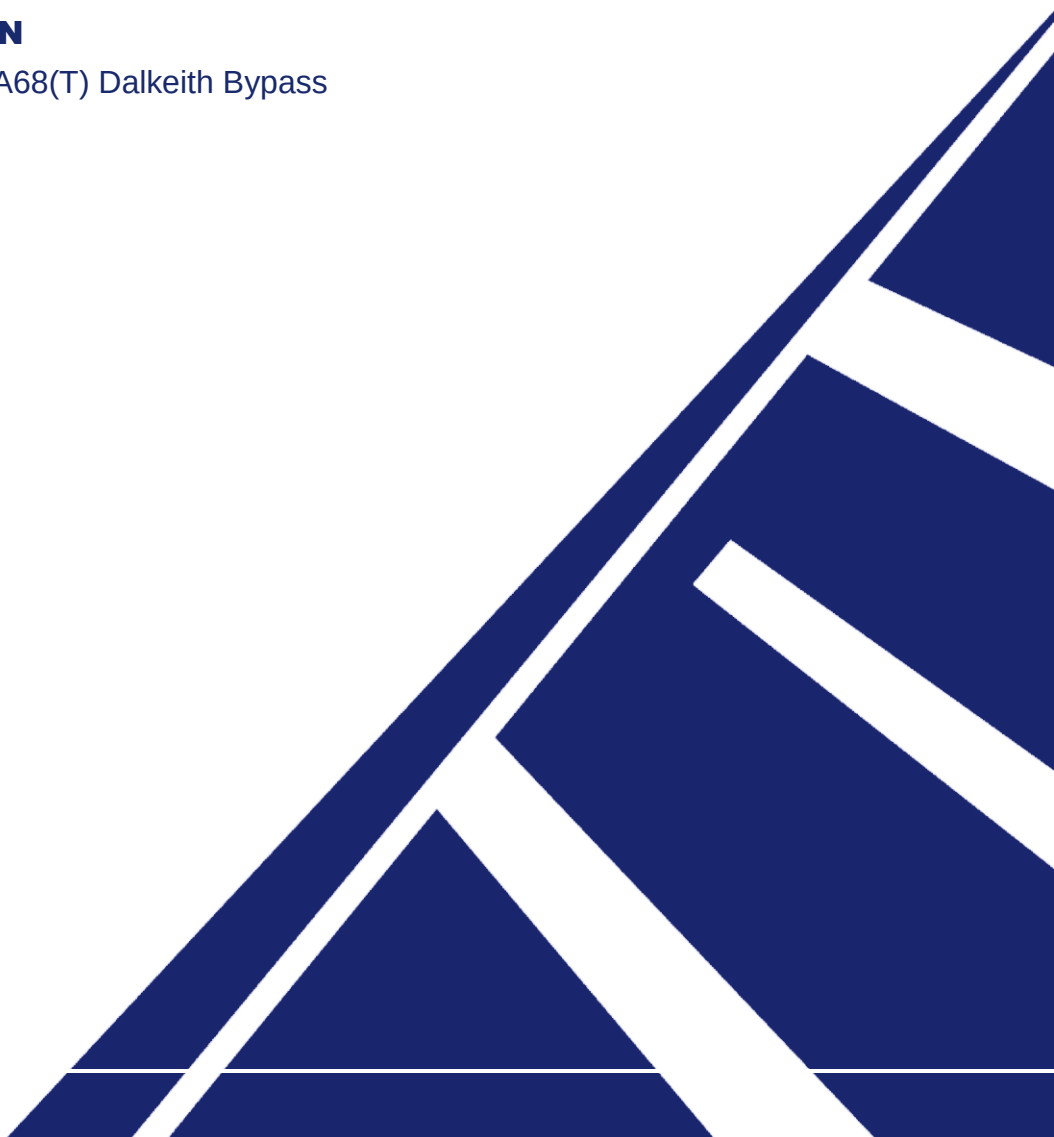
TRANSPORT SCOTLAND
SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

3YA Evaluation Report for A68(T) Dalkeith Bypass



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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
CL	Climbing Lane
DAL	Differential Acceleration Lane
DMRB	Design Manual for Roads and Bridges
EMR	Environmental Mitigation Report
NPV	Net Present Value
NRTF	National Road Traffic Forecasts
RSA	Road Safety Audit
S2	Single 2-lane Carriageway
STAG	Scottish Transport Appraisal Guidance
STRIPE	Scottish Trunk Road Infrastructure Project Evaluation
1YA	1 Year After
3YA	3 Year After

SUMMARY OF IMPACTS

1 SUMMARY OF IMPACTS

This section provides a short summary of the key elements contained within this Three-Year After Evaluation report of the A68(T) Dalkeith Bypass project. The summary provides a background to the project and commentary on performance and delivery in terms of operation, process, forecasting, performance against objectives and cost.

1.1 Introduction

The evaluation of a project is undertaken after completion to determine if the objectives have been achieved, assess how well it was implemented and if it is performing as expected. Transport Scotland applies such an evaluation process through the Scottish Transport Infrastructure Project Evaluation Guidance for all projects listed within its Motorway and Trunk Road Programme that cost over £5m.

The A68(T) Dalkeith Bypass project involved the construction of a 5.4 kilometre bypass to the north of Dalkeith between the A68(T) at Fordel Mains and the A720(T) City of Edinburgh Bypass. It also involved the provision of 2.6 kilometres of single carriageway and a 2.8 kilometre southbound climbing lane. The project was officially opened to traffic on 23 September 2008. Figure 1.1 shows the Dalkeith Bypass looking north towards Edinburgh.

Figure 1.1: A68(T) Dalkeith Bypass looking north towards Edinburgh

Prior to construction of this bypass, the previous alignment of the A68(T) passed through Dalkeith, causing delay for strategic traffic as it travelled through the town and conflicted with local traffic. The situation was compounded by a restricted road layout.

The project was implemented as part of a strategy for the A68(T) route that was developed to improve accessibility from Edinburgh to the Central Borders and the North of England. The Dalkeith Bypass was targeted principally to improve journey times for strategic traffic, by removing the need to travel through the town, and also address a poor accident history along this existing section of the A68(T). The project would also help alleviate traffic noise and pollution within the town centre by reducing congestion and the relatively high traffic volumes that led to an increase of accidents and a general loss of amenity within the town.

1.2 Operational Indicators – How is the project operating?

Traffic flows on the bypassed route through Dalkeith have reduced significantly, following the opening of the A68 (T) Dalkeith Bypass with volumes approximately 40% lower than pre-opening levels. Traffic flows on the bypass are now higher than when it initially opened suggesting that it is operating effectively and continues to provide an attractive route for travel between Edinburgh and the Central Borders.

Journey times on the bypass tend to be significantly lower than those on the bypassed route through Dalkeith, with surveys recording average savings of approximately 3 minutes, both compared with pre-opening journey times and May 2014 journey times.

Since the bypass opened, there has been a reduction in the number and severity of personal injury accidents occurring. Accidents declined from a total of fifty-seven three years before opening to a total of forty-seven three years after opening. It should be noted that the majority of accidents, both before and after the bypass opened, have occurred either within the built-up area of Dalkeith or in the vicinity of Sheriffhall Roundabout. The number of accidents on the bypass, when compared with the bypassed route, do suggest it has had a positive impact on safety on the trunk road network within the vicinity of the improvement.

1.3 Process Indicators – How well was the project implemented?

Approval to proceed with implementation of the project was made by Transport Scotland in 2005. The construction contract was awarded in August 2006 and the Bypass opened in September 2008.

The mitigation described in the Environmental Mitigation Report has been implemented and is in good condition and performing as expected. There were issues noted relating to the planting of trees and hedgerow at specific locations which require further maintenance or replanting, to the absence of artificial bat roosts under the River Esk crossing and hop-over points, and a section of mammal fencing that requires repair and continued monitoring. Additional noise mitigation (acoustic fences) has been installed that was not described in the Environmental Mitigation Report. Further analysis is suggested for consideration in view of the 3YA findings identifying that actual traffic flow is up to 20% higher than predicted in certain locations to establish any potential resulting air quality impacts.

A number of Road Safety Audits (RSA) were undertaken. No outstanding safety issues have been identified by the RSA process.

