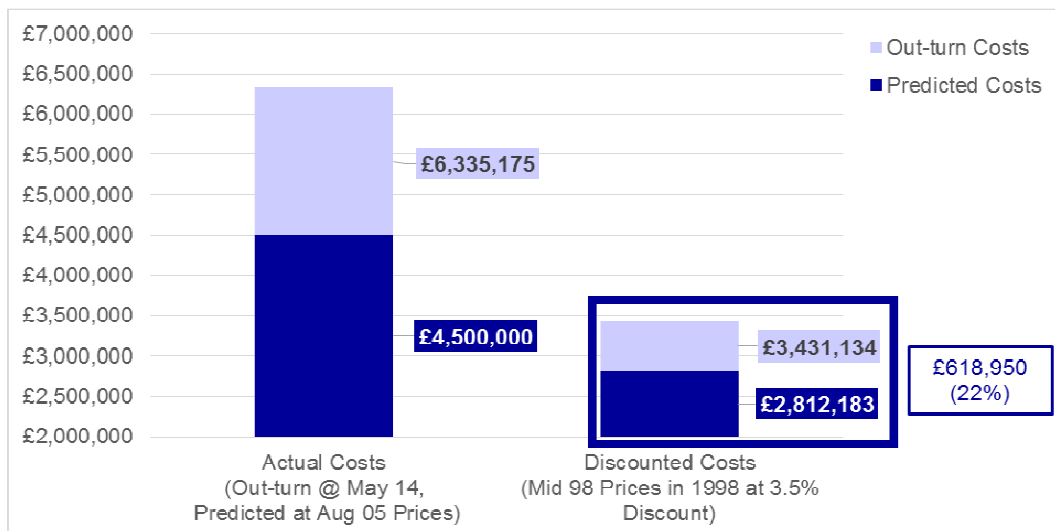
Comparison Between Predicted and Out-turn Costs

The out-turn and predicted project costs are shown in Figure 3.5.

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Figure 3.5: Project Cost Summary



The latest comparison indicates that the current out-turn costs for the project are slightly greater than the out-turn costs at the time of the **1YA Evaluation**. The current out-turn costs are approximately £0.6m (22%) greater than was predicted at the time of assessment. This was, in part, due to issues relating to the topographical survey carried out for the project.

It should be noted, however, that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

The project had a tender cost of approximately £5m² which, when discounted to a consistent mid 1998 price base, suggests a discounted cost of approximately £2.7m. This can be compared to the discounted out-turn cost, presented in Figure 3.5, of approximately £3.4m, suggesting that the project has been delivered approximately £0.7m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

Cost to Government: Key Findings

The out-turn cost of the project is approximately £0.6m (22%) greater than was predicted at the time of assessment. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

² Tender cost in 2008 / 2009 Prices

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Based on the project's discounted tender cost of approximately £5m, the comparison of out-turn and tender costs suggests that the project has been delivered approximately £0.7m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

The variations in out-turn and predicted costs can, in part, be attributed to issues relating to the topographical survey carried out for the project.

3.9 Value for Money

Initial Indications

The appraisal results for the project predicted a Net Present Value (NPV) of £0.09m and Benefit to Cost Ratio (BCR) of 1.02 under the 60/40 traffic forecast scenario³.

The comparisons undertaken at the **1YA Evaluation** stage indicated that the benefits may be realised and that the cost is marginally greater than predicted suggesting that the NPV and BCR of the project are unlikely to be as great as predicted.

The latest comparisons presented in Sections 3.3 and 3.8 in relation to traffic flows and costs suggest that the benefits will have been over estimated and indicate that the cost is greater than predicted. As a result, the NPV and BCR of the project are unlikely to be as great as predicted.

Value for Money: Key Findings

The difference between predicted and actual AADT flows suggests that the economic benefits of the project have been over estimated as a result of external factors that could not have readily been foreseen at the time the assessment was undertaken. The out-turn cost of the project is approximately £0.6m (22%) greater than predicted at the time of assessment.

The NPV and BCR and thereby the value for money of the project would have fallen in comparison to the pre-opening assessment given the gap between actual and predicted traffic volumes and the greater than predicted costs.

Although the NPV and BCR of the project are unlikely to be as great as predicted at the time of assessment, it is judged that the project will continue to provide a benefit to road users through facilitating overtaking and has also facilitated local community benefits through the provision of a shared path for cyclists and pedestrians on the now bypassed section of the A76.

³ 60/40 traffic forecast scenario calculated through factoring results of low and high traffic forecast scenarios by 0.6 and 0.4 respectively

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3.10 Progress Towards Achieving Objectives

An indication of whether the project has achieved its objectives is based on the pre opening data available, supplemented by post opening data collected as part of the evaluation.

Indications

A summary of the performance of the project against its objectives is presented in Table 3.5.

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Table 3.5: Progress Towards Achieving Objectives

Objective	Commentary	Progress
<p>Improve and increase the number of overtaking opportunities to reduce the conflicts between long distance users, local and agricultural traffic.</p>	<p>A comparison between the results of the pre and post overtaking surveys indicate that the provision of a dedicated overtaking opportunity has increased overtaking in both directions of travel.</p> <p>While the impact of the project on overtaking is considered to be largely positive, stakeholder feedback received noted that the length of the overtaking lanes may not be long enough to facilitate overtaking of platoons and lanes are often occupied by HGV's restricting other vehicles from overtaking.</p>	<p>+ve</p>
<p>Improve the operational performance and level of service on the A76(T) by reducing the effect of driver stress and journey times by constructing guaranteed overtaking sections designed to break up convoys / platoons.</p>	<p>A comparison between the results of the pre and post overtaking surveys indicate that as a consequence of the increased overtaking in both directions of travel, a greater number of platoons are dispersed.</p> <p>Mean vehicle speeds in both directions of travel have increased following the opening of the project and it can be expected that any overall impact on journey times is likely to be positive.</p> <p>Stakeholder feedback received indicates that a slight reduction in journey times and a reduction in driver frustration is likely to have occurred as a result of the project.</p>	<p>+ve</p>
<p>Wherever practicable incorporate measures for non-motorised users. In particular, cycling proposals shall be designed in accordance with the "Trunk Road Cycling Initiative".</p>	<p>A Cycle Audit was carried out for the project, which noted cycling provisions.</p> <p>A shared cycle and pedestrian facility, as identified in the Environmental Statement, was provided which utilised the redundant section of the bypassed A76.</p>	<p>+ve</p>

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Objective	Commentary	Progress
Maintain the asset value of the A76(T) route.	Given the nature of the project, which involved replacing 2.9 kilometres of existing single carriageway with 2.5 kilometres of off-line wide single 2+1 carriageway and 500m of on-line improvements, the asset value of the A76(T) between the project tie-in points is likely to have increased thus maintaining the value of the route.	+ve
Mitigate the environmental impact of the new works where possible.	The majority of measures committed within the Environmental Statement are in place. Whilst some variations from the proposed mitigation measures have been identified, these are not considered to have had a material detrimental impact on the general integration of the project into its surrounding.	+ve
Achieve good value for money for both taxpayers and road users.	Although the NPV and BCR are unlikely to be as great as predicted at the time of assessment, it is judged that the project will continue to provide a benefit to road users.	○

Key: +ve Indication(s) that objective has been / will be achieved
 = Progress towards achievement of objective cannot be confirmed
 ○ Indication(s) that objective has not / will not be achieved

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3.11 Evaluation Summary

The evaluation of the A76(T) Glenairlie project indicates that while the project is not considered to have had a material impact on journey times, it has positively contributed to alleviating driver frustration through helping to break-up traffic travelling in platoon on this section of the A76(T). The project can be considered to have had a positive impact on road safety on this section of the A76(T). Four accidents (one fatal, one serious and two slight) occurred during the period three years prior to the opening of the project in comparison to one accident (slight) during the period three years following opening of the project indicating a reduction in the number and severity of accidents occurring within the vicinity of the project.

The variation between the actual and predicted traffic volumes, resulting from unforeseen external factors at the time of the appraisal and out-turn costs 22% greater than forecast are impacting on the project's value for money. The NPV and BCR will continue to fall and the value for money of the project will decrease if the gap between actual and predicted traffic volumes continues to widen.

While the value for money of the project is likely to be less than expected, the project is impacting positively in terms of facilitating overtaking to the benefit of the level of service and safety of road users travelling on the A76(T) south of Sanquhar. It has also facilitated local community benefits, such as the provision of a shared path for cyclists and pedestrians on the now bypassed section of the A76.