The project does not have any specific objectives relating to cyclists or other non-motorised users. As such, no cycle or accessibility audits have been undertaken.

The project was implemented prior to the publication of Transport Scotland's *Disability Discrimination Act: Good Practice Guidance for Roads* document. As such, no DDA audits have been undertaken. It was also not considered the nature of the project would have a particular impact in this regard.

1.4 Forecasting – How accurate were predictions?

Actual traffic flows on the bypass were similar to predicted values for the first year of opening. Actual 2012 flows are higher than predicted flows, by up to 20%.

In terms of journey times on the bypass, actual southbound AM journey times are consistent with predicted values. Actual northbound AM journey times are lower than predicted journey times by up to approximately 1 minute.

In terms of journey times on the bypassed route through Dalkeith, predicted northbound AM journey times are less than actual values, by around 1 minute 30 seconds. This is considered to be mainly attributable to delays at Sheriffhall Roundabout. However, predicted southbound AM journey times are significantly higher than actual journeys by around 5 minutes.

In terms of the section of the A720(T) City of Edinburgh Bypass between the A68(T) and Sheriffhall Roundabout predicted journey times are significantly higher than actual values during the AM peak period and in both directions of travel.

The evaluation has not identified any significant design changes being made to the project. Some remedial works to the Fordel Mains junction were undertaken to address an unforeseen safety issue. Some post-construction cycling measures were also implemented.

The latest out-turn cost for the project was approximately £4.6m greater than the predicted cost estimate. This is a 17% increase, but is not considered likely to have affected the original decision to proceed with 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. As such, variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

1.5 Objectives – Has the project met its objectives?

The evaluation indicates that the six project objectives are considered to have been achieved. Whilst the project may have cost more than predicted, journey times on this section of A68(T) have improved. The trunk road accident record has improved, albeit there are still a significant number of accidents occurring within Dalkeith and in the vicinity of Sheriffhall Roundabout. More traffic is also using the route compared to volumes predicted, with benefits arising for Dalkeith through the removal of through traffic. The project is positively contributing to the overall operation of the A68(T), by improving accessibility from Edinburgh to the Central Borders; and between the Scottish Borders and area of wider Central Scotland and beyond.

1.6 Cost to Government – Is the project delivering value for money?

The key benefits of the A68(T) Dalkeith Bypass are considered to be:

- Improved average journey times for strategic traffic using the A68(T), reducing travel costs and improving inter-urban connectivity;
- Improved road safety through a reduction in the number and severity of personal injury accidents; and
- Reduced detrimental impacts of traffic through Dalkeith town centre.

The project was predicted to achieve a Net Present Value (NPV) of -£4.42m and a Benefit to Cost Ratio (BCR) of 0.88 for a scenario that did not include the closure of Dalkeith High Street. The evaluation suggests that the predicted economic benefits for this option may have been underestimated with more traffic using the bypass than forecast and journey time savings also higher than predicted. However as the out-turn cost was slightly higher than predicted, the overall conclusion is that actual NPV and BCR values for the project may be lower than expected. Whilst the NPV and BCR are unlikely to be as great as predicted at the time of assessment, the project is expected to continue to provide a benefit to road users in terms of offering a quicker route between Fordel Mains and the A720(T) City of Edinburgh Bypass.

INTRODUCTION

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. 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.

Furthermore, Scottish Trunk Road Infrastructure Project Evaluation (STRIPE) guidance, prepared 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 – 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 This Evaluation and Project Reported

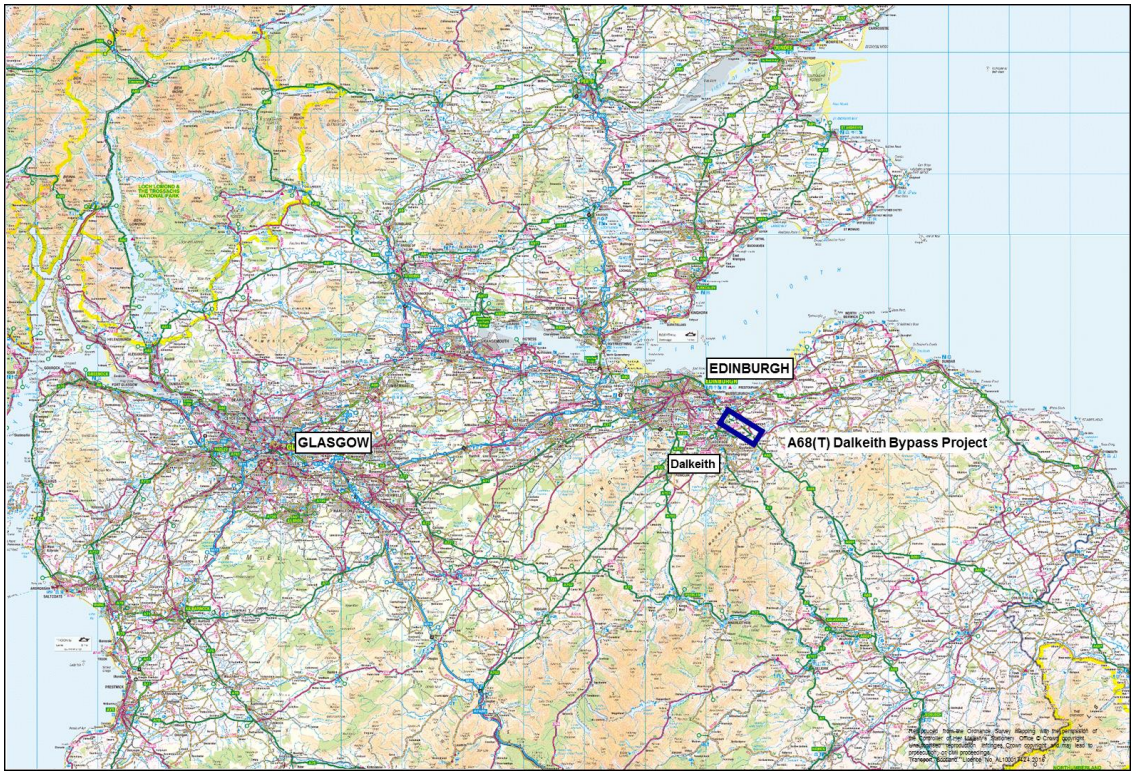
As recommended in STRIPE, this report effectively constitutes a Three-Year After (3YA) Evaluation Report, which updates the earlier One-Year After (1YA) Evaluation Report. It is a standalone report on the A68(T) Dalkeith Bypass. This project fits the criteria for evaluation at this stage, as it cost over £5m and has previously been evaluated at the One Year After (1YA) Stage. Table 2.1 summarises the characteristics of the project. 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
A68(T)	Dalkeith Bypass	S2, DAL & CL	5.4	Sept 2008

Key:
S2 Single 2-Lane Carriageway
DAL Differential Acceleration Lane
CL Climbing Lane

Figure 2.1: Project Location Plan



2.3 Previous Evaluations

A 1YA Evaluation was carried out for the A68(T) Dalkeith Bypass project. The findings were reported within the *Evaluation Report for Trunk Road Projects Opened between April 2007 and March 2009* report, published by Transport Scotland in 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 bypassed route through Dalkeith indicated that traffic flows within the centre of the town in 2009 were significantly lower than comparable flows in 2007. Flows were approximately 45% lower following opening of the Dalkeith Bypass.

Comparison Between Predicted and Actual Traffic Flows

The comparison between predicted and actual AADT flows indicated that the predicted 2009 flow for the Dalkeith Bypass were similar to the observed flow. Flows were in the range of -1.7% to 2.5%.

Change in Travel Times

Journey times for traffic using the Dalkeith Bypass were shorter than traffic using the previous bypassed route through Dalkeith. Journey time savings of between 20% – 40% were recorded depending on direction of travel.

Environment

The review of the mitigation measures implemented for the project confirmed that those described in the Environmental Mitigation Report were in implemented to a satisfactory level. Whilst areas were identified that require maintenance, the project was considered to fit well within the existing open landscape.

Safety

An assessment of the one-year post opening personal injury accidents in the vicinity of the project supported the view that the Dalkeith Bypass was operating safely, as the number of injury accidents had reduced. The Stage 4 RSA report also concluded that the project was operating safely, following remedial works undertaken to address u-turn movements on the Dalkeith Bypass.