Appendix A: Environment

A ENVIRONMENT

This section provides details of the 3-year after evaluation undertaken for the Environment criterion in the Scottish Trunk Road Infrastructure Project Evaluations (STRIPE).

A.1 INTRODUCTION

Background

Transport Scotland has commissioned CH2M to evaluate several schemes on the Scottish Trunk Road Network that were constructed and opened approximately three years ago. Part of this 'Three Year After Opening Evaluation' (3YA) comprised a review of the implementation of the schemes' environmental mitigation measures.

This report presents the findings of the 3YA environmental review for the A76(T) Glenairlie project. The project has previously been subject to a 'One Year After Opening Evaluation' (1YA) environmental review. The findings of the 1YA environmental reviews were reported in:

- Project Evaluation Environmental Mitigation Review August 2010, Report to Transport Scotland, Halcrow Group Ltd 2010.
- Project Evaluation Environmental Mitigation Measures Review October 2010, Report to Transport Scotland, Halcrow Group Ltd 2010.

Environmental Review Purpose and Methodology

The purpose of the 3YA environmental review is to provide a review of the condition of the mitigation measures that had been implemented by the project at approximately three years after opening, and make any recommendations to improve the effectiveness of the mitigation or identify trends in the issues being observed so that Transport Scotland can implement improvements in future environmental impact assessment and project design or in the operation and maintenance of the existing schemes.

Environmental Review Methodology

The methodology used for the 3YA environmental review selected relevant aspects of the STRIPE⁴ 'Three Years After' methodology that comprised:

- A desk study review of the project objectives, Environmental Statement and 1YA environmental mitigation review to identify the likely key issues to be evaluated during the 3YA review and any questions remaining from the 1YA reviews.

⁴ Transport Scotland Scottish Trunk Road Infrastructure Project Evaluation (STRIPE). Final Guidance August 2013.

- A site visit – to give an overview of the mitigation implemented and to focus observations on any issues raised by the 1YA reviews rather than to repeat a visit to every feature that was confirmed as being present and in good condition in the 1YA reviews.
- A short report, setting out the key issues from the 1YA review, the observations from the site visit and comments on the condition of the environmental mitigation. The report will also identify any additional issues/mitigation requirements to improve the effectiveness of the mitigation, and identify any resultant trends in the recommendations being made.

Structure of the Report

The project objectives (including any specific environmental objectives) are provided, followed by the list of likely key environmental issues that were identified during the 3YA desk study and any questions remaining from the 1YA reviews. The 3YA observations on these key issues identified in the desk study are commented upon, followed by a table of all of the mitigation proposed with details of the 3YA observations and the associated 1YA observations to aid comparison.

A summary of recommendations regarding further studies or suggestions for improving the effectiveness of the environmental mitigation is provided.

A.2 ENVIRONMENTAL FINDINGS

Project Objectives

The A76(T) Glenairlie project involved the construction of an off-line alternating wide single 2+1 carriageway (WS2+1) over 2.5 kilometres between Caynyen Glen and the village of Mennock and 0.5 kilometres of on-line improvements to the southern end of the project. The new road comprises a dedicated 1.2 kilometre northbound overtaking lane and a dedicated 0.8 kilometre southbound overtaking lane, thereby allowing alternate overtaking opportunities in both directions of travel.

The project objectives included increased provision for overtaking opportunities and improvement of the operational performance and level of driver stress and journey times, with appropriate mitigation of the environmental impact of the new works where possible.

Key Issues to be Reviewed

The key issues identified during the desk study are summarised below.

- Landscape/biodiversity - including whether the non-native planting in the Rapid Response Planting has been thinned out to support native species.

- Landscape/land use – confirm the reason for the omission of the dry stone wall.

These formed the focus of the 3YA Evaluation instead of re-visiting everything that had been confirmed as being present during the 1YA site visits.

A.3 THREE-YEAR AFTER REVIEW FINDINGS

Key issues from the desk-study

The 1YA assessment confirmed that the mitigation set out within the Environmental Statement had been implemented successfully, and following consultation with the landowner, the question regarding the dry stone wall has been resolved.

The observations made during the 3YA site visit found that the environmental mitigation measures implemented ensure that the project fits well into the wider landscape with the planting helping to screen the road, see Figures 1 and 2. The Rapid Response Planting included as part of the scheme's landscape mitigation has been successful. Both native and non-native (rapid response) species are well established and provide some screening of the road particularly on the east side embankment, see Figure 3 and Figure 4. Non-native planting will need thinning as appropriate to ensure a mix of species more in keeping with the local area and to increase benefits to biodiversity.



Figure 1: Looking North



Figure 2: Looking South



Figure 3: Wildflower and tree planting



Figure 4: Established vegetation on the road verge

Throughout the project there is a good mix of wildflower planting, natural regeneration and native tree planting such as oak, ash, rowan, beech and willow, which provides a diverse mosaic of grassland, scrub and woodland habitats to support a variety of fauna such as invertebrates, mammals and birds.

During the site visit the area of wetland proposed at Ritchie's Cleuch wasn't accessed directly, although there was a line of rushes visible near to the farm track which could indicate wetland species are present. Drainage throughout the scheme comprised swales and French drains.

Mammal tunnels and fencing appeared to be in good condition when inspected, although there was no clear evidence (such as mammal trails, hairs or footprints) the tunnel is in current use, see Figure 5 and Figure 6.



Figure 5: Mammal tunnel



Figure 6: Mammal fence

Any new issues identified

No new issues were identified during the 3YA site visit. The predicted AADT flows were within 4% of the observed flows, and therefore the environmental assessment's forecast that noise and local air quality would not be significant issues were appropriate.

Mitigation measures – detailed observations

An update of the observations relating to individual mitigation measures provided in the 1YA report using the 3YA observations can be found in Table A1.

Recommendations

- Thinning of non-native rapid response species should be carried out to ensure a mix of species more in keeping with the local area.
- Transport Scotland may wish to consider monitoring of the use of the mammal underpasses on various schemes to establish the long term effectiveness compared with the expectations set by the environmental impact assessment. For example, this could consist of installing sand boxes at tunnel entrances or motion-operated cameras, reviewing road-kill records and possibly repeating the pre-project mammal surveys within the vicinity of the schemes.

The issues that have been identified as part of the environmental evaluation process have been provided to Transport Scotland's operating companies for actioning.

Table A1: Implementation of Mitigation Proposed in the Environmental Statement and Observations at 1YA and 3YA Opening

Mitigation Measure	1 YA Comments	3 YA Comments
Ecology		
<p>Brewster's Burn, Ritchie's Cleuch</p> <p>Culverts will be designed to appropriate standards and should consider the provision for otter access through culverts will need to be maintained and enhanced if possible.</p>	<p>The culvert is in place and a separate dry culvert for mammal passage is also present although there was no evidence of mammals using the culvert and the southern entrance appears to be overgrown. The culvert entrances are surrounded by protected species fencing which is in good condition.</p>	<p>Mammal passage clear of obstruction and fence in good order. No clear evidence of mammal presence and vegetation around the entrance could indicate not currently in use.</p>
Landscape		
<p>Seeding of swales/ditches/soakaways. Consider additional planting of drainage features using appropriate species composition.</p>	<p>The verges have been seeded and are being well maintained. Planting has taken place on the verges throughout the scheme and is establishing well.</p>	<p>Planting continues to thrive.</p>
<p>Appropriate landscape mitigation strategy (based on 10.3a and 10.3b) including grading of earthworks, replace stone walls, seeding of earthworks, replacement of oak trees lost to scheme, planting new trees and shrubs of native species of local provenance. Consider 'Rapid response Planting' between Chainage 2350 and 2900.</p>	<p>Woodland planting is establishing well, the rapid response planting is also establishing well and will help to tie in to the existing woodland areas to the west of the scheme whilst also helping to screen the road from the west.</p>	<p>Woodland planting growing very well with a good mix of native species, helping to tie into existing woodland.</p>
<p>North of Sawmill Wood</p> <p>'Rapid Response Planting' –the technique involves inter-planting the core species with rapid growing species, such as poplar, larch or willow, to provide shelter and promote established growth. The non-native</p>	<p>The planting is establishing well and both core species (such as oak) and rapid response species are planted which provides a good blend of species</p>	<p>Planting continues to thrive.</p>