Economy

The comparison of predicated and actual traffic flows and journey times confirms that the predicted economic benefits from the model that best reflected the improvements that were actually implemented within Dalkeith town centre may be exceeded.

Cost to Government

The out-turn cost of the project was approximately £2.9m. This is 11% greater than the predicted cost at the time of assessment and in part attributable to the subsequent incorporation of safety measures at Fordel Mains and cycle provision within the extent of the project.

Value for Money

The 1YA Evaluation Report noted the NPV and BCR relating to the alternate model (which better reflected the improvements that were implemented within Dalkeith town centre) may be greater than predicted at the time of assessment. This reflects higher than forecast traffic flows using the bypass and greater journey time savings compared to predictions.

Achievement of Objectives

The 1YA Evaluation Report concluded that for five of the six project objectives, progress was being made to achieving them.

The subsequent decision by Midlothian Council not to close Dalkeith High Street to through traffic, as originally proposed, affected the sixth objective relating to delivering good value for money. The economic model with the High Street closure had predicted a BCR of over 1.0 but the 1YA Evaluation Report noted the economic benefits associated with this model would be unlikely to be fully realised.

DETAIL OF EVALUATION

3 PROJECT EVALUATION

3.1 Introduction

Project Description

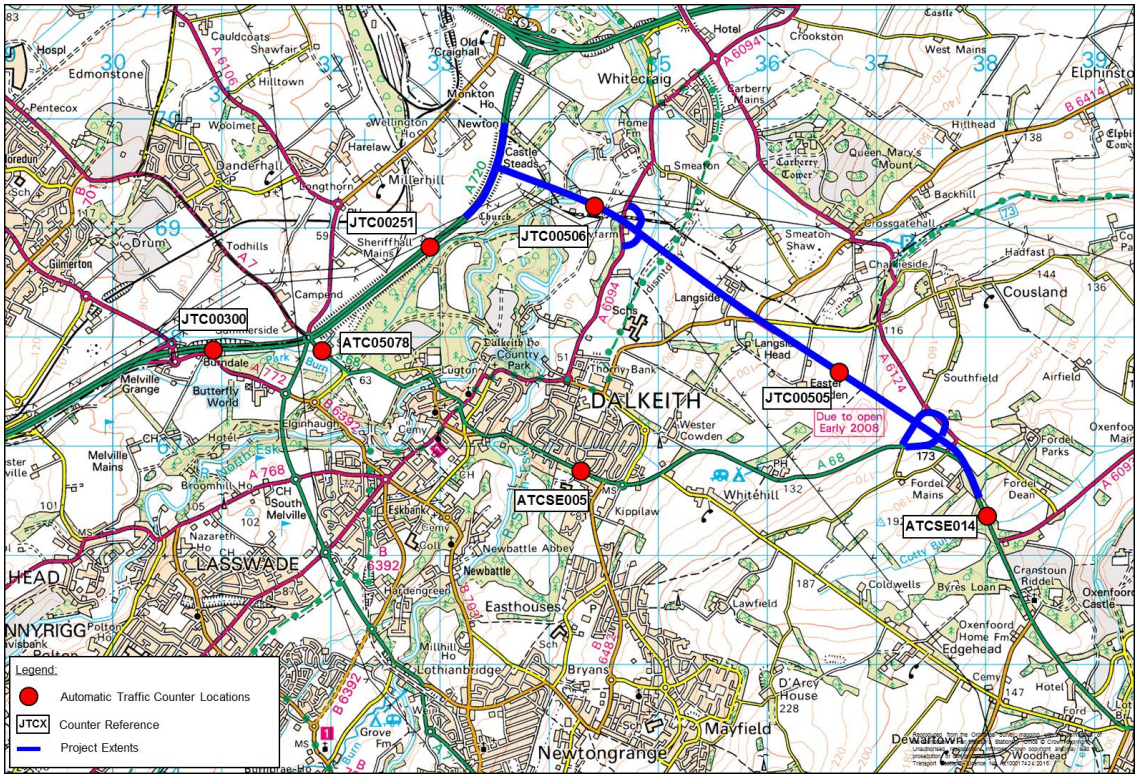
The A68(T) is approximately 82 kilometres in length and extends across Midlothian and the Scottish Borders, running between Edinburgh and Carter Bar. It is a key transportation corridor in the south of Scotland, linking the Central Borders and Midlothian areas with the Central Belt, as well as providing an important link with the North of England.

The project involved the construction of a 5.4 kilometre bypass to the north of Dalkeith between the A68(T) at Fordel Mains and the A720(T) City of Edinburgh Bypass. For most of its length, the Dalkeith Bypass is a single 2-lane carriageway, with a climbing lane on the southbound side between Salter's Road and Fordel Mains. New junctions were constructed at Millerhill, Salter's Road and Fordel. A major structure bridge over the River Esk and new overbridges were constructed within Dalkeith Park (Home Farm access), at Salter's Road, the B6414 crossing and at Southfield Road.

The northern end of the Dalkeith Bypass commences at a new grade-separated junction on the A720(T) City of Edinburgh Bypass, near Newton Farm, between Old Craighall Junction and Sheriffhall Roundabout and ties-in at the southern end to the existing A68(T) to the south east of Fordel Mains farm. The general location of the project is shown in Figure 3.1.

The project was officially opened to traffic on 23 September 2008. In parallel and on completion of the bypass construction, Midlothian Council was expected to implement a full closure of Dalkeith High Street to through traffic and pedestrianise the historic town centre. Subsequently, however, this did not happen. Following public consultation by the Council, the implemented measures included public realm enhancements and traffic calming measures whilst maintaining a through route for traffic along Dalkeith High Street.

Figure 3.1: Project General Location Plan



Project Objectives

The objectives of the A68(T) Dalkeith Bypass project were set as follows:

- *Objective 1* - To provide good quick and reliable inter-urban road links;
- *Objective 2* - To improve accessibility from Edinburgh to the Central Borders and the North of England;
- *Objective 3* - To aid economic prosperity and development by reducing travel costs particularly for business and commercial traffic serving existing and proposed business and commercial developments (including tourism and service industries);
- *Objective 4* - To improve road safety and contribute towards the Government's overall target of reducing road casualties;
- *Objective 5* - To minimise the intrusion of roads and traffic on communities and on the environment; and
- *Objective 6* - To use the limited resources available as effectively as possible to achieve good value for money for both taxpayers and transport users.

3.2 Evaluation Methodology

As set out in Section 2.1, this evaluation report presents the results of a Three-Year after opening evaluation of the A68(T) Dalkeith Bypass 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 achieved 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.

As noted, the decision to proceed with the project was based on the assumption that there would be a full closure of the High Street in Dalkeith, in line with the proposals of Midlothian Council at that time. Subsequent to public consultation by the Council, implemented measures included public realm enhancements and traffic calming measures, whilst maintaining a through route for vehicular traffic.

For the purposes of both the 1YA and 3YA evaluations, therefore, the predicted traffic flows and journey times are taken from a model developed during the preparation of the project which better reflects the improvements that were subsequently implemented within Dalkeith town centre. As reported in the ***1YA Evaluation***, this alternate model predicted economic benefits that did not outweigh the cost of the project but has been used for the post-construction evaluations instead of the main model on which the decision to proceed with the project was originally based.

This 3YA Evaluation has been informed by the analysis of survey data supported by site visits carried out in August and October 2014. Consultation was also undertaken with stakeholders. Feedback was received from a variety of respondents, which is presented later in the report. In summary, those stakeholders who responded generally consider the project successful, particularly in removing traffic from the bypassed route through Dalkeith.

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

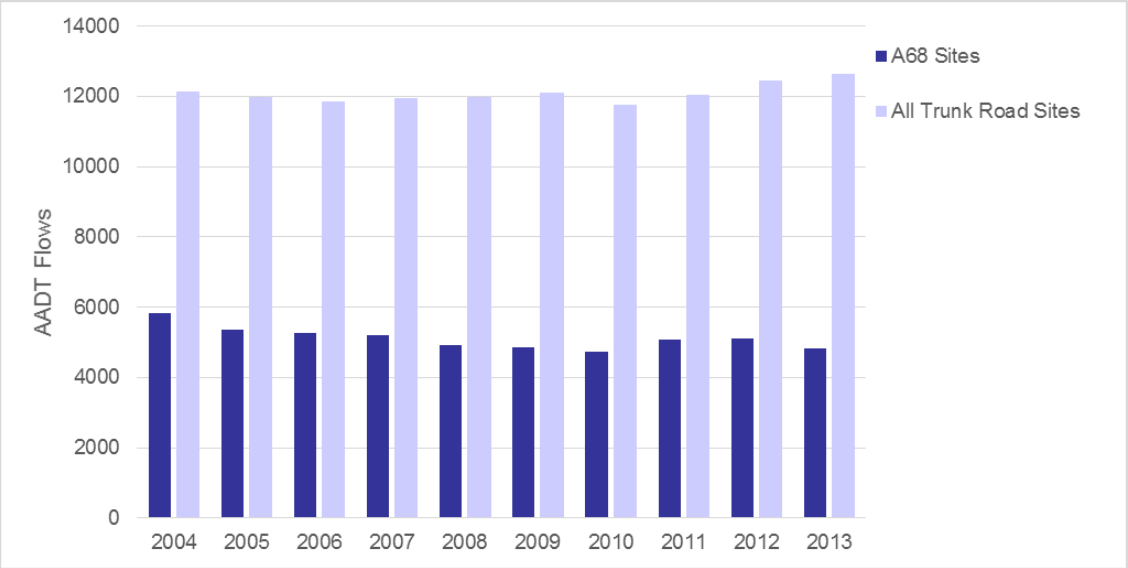
3.3 The Operation of the Project

The evaluation is supported by the consideration of pre and post opening comparison of operational indicators. These focus on network traffic indicators, including traffic volumes and travel times, presented in the following section.

Background Traffic Growth

The growth in traffic across the network between 2004 and 2013 is presented in Figure 3.2. This is included to put the A68(T) Dalkeith Bypass project into the context of the wider Scottish Trunk Road Network and the prevailing trends in traffic growth.

Figure 3.2: Scottish Trunk Road Network Trends in Traffic Growth (2004 – 2013)



The data presented in Figure 3.2 indicate that, from analysis of all the ATCs located on the A68(T) between Edinburgh and the Scottish Borders , there has been a slight decrease in traffic since 2008, with traffic levels reducing on the A68(T) route. A decrease in AADT flows of approximately 100 vehicles per day (around 2%) has occurred since the opening of the project in late 2008, suggesting there has been no increase in background growth on the A68(T) route although, as discussed later, some localised growth has occurred within the vicinity of the A68(T) Dalkeith Bypass, probably due to urban areas such as Dalkeith.

The available data for the wider Scottish Trunk Road network, however, appears to reflect overall growth in traffic flows, which is not noted on the A68(T) route. An increase in AADT flows of approximately 650 vehicles per day (around 5%) was observed since 2008 across the Scottish trunk road network.

Traffic Volumes

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

- JTC00506 & JTC00505 A68(T) Dalkeith Bypass
- ATCES014 A68(T) South of Dalkeith Bypass
- ATC05078 & ATCSE005 Bypassed Route through Dalkeith
- JTC00300 A720(T) City of Edinburgh Bypass (West of Sheriffhall Roundabout)
- JTC00251 A720(T) City of Edinburgh Bypass (Between Sheriffhall Roundabout and A68(T) Junction)

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

Comparison Between Pre and Post Opening Traffic Flows

A comparison between pre and post opening Annual Average Daily Traffic (AADT) flow volumes within the vicinity of the project has been undertaken and is presented in Figures 3.3a and 3.3b. Due to technical issues with the equipment, some ATC data was not available at JTC00505 and JTC00506 in 2012 and 2013.

For the ***1YA Evaluation***, a key comparison between the pre and post opening traffic volumes on the bypassed route through Dalkeith had indicated that average traffic flows in 2009 were approximately 7,100 vehicles per day (vpd) lower compared with 2007 levels within Dalkeith and approximately 5,100 vpd lower south of Sheriffhall Roundabout. This suggests that some 45% of traffic previously travelling via Dalkeith town centre switched to the Dalkeith Bypass after it opened.

This 3YA evaluation could have focused on 2011 data, as that is three years after the Dalkeith Bypass opened. However, as the evaluation is being undertaken during 2014, 2012 and 2013 data has also been drawn on, where available, to provide the most up-to-date position.

Figure 3.3a: Long Term ATC Data – A68(T) Dalkeith Bypass and bypassed A68 through Dalkeith

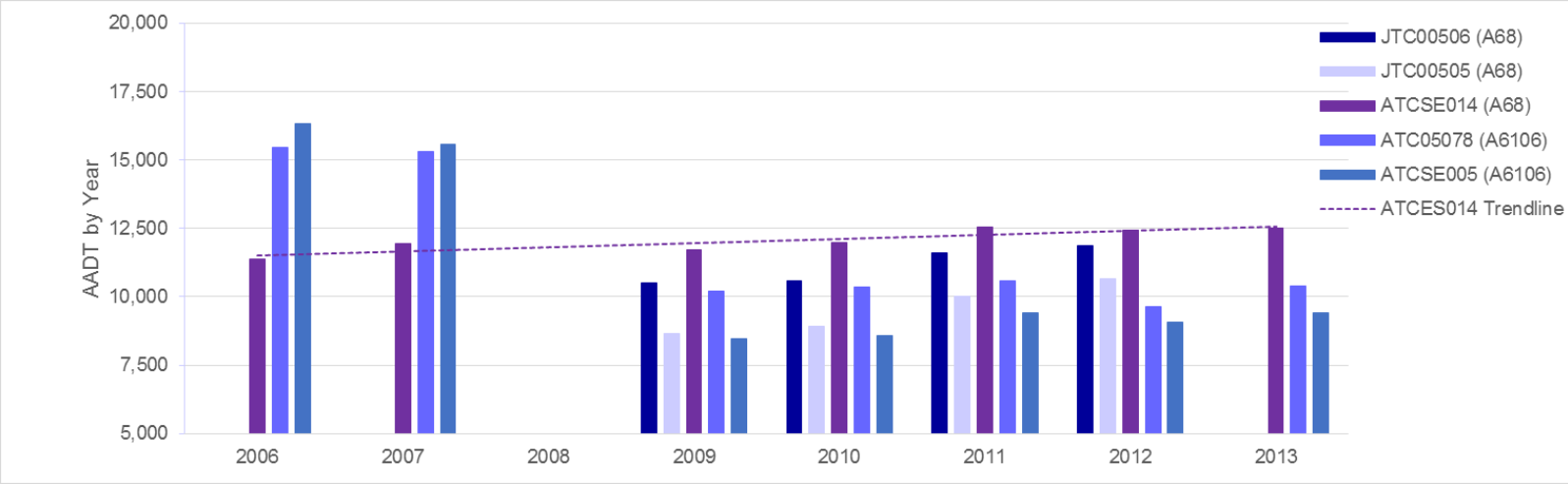
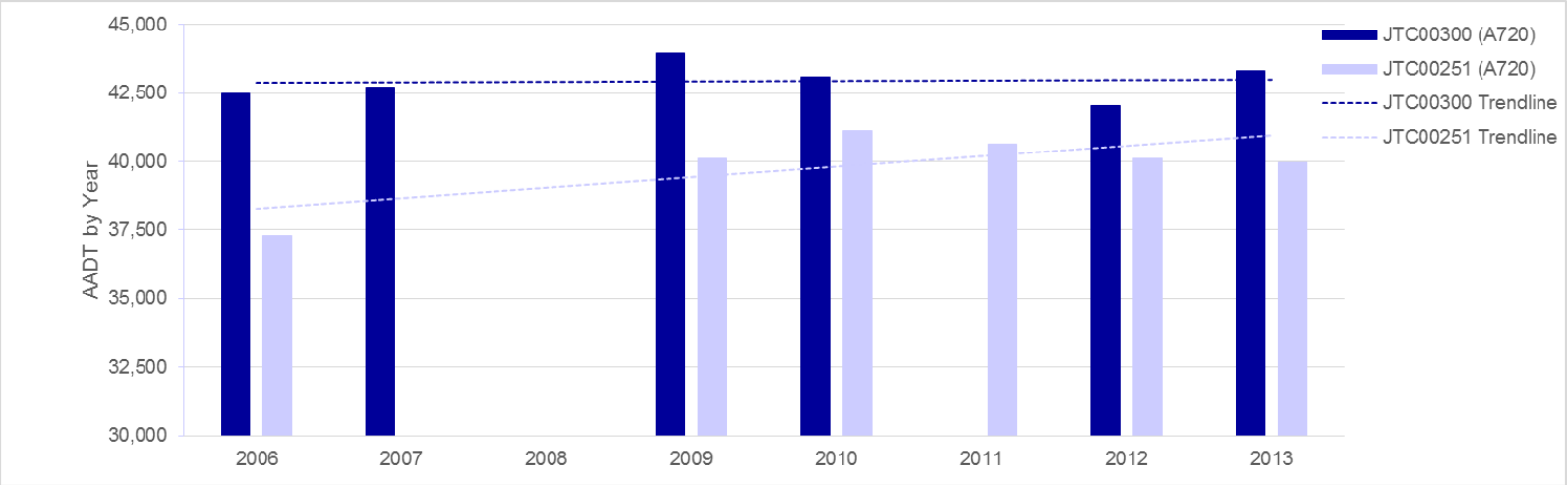