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

Mitigation Measure	1 YA Comments	3 YA Comments
<p>species may be coppiced or removed once the screen is established.</p>	<p>throughout the scheme. The trees all appear to be healthy with many measuring 4 - 6ft in height.</p> <p>The technique of rapid response planting is one which appears to be working well, this scheme should be further monitored to establish the effectiveness of the planting, however, the use of rapid response planting should be considered for future schemes where screening is required.</p>	
<p>New B797 Junction; Mennock Park; and Between Mennock Park and Dalpeddar (North of A76)</p> <p>Land to be graded and filled with excavated material from the site where required to unite the superseded road embankment with the new road cutting slopes. Area then to be planted as semi-natural woodland to visually unite it with the planting on the south side of the road and blend into the hillside beyond when viewed from the River Nith and unclassified road.</p>	<p>Woodland planting is establishing well, the rapid response planting is also establishing well and will help to tie in to the existing woodland areas to the west of the scheme whilst also helping to screen the road from the west.</p>	<p>Planting continues to thrive.</p>
<p>Dalpeddar (North of A76) and west of Ritchie's Cleuch</p> <p>Grade cutting slope back to base of wall to enhance the appearance of the wall and open views to the south from the road.</p>	<p>There is no wall running along the length of the road, cutting slopes have been graded back to the fence at the base of the slope to the west. Views to the west from the road are open over the farmland, river and woodland beyond, however the planting adjacent to the</p>	<p>No further comment.</p>

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

Mitigation Measure	1 YA Comments	3 YA Comments
	road whilst screening the road to views from the west will fragment views out from the road once established.	
Access to Dalpeddar Farm will be provided by the existing A76, which will be decommissioned and will form a private access. The farm will also be provided access to the fields opposite the N/B lane of the new road and sheds and pens will be relocated to an appropriate location (three potential locations). Current proposals include the field access track being located either opposite the new B797 junction (proposed for both options), opposite the existing Dalpeddar Farm junction (under the railway line) or comprising a new overbridge/underpass facility (option 1B only).	The new agricultural underpass is present and well used, the old A76 to the east is also used as a farm access. The sheep pens are now located to the south east of the new farm access.	No further comment.
Ritchie's Cleuch (South of A76) Standard oak trees to be planted to create striking effect.	No comment made	Standard trees planted along verge in this area to complement mature oak trees within the fields. Planting continues to thrive, although it will take several years for a 'striking effect' to be realised.
Ritchie's Cleuch (North of A76) Place soil excavated from the site as necessary and grade to integrate the verge of the superseded A76 with new earthworks. Possibly plant with oak to complement the proposed planting on the other side of the scheme.	The grading of the land integrates the scheme well into the surrounding landscape. Large specimen oak trees have been planted and surrounded by other "rapid" response trees.	Planting continues to thrive.
Ritchie's Cleuch to Existing Dalpeddar Shed Create wetland habitat in vicinity of the drainage ponds	As well as the wetland habitat at Ritchie's Cleuch a new mammal underpass is also present although there was no evidence of use. Mammal	Proposed drainage comprised swales and drains, rather than ponds. Direct access to Ritchie's Cleuch was not possible on the day of the visit but stands

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

Mitigation Measure	1 YA Comments	3 YA Comments
	fencing was also provided at this location.	of rushes were noted which indicates wetland species present.
<p>At the eastern and western ends of the scheme, post construction (site restoration).</p> <p>Rebuilding of drystone walls at the edge of the newly realigned/widened road according to standards design in agreement with the landowner.</p>	There is no evidence that the dry stone walls have been re-built between the road and new farm access, however, the area has been "rapidly planted" which will help to integrate the scheme into the wider woodland to the west.	Response from the Contractor, Mouchel, confirmed they completed consultation with landowners about the walls and fencing, in line with the commitments in the ES.
Water Quality and Drainage		
Application of pollution prevention measures and SUDS.	No comment made.	French drains and swales built along the length of the scheme were found to be clear of significant weeds, litter or debris.
Pedestrians, Cyclists and Community Effects		
<p>At the start and end of the cycleway and where it crosses/merges with the B797, during/post construction.</p> <p>Clear demarcation of new track along redundant A76 and landscaping. Appropriate signage to be incorporated for the combined cycleway/footpath incorporated as part of the scheme. Safe crossing points on and off the cycleway, including waiting areas, to be provided.</p>	The cycleway is clearly demarcated and is both well maintained and in use. The segregated cycle way at the northern end of the scheme incorporates both a passing place and a crossing area over the old A76.	No further comment.
<p>Nether Glengenny</p> <p>Opportunity to link the two informal footpaths and to provide an informal rest area for pedestrians.</p>	Footpaths on the new A76 are linked to the footpaths on the former A76, however there is no evidence of a pedestrian rest-stop.	No further comment.