Figure 3.3b: Long Term ATC Data – A720(T) Edinburgh City Bypass



Since opening, the A68(T) Dalkeith Bypass project has experienced changes in traffic volumes along its length and the route is now carrying more vehicles than when it initially opened. The results do support the conclusion that the A68(T) Dalkeith Bypass is operating effectively as an attractive route. Whilst some of the these increases are likely to be due to localised background traffic growth over a period of years, it is likely the Dalkeith Bypass may be seen as a more attractive for some Dalkeith traffic (and maybe even some A7 traffic) that can then avoid Sheriffhall Roundabout if travelling to and from the east. However, no origin-destination surveys have been undertaken to evidence this suggestion.

Immediately to the south of the A68(T) Dalkeith Bypass, traffic levels have risen between 2009 and 2012 by approximately 6%, but this is likely to be mainly due to background traffic growth. During the same period, traffic levels on the southern section of the bypass, between the A6124 junction and the A6094 junction, have increased by approximately 23%. For the northern section of the bypass, between the A6094 junction and the A720(T) City of Edinburgh bypass, traffic levels have increased by some 13%. Whilst a proportion of these increases will be due to localised background traffic growth, the results suggest the A68(T) Dalkeith Bypass is now providing an even more attractive route for motorists than travelling through Dalkeith town centre compared with its first year of operation.

As was expected, the A68(T) Dalkeith Bypass has led to a decrease in traffic on the bypassed route through Dalkeith. Within the vicinity of the town centre, traffic volumes are approximately 40% lower than pre-opening levels, even though post-opening levels have increased by approximately 11%. Whilst most of the traffic on the A68(T) to the south of the A68 (T) Dalkeith Bypass would appear to travel on the bypass, the data implies some traffic is using the bypassed route. This traffic may be accessing the general Dalkeith area but some may be continuing to travel through Dalkeith. The proposed closure of Dalkeith High Street may have resulted in less traffic using the bypassed route and even more using the A68(T) Dalkeith Bypass.

Traffic flows on the bypassed route just to the south of Sheriffhall Roundabout have remained fairly static post-opening, with a nominal 2% increase between 2009 and 2013 levels and are approximately 32% lower than pre-opening levels. As traffic flows with Dalkeith have increased, it would appear some traffic is re-routing via local roads, possibly to avoid Sheriffhall Roundabout.

A comparison of the bypassed route through Dalkeith with the combined A68(T) Dalkeith Bypass and bypassed route traffic flows indicates there must have been initial changes in local traffic patterns within the Dalkeith locality, with more local traffic using the bypassed route. This is evidenced by traffic

flows on the bypassed route not decreasing to the levels that might have been expected if much of the traffic using it previously changed to the A68(T) Dalkeith Bypass and was not replaced. Since opening, there appears to have been further growth in local traffic patterns within the Dalkeith locality from initial post opening conditions.

Comparison Between Predicted and Actual Traffic Flows

Actual traffic flows are compared with flows predicted to review the accuracy of the project's assessment. For this 3YA Evaluation, as the most recent data (2013) for the A68(T) Dalkeith Bypass was not available for analysis, actual traffic flows for 2012 have been used and compared with predicted 2012 traffic flows.

Predicted traffic flows for 2012 / 2013 were derived by interpolating between the 2011 and 2021 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
A68(T) Dalkeith Bypass			
JTC00506	11,869*	10,911	-8.1%
JTC00505	10,651*	8,482	-20.4%
A720(T) Edinburgh City Bypass (West of Sheriffhall Rb)			
JTC00300	43,314	41,803	-3.5%
A720(T) Edinburgh City Bypass (Between Sheriffhall Rb & A68(T) Junction)			
JTC00251	39,975	41,146	2.9%

Notes: *2012 flows

The ***1YA Evaluation*** indicated that predicted 2009 AADT flows on the A68(T) Dalkeith Bypass were between 1.7% lower on the south section and 2.6% greater on the north section than the observed 2009 flows. This was considered to be well within accepted limits.

The latest comparison between the predicted and actual AADT flows in Table 3.1 indicates that the predicted 2012 AADT flows on the A68(T) Dalkeith Bypass are now between 8.1% and 20.4% lower than the observed 2012 flows.

Comparing 2009 results with 2012 results, indicated that actual AADT flows on the A68(T) Dalkeith Bypass are now significantly greater than predicted flows compared to one year after opening. It is expected the changes are attributable to (i) more A68(T) traffic from the south now using the Dalkeith Bypass than predicted and (ii) further changes to local traffic patterns and increased local traffic generation than was predicted. The increase in actual traffic flows over predicted flows since the year of opening, does suggest that the route is proving to be more attractive than was envisaged.

Stakeholder feedback

A number of stakeholders including, SEStran, Midlothian Council, Police Scotland and BEAR Scotland considered that the project had been positive in terms of removing traffic from Dalkeith town centre. As well as removing congestion, associated benefits in terms of local air quality and general amenity in particular were highlighted.

Rerouting of local trips was also identified as an effect of the project. In particular, use of the new bypass and avoidance of routing through Dalkeith, resulting in drawing traffic from the A7(T) to the A68(T) was identified as a concern in some communities to the south of the bypass. As a result, BEAR Scotland, who operate and maintain the A68(T) on behalf of Transport Scotland and Scottish Ministers, have worked with the residents of Pathhead to introduce enhanced safety measures through the village.

Traffic Volumes: Key Findings

The A68(T) Dalkeith Bypass is now carrying more traffic than during its initial year of opening. In addition, volumes are now between 8% and 20% higher than predicted. For the 1YA evaluation, the recorded AADT volumes were approximately 10,500 and 8,700, compared with predicted volumes of approximately 10,800 and 8,500, respectively, so both very similar. For the 3YA evaluation, the recorded 2012 AADT volumes were approximately 11,900 and 10,700, compared with predicted volumes of approximately 10,900 and 8,500, respectively.

Traffic flows on the bypassed route are still between 32% and 40% lower than pre-opening levels. A comparison between the 1YA and 3YA after evaluation shows increasing variation between the forecast and predicted traffic flows. The results suggest the A68(T) Dalkeith Bypass is operatively effectively and being used by more traffic than forecast.