Appendix B: Methodology and Data Sources

B METHODOLOGY AND DATA SOURCES

B.1 OVERVIEW

The project presented in this report has been evaluated against their objectives and the following criteria, where applicable, to support the evaluation:

- Environment;
- Safety;
- Economy;
- Accessibility & Social Inclusion;
- Costs to Government; and
- Value for Money.

As the evaluation focuses on impacts relating to the project's objectives, evaluations against all of the above criteria may not be undertaken for all projects. The evaluation is supported by the consideration of network traffic indicators, including traffic volumes and travel times, as presented in the following section.

B.2 NETWORK TRAFFIC INDICATORS

Traffic Volumes

Comparison Between Pre and Post Opening Traffic Flows

A comparison of traffic flows pre and post opening has been undertaken for all projects to provide an indication of the impact that the project has had on traffic volumes. The amount of traffic data presented is dependent upon the complexity of the project. The comparison can also serve as a proxy for the effect that the project has had on noise and air quality.

Comparison Between Predicted and Actual Traffic Flows

A comparison of predicted and actual opening year traffic flows has been undertaken for all projects to confirm the accuracy of predictions during the project's preparation. The comparison can also serve as a proxy for whether the predicted benefits of the project are likely to be realised.

Depending on the nature of the traffic modelling undertaken to assess the project, the predicted traffic flow is either derived by:

- factoring the base year or the predicted opening year, design network flows to the actual opening year using National Road Traffic Forecast (NRTF) growth factors; or
- extrapolating from, or interpolating between, the modelled assessment year, design network flows.

The difference between the actual traffic flow and the predictions has been calculated and expressed as a percentage of the actual flow. A threshold of +/-20% is generally accepted by Transport Scotland as being a reasonable range for future year forecast traffic flow comparisons.

The amount of traffic data presented is dependent upon the complexity of the project. The comparison can also serve as a proxy for the likely impact of the project on noise and air quality.

Data Sources

Predicted Traffic Flows	Obtained/derived from the traffic/economic modelling undertaken to support the pre-tender economic assessment.
Actual Traffic Flows	Obtained from automatic traffic counters in the vicinity of the project/study area.

Overtaking Opportunities

Post Opening Overtaking Opportunities

Where no overtaking information is available, the impact of providing increased overtaking opportunities has been based on the evaluation of other projects with a comparable standard of carriageway for which overtaking surveys have been carried out.

Anecdotal, qualitative evidence from stakeholders has also been gathered, where available.

Data Sources

Pre and Post Opening Overtaking Conditions	Obtained from pre and post opening survey information
Stakeholder Feedback	Obtained from Police Scotland.

Travel Times

Change in Travel Times

Based on the evaluation of other projects with a comparable standard of carriageway for which pre and post opening journey time data is available, supported by anecdotal evidence where available.

Comparison Between Pre and Post Opening Travel Times

A comparison between pre and post opening travel times has been carried out for projects where the change in travel times cannot be judged based on other projects of a similar nature for which an evaluation has been undertaken.

Comparison Between Predicted and Actual Travel Times

A comparison between predicted and actual opening travel times has been carried out for projects where predicted and post opening travel time information is readily available.

Data Sources

Pre and Post Opening Travel Times	Proxy indicator of traffic speed confirmed through pre and post opening survey information collected to support the project's economic assessment.
Stakeholder Feedback	Obtained from Police Scotland.

B.3 ENVIRONMENTAL

Mitigation Measures

A review of the environmental mitigation measures implemented during construction has been undertaken for all projects to establish whether or not the measures proposed during the project's preparation have been introduced and to provide comment on their success. The mitigation measures implemented were confirmed through site visits.

Data Sources

Proposed Mitigation Measures	Presented in the Environmental Statement produced during the project's preparation.
Implemented Mitigation Measures	Confirmed through site visit.

Noise and Air Quality

A review of noise and air quality has not been undertaken for the project as no significant impacts on noise and air quality were expected.

B.4 SAFETY

Accidents

Comparison Between Pre and Post Opening Personal Injury Accident Numbers

A comparison of the personal injury accident numbers pre and post opening has been undertaken for all projects to provide an early indication of whether the project is operating safely.

The number of personal injury accidents for the 3 years within the vicinity of the project prior to opening has been compared with the observed number of personal injury accidents for the project in the three year period after opening.