Travel Times

Comparison Between Pre and Post Opening Travel Times

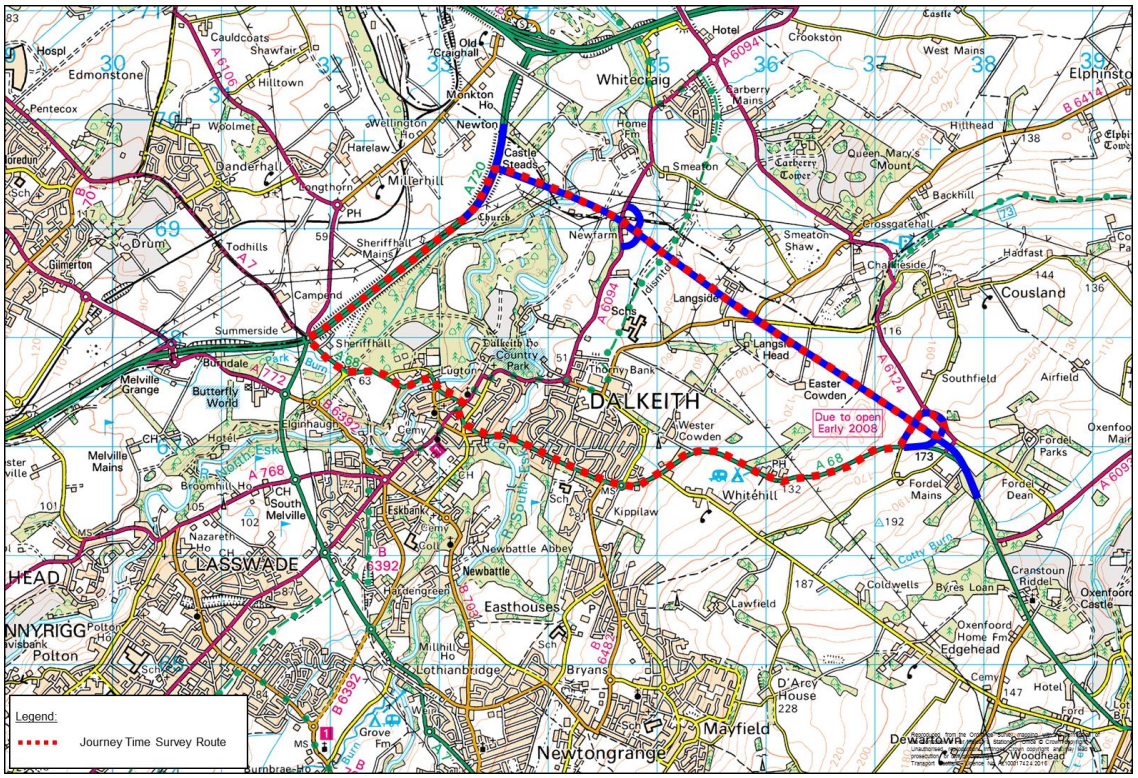
For the ***1YA Evaluation***, AM and PM peak period journey time surveys were carried out in March 2012. The surveys were intended to establish the average post opening savings in travel times between Fordel Mains and Sheriffhall Roundabout using (i) the A68(T) Dalkeith Bypass (& A720(T) City of Edinburgh Bypass) and (ii) the bypassed route through Dalkeith, compared with baseline travel times along the previous A68(T) route through Dalkeith in 2005.

The ***1YA Evaluation*** indicated travel time savings for vehicles travelling on the A68(T) Dalkeith Bypass northbound, between Fordel Mains and Sheriffhall Roundabout of around 3.5 minutes (40%) and 2 minutes (21%) during the AM and PM peak periods respectively. In the southbound direction of travel, savings of around 4 minutes (46%) and 3.5 minutes (41%) were observed during the AM and PM peak respectively.

The ***1YA Evaluation*** also indicated that pre and post opening AM and PM travel times on the bypassed route through Dalkeith were broadly consistent with each other. This indicates there had been little change in travel times through Dalkeith despite the fall in traffic passing through the town and may be attributable to traffic calming within Dalkeith town centre.

For this 3YA Evaluation, AM and PM peak period journey time surveys were carried out again in May 2014. The extents of the May 2014 journey time survey routes are shown in Figure 3.4.

Figure 3.4: Journey Time Survey Routes



The surveys were intended to establish the change in the average savings in travel times in 2014 compared with 2005 baseline travel times. The 2014 surveys also allow a comparison between 2012 and 2014 journey time savings. The average pre (2005) and post (2014) opening journey times, along with the savings in travel time, are shown in Tables 3.2a and 3.2b.

Table 3.2a: Travel Time Data (A68(T) Dalkeith Bypass)

Direction	Average Journey Time		Average Time Savings (mins / secs)	Average % Saving
	Bypassed Route Observed Pre Opening (2005)	Dalkeith Bypass Observed Post Opening (2014)		
AM Peak (07:30 - 09:30)				
Northbound	9m 23s	5m 35s	3m 48s	40%
Southbound	9m 18s	5m 23s	3m 55s	42%
PM Peak (16:30 - 18:30)				
Northbound	8m 32s	6m 14s	2m 18s	27%
Southbound	8m 15s	5m 13s	3m 2s	37%

Table 3.2b: Travel Time Data (Bypassed Route Through Dalkeith)

Direction	Average Journey Time		Average Time Savings (mins / secs)	Average % Saving
	Bypassed Route Observed Pre Opening (2005)	Bypassed Route Observed Post Opening (2014)		
AM Peak (07:30 - 09:30)				
Northbound	9m 23s	12m 6s	+ 2m 43s	+ 29%
Southbound	9m 18s	8m 20s	58s	10%
PM Peak (16:30 - 18:30)				
Northbound	8m 32s	8m 25s	7s	1%
Southbound	8m 15s	8m 20s	+ 5s	+ 1%

Note: Increases in journey times noted on the bypassed route during the AM and PM survey periods, in the northbound and southbound direction of travel, respectively.

Examination of the pre and post opening journey times, presented in Table 3.2a, indicate that for vehicles travelling northbound on the A68(T) Dalkeith Bypass, there were average savings of around 3.8 minutes (40%) and 2.3 minutes (27%) during the AM and PM peak periods respectively. In the southbound direction of travel, average journey time savings were around 4 minutes (42%) and 3 minutes (37%) in the AM and PM peak periods respectively.

Table 3.2b indicates that, for vehicles travelling northbound on the bypassed route through Dalkeith, there has been an increase in journey times of around 2.8 minutes (29%) and a minor saving of 7 seconds (1%) during the AM and PM peak periods respectively. Southbound traffic has experienced an average saving of around 1 minute (10%) and a minor increase of around 5 seconds (1%) during the AM and PM peak periods respectively.

In terms of change from the 1YA Evaluation, journey time savings for vehicles using the Dalkeith Bypass in 2014 are generally consistent with those observed in 2012, when compared to the 2005 baseline pre-opening travel times. This suggests the bypass is still operating effectively.

The 2014 average observed journey times on the A68(T) Dalkeith Bypass, between Fordel Mains and Sheriffhall Roundabout, have slightly increased in comparison with the corresponding 2012 average observed journey times (increases range between 18 and 35 seconds). This is with the exception of the northbound AM peak period where times have remained consistent. Further analysis indicated the 2014 observed average journey times on just the Dalkeith Bypass section, between Fordel and the A720(T) are lower than the corresponding 2012 journey times, even with increased traffic volumes. This suggests the increase is primarily attributable to increased journey times on the A720(T) City of Edinburgh Bypass between the A68(T) and Sheriffhall Roundabout.

Comparison Between Bypass and Bypassed Route Post Opening Travel Times

The May 2014 surveys also allow an assessment of the current savings in travel times between Fordel Mains and Sheriffhall Roundabout using the A68(T) Dalkeith Bypass (& A720(T) City of Edinburgh Bypass) compared with using the bypassed route through Dalkeith. The 2014 average savings in travel time using the A68(T) Dalkeith Bypass instead of the bypass route through Dalkeith are shown in Table 3.3.

Table 3.3: Average Journey Time Savings (2014)

Direction	AM Peak		PM Peak	
	Time Savings (mins / secs)	% Saving	Time Savings (mins / secs)	% Saving
Northbound	6m 31s	54%	2m 11s	26%
Southbound	2m 57s	35%	3m 7s	37%

The average journey time surveys suggest that in the period since opening, the A68(T) Dalkeith Bypass is still operating successfully in providing a faster journey time between Fordel Mains and Sheriffhall Roundabout compared to routing through Dalkeith. The most noticeable journey time saving occurs during the AM peak period in the northbound direction of travel.

Comparison Between Pre and Post Opening Journey Time Reliability

The available pre and post opening minimum and maximum journey times for both the A68(T) Dalkeith Bypass and the bypassed route through Dalkeith have been compared to evaluate the project's impact on the reliability of journey times on the A68(T) between Fordel Mains and Sheriffhall Roundabout. The comparison of pre and post opening minimum and maximum journey times is presented in Tables 3.4a and 3.4b.

Table 3.4a: Journey Time Reliability (Maximum and Minimum Journey Times)

Direction	Maximum and Minimum Journey Times (mins)					
	Pre Opening (2005)[1]		Post Opening (2012)[1]		Post Opening (2014)	
	Max	Min	Max	Min	Max	Min
A68(T) Dalkeith Bypass (Fordel Mains to Sheriffhall Roundabout)						
AM Peak						
Northbound	-	-	5m 42s	5m 3s	7m 44s	4m 48s
Southbound	-	-	5m 3s	4m 56s	5m 51s	5m 2s
PM Peak						
Northbound	-	-	5m 43s	5m 35s	8m 42s	4m 49s
Southbound	-	-	5m 3s	4m 46s	5m 36s	4m 53s
Bypassed Route through Dalkeith (Fordel Mains to Sheriffhall Roundabout)						
AM Peak						
Northbound	10m 54s	8m 29s	9m 50s	8m 30s	16m 35s	8m 38s
Southbound	9m 45s	8m 57s	8m 22s	6m 58s	9m 36s	7m 34s
PM Peak						
Northbound	8m 43s	8m 23s	8m 57s	8m 36s	9m 17s	7m 21s
Southbound	8m 42s	7m 31s	8m 10s	7m 11s	9m 23s	7m 31s

Note 1 – based on limited number of journey time counts (3 runs in each direction in both AM/PM peaks)

Table 3.4b: Journey Time Reliability (Journey Time Range)

Direction	Journey Time Range (mins)		
	Pre Opening (2005)[1]	Post Opening (2012)	Post Opening (2014)
A68(T) Dalkeith Bypass (Fordel Mains to Sheriffhall Roundabout)			
AM Peak			
Northbound	-	7s	2m 56s
Southbound	-	7s	49s
PM Peak			
Northbound	-	6s	3m 53s
Southbound	-	17s	43s
Bypassed Route through Dalkeith (Fordel Mains to Sheriffhall Roundabout)			
AM Peak			
Northbound	2m 25s	1m 20s	7m 57s
Southbound	48s	1m 24s	2m 3s
PM Peak			
Northbound	20s	21s	1m 54s
Southbound	1m 11s	59s	1m 52s

Note 1 – based on limited number of journey time counts (3 runs in each direction in both AM/PM peaks)

Whilst average journey times experienced on the A68(T) Dalkeith Bypass are significantly lower than for the bypassed route through Dalkeith, the findings set out in Tables 3.4a and 3.4b suggest journey time reliability has actually decreased across both the AM and PM peak periods, particularly in the northbound direction. The primary cause appears to relate to greater variability on the A720(T) City of Edinburgh Bypass section of the route.

For the bypassed route through Dalkeith, little change was evident in journey time reliability between pre-opening and 2012 post-opening situations, except for an improvement in the northbound AM peak period. However, the reliability of journey times has subsequently reduced in both directions of travel during the AM and PM peak periods in 2014. This is particularly apparent in the northbound AM peak period, which is considered in part to reflect traffic queuing on the approach to Sheriffhall Roundabout.

Comparison Between Predicted and Actual Travel Times

The ***1YA Evaluation*** compared available predicted 2011 AM peak journey times with post opening journey times collected in March 2012. The comparison indicated that predicted AM peak journey times on the A68(T) Dalkeith Bypass, between Fordel Mains and the A720(T) City of Edinburgh Bypass were consistent with actual journey times in both directions of travel. The comparison also noted predicted AM peak journey times on the bypassed route through Dalkeith, between Fordel Mains and Sheriffhall Roundabout, were broadly consistent with the actual journey times in both directions of travel.

The 1YA comparison also noted predicted AM peak journey times on the A720(T) City of Edinburgh Bypass, between Sheriffhall Roundabout and the A68(T) Dalkeith Bypass, were significantly longer than the actual journey times in both directions of travel. The ***1YA Evaluation*** suggested this may be due to improvements implemented at Sheriffhall Roundabout in 2008 that were not considered as part of the modelling.

This 3YA Evaluation has compared available predicted 2011 AM peak journey times with the post opening journey times collected in May 2014. The comparison indicates that the predicted northbound AM peak journey time on the A68(T) Dalkeith Bypass, between Fordel Mains and the A720(T) City of Edinburgh Bypass, is longer than the actual journey time by around 1 minute whilst the predicted southbound AM peak journey time is consistent with the actual journey time. For specifically the A720(T) City of Edinburgh Bypass section, the predicted AM peak journey times are significantly longer than the actual journey times in both directions of travel.

For the bypassed route through Dalkeith, between Fordel Mains and Sheriffhall Roundabout, the predicted northbound AM peak journey time is less than the actual journey time by around 1 minute and 30 seconds. The predicted southbound AM peak journey time is significantly longer than the actual journey time by around 5 minutes. As suggested in the 1YA Evaluation, the predicted AM peak journey times for the section of the A720(T) City of Edinburgh Bypass may be significantly longer than actual journey times due to improvements implemented at Sheriffhall Roundabout in 2008 that were not factored into account as part of the modelling.

In terms of changes identified in this 3YA Evaluation when compared with the 1YA Evaluation, it is noted there is an increase in the actual northbound AM peak journey time saving on the A68(T) Dalkeith Bypass in 2014 compared with the predicted journey time saving in 2012. Also, the actual southbound AM peak journey time saving on the A68(T) Dalkeith Bypass in 2014 compared with the predicted journey time saving shows little change to the same comparison undertaken in 2012. The actual AM peak period journey time savings in 2014 on the A720(T) City of Edinburgh Bypass section between Sheriffhall and the A68(T) have decreased slightly compared to 2012.

Stakeholder feedback

Of the various stakeholders who provided feedback on the project, five made comment with regard to journey times. Comments included the following:

- Pre and post-bypass surveys have confirmed there has been an improvement in average journey times since the bypass was opened.
- Experience supports the suggestion of improved journey times.
- Consider the scheme objectives have been achieved.
- Project has achieved its objectives by taking trunk road traffic out of Dalkeith with the associated urban environment delays of the former trunk road with its awkward alignment through Dalkeith.
- The A68 Dalkeith Bypass has reduced congestion, provided more reliable journey times for commuters and provides overtaking opportunities (albeit only southbound).

Travel Times: Key Findings

The project is considered to have had a significant positive impact on journey times. For the A68(T) Dalkeith Bypass compared with the bypassed route through Dalkeith, journey time savings of between approximately 2 minutes to 4 minutes (27% to 42%) were observed.

Journey times in 2014 on the A68(T) Dalkeith Bypass between Fordel Mains and Sheriffhall Roundabout have slightly increased compared to journey times in 2012. This increase appears to be mainly due to increased journey times on the A720(T) City of Edinburgh Bypass section. The actual journey times on the A68(T) Dalkeith Bypass section are less than the predicted values.

Journey time savings on the A68(T) Dalkeith Bypass compared with the bypassed route through Dalkeith are between approximately 2 minutes to 6.5 minutes (27% to 54%) depending on direction of travel and time period, when comparing journey times in 2014. Whilst the observed journey times in 2014 on the bypass are significantly less than on the bypassed route through Dalkeith, the reliability of journey times via the bypass has actually decreased when compared with journey times in 2012. The primary cause appears to relate to greater variability on the A720(T) City of Edinburgh Bypass section of the route.

3.4 Environment

This section provides a summary of the assessment of environmental mitigation measures that were proposed for the A68(T) Dalkeith Bypass. A fuller report is provided in Appendix A.

Review of Environmental Mitigation Measures

The environmental mitigation measures originally proposed for the project were obtained from the project's Environmental Mitigation Report. The ***1YA Evaluation*** undertook a review of the environmental mitigation measures and concluded the measures committed within the Environmental Mitigation Report were in place and were providing appropriate levels of mitigation. The key mitigation measures implemented as part of the project are as follows:

- Use of the existing landscape and topography to fit the project into the wider landscape;
- Noise mitigation measures within the vicinity of Smeaton Burn;
- Sustainable Urban Drainage Systems (SUDS);
- Hedgerow and woodland planting; and
- Specific measures for the protection of mammals including badgers and otters.