It is important to realise that road infrastructure projects normally take a minimum of 5 to 7 years to plan prior to the commencement of construction. Many proposed road projects are derived from safety concerns such as fatal and serious accidents and often, these are treated in terms of Accident Investigation and Prevention work prior to planning the permanent solution. The comparison between 3 year pre and post opening accidents, therefore, only demonstrate the minimum road safety improvement derived from the project.

Where the influence of a trunk road improvement project has a significant impact on the local road network, it may be appropriate to extend the scope of the accident analysis.

Road Safety Audits

Road Safety Audit (RSA) reports have been reviewed for the project, where available, to confirm whether there is any evidence that the project is not operating safely and where recommendations have been made for ameliorative measures, if appropriate.

Data Sources

Personal Injury Accident Numbers	Obtained from the STATS19 data collection system.
Safety Issues	Detailed within RSA reports produced following audits carried out 3 years after project opening.

B.5 ECONOMY

Transport Economic Efficiency

A comparison between predicted and actual traffic flows and/or travel times has been undertaken for all projects as a proxy for whether the predicted benefits of the project are likely to be realised.

A comparison which returns a positive traffic flow difference in an uncongested situation indicates that the economic benefits of the project may have been over predicted as fewer vehicles will actually accrue journey time savings than predicted. Similarly, the economic benefits of a project may also be over predicted where actual travel times are greater (i.e. speeds lower) than predicted.

Conversely, where the comparison returns a negative traffic flow difference or actual travel times are less (i.e. speeds higher) than predicted, the economic benefits of the project may have been under predicted.

B.6 ACCESSIBILITY & SOCIAL INCLUSION

Commentary on Community Accessibility has been provided for projects that have specific objectives relating to the Accessibility & Social Inclusion criterion, supported by anecdotal evidence where available.

Data Sources

Provision for Non-motorised Users	Confirmed through site visits.
Cycling Provisions	Detailed within the Cycle Audit report produced as part of the latest RSA.

B.7 COSTS TO GOVERNMENT

Investment Costs

Comparison Between Predicted and Out-turn Costs

A comparison between predicted and out-turn costs has been undertaken for all projects to confirm the accuracy of predictions during the pre-tender stage and support the evaluation of value for money.

The project cost predicted during the pre-tender stage has been used in the evaluation as it is at this stage that the decision is taken on whether or not to proceed with the project.

One of the features of the progressive analysis of projects is that the economic assessment is undertaken at each stage based on the return on future investment. This means that project costs incurred prior to the pre-tender economic assessment, which are already spent and cannot be recovered (whether or not the project goes ahead) are excluded from the overall project costs input to the economic assessment. As such, only out-turn costs incurred after the pre-tender economic assessment have been included in the comparison.

Adjustments for Retail Price Indices and discount rates to both the predicted and out-turn costs have been made, taking expenditure by year into account, to convert the figures to a common 'present value year' for prices and values – either 1998 or 2002 depending on the 'present value year' used in the pre-tender economic assessment.

Data Sources

Predicted Project Costs	Obtained from the pre-tender economic assessment undertaken during the project's preparation.
Out-turn Costs	Obtained from out-turn cost records.

B.8 VALUE FOR MONEY

Initial Indications

Based on the evaluation of economic benefits and project costs outlined in sections 3.6 and 3.8 respectively, a judgement in terms of the potential impact on the projects' value for money has been made.

The value for money of a project is considered to be greater than predicted where the economic benefits have been under predicted and the project costs over predicted. Conversely, the value for money of a project is considered to be lower than predicted where the economic benefits have been over predicted and the project costs under predicted.

Where both the economic benefits and project cost have been under predicted or over predicted, a judgement has been made with regards to the likely overall impact on value for money.

Data Sources

Predicted NPV and BCR	Obtained from the pre-tender economic assessment undertaken during the project's preparation.
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B.9 ACHIEVEMENT OF OBJECTIVES

Initial Indications

The evaluation includes an indication of how the project is progressing towards achieving its objectives. Where specific indicators to measure the project's performance against its objectives have not been developed, an indication of how the project is progressing towards achieving its objectives is based on the pre opening data available, supplemented by post opening data collected as part of the evaluation.

Data Sources

Objectives	Confirmed from reported Environmental Statements or Route Action Plan, where applicable.
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