However, the 1YA Evaluation identified the following areas that required maintenance or addressing:

- Gaps beneath the acoustic barrier at Smeaton Burn;
- Mammal fencing along the route;
- Missing artificial bat roosts; and
- The hedgerow planting at Fordel Mains.

As part of the 3YA Evaluation, a site visit was carried out in October 2014, to confirm the implementation and condition of the environmental mitigation measures and review any comments raised in the 1YA Evaluation.

Findings

Overall, the design and construction of the project has led to successful integration into the wider surrounding landscape of fields and farmland. Planting of native tree species and hedgerow has been carried out along the carriageway and, whilst mostly successful, there are locations where maintenance and possibly further planting will be required. Planting was generally better established towards the western extent of the project and on the southern side of the carriageway compared to towards the east and on the northern side.

The ***1YA Evaluation*** reviewed data from noise surveys undertaken in 2009 to assess the level of noise impact on properties within the vicinity of the Dalkeith Bypass and to establish whether any noise insulation measures were required. The review concluded that none of the 21 properties identified as potentially being subject to changes in noise levels as a result of the project satisfied the criteria where noise insulation compensation would be required. However Transport Scotland provided acoustic fencing at three locations after the completion of the scheme.

This 3YA Evaluation has identified that actual traffic flow has increased by over 20% in places compared with predicted flows. It is, therefore, suggested for consideration that follow up analysis is undertaken to identify any potential impacts in terms of air quality as a result of the higher traffic flows recorded. No noise measurements were taken during the 3YA Evaluation, and further investigation is not required according to the STRIPE methodology as the change in traffic was under 25%.

The stretch of mammal fence which had been subject to vandalism as observed during the 1YA site visit remains missing, reducing the effectiveness of this mitigation measure. If this is the boundary fence, then the landowners would be responsible. Mammal fencing was visually inspected at other places across the extent of the project and found to be in good condition.

The ***1YA Evaluation*** could not identify any artificial bat roost at the River Esk crossing, as set out in the Environmental Mitigation Report. During the return visit to this location as part of this 3YA Evaluation it was still not possible to locate any of these roosts despite inspection being made from underneath the crossing.

Similarly, hop-over points were to be provided to repair flight lines used by owls and other birds. It is not obvious from a survey along the length of the carriageway that any hop-over points were planted. Certainly, any new trees planted for this purpose have not yet reached a height to allow them to serve this purpose.

Environment: Key Findings

Overall, it is considered that the project now sits well within the wider landscape of the surrounding farmland. The successful establishment of the planting has varied across the scheme, although it is anticipated to grow further and assimilate with the landscape after the five year establishment period. There are locations that will require further landscape maintenance or replanting.

No artificial bat roosts could be located under the River Esk crossing and hop-over points for large birds could not be identified. Noise mitigation (acoustic fencing) had been installed post-completion of the scheme despite this not being identified as required mitigation in the Environmental Mitigation Report.

The following actions are recommended for consideration:

- Follow up work to establish what, if any, impact the higher than forecast traffic flows of over 20% in certain locations are having in terms air quality following the STRIPE methodology.

- Identify the responsibility for the repair of the damaged mammal fencing at Bellyford Burn underpass to ensure the effectiveness of the mitigation measure.

- Review the condition of the existing planting and the apparent absence of “hop-over points” for large birds. The review should check in particular the northern side and towards the eastern end of the scheme, and where necessary to supplement the planting of trees and hedges where it is found to have failed or is sparse/missing and not in line with the commitments made in the Environmental Mitigation Report.

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

One of the objectives of the project was to improve road safety and contribute towards the Government's overall target of reducing road casualties. This evaluation has considered the accident statistics for the three year after opening period and compared it with the three year period before opening.

The locations and severities of accidents occurring within the vicinity of the A68(T) Dalkeith Bypass three years before and three years after the project opened are shown in Figures 3.5a and 3.5b, respectively. A summary of the personal injury accident data is shown in Table 3.5.

Table 3.5: Personal Injury Accident Data Summary

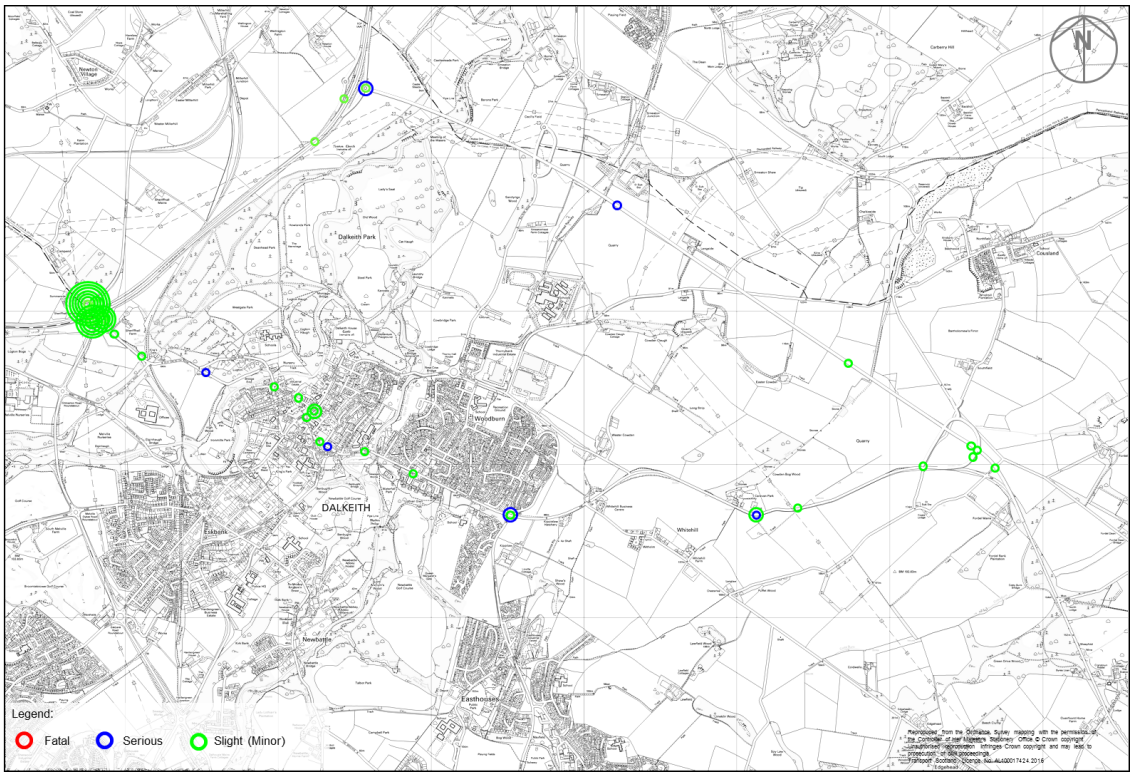
Period	Fatal	Serious	Slight	Total Accidents
3 Years Before				
A68(T)	0	9	48	57
1 Year After				
A68(T) Dalkeith Bypass	0	1	1	2
Bypassed Route	0	1	12	13
Total	**0**	**2**	**13**	**15**
3 Years After				
A68(T) Dalkeith Bypass	0	2	6	8
Bypassed Route	0	4	35[1]	39[1]
Total	**0**	**6**	**41**	**47**

Note 1: Subsequent 3YA data reported two fewer slight injury accidents occurring 1YA than the initial data reviewed in the 1YA Evaluation. The most likely reason for an accident record no longer appearing is that it has been deleted due to being non-injury, a duplicate record or having occurred in a car park.

On the A68(T) Dalkeith Bypass, eight personal injury accidents (two serious and six slight) occurred during the three year after opening period. During the same period, 39 personal injury accidents (four serious and thirty-five slight) occurred on the bypassed route through Dalkeith, although it should be noted the majority of these were located either within the built-up area of Dalkeith or in the vicinity of Sheriffhall Roundabout. The data indicates a reduction in the number and severity of personal injury accidents after the project opened.

Figure 3.5a: 3 Years Before Opening Personal Injury Accident Numbers

Figure 3.5b: 3 Years After Opening Personal Injury Accident Numbers



For the Dalkeith Bypass, eight personal injury accidents (two serious and six slight) occurred after opening. The data indicates five of the accidents were located within the proximity of two junctions. This included one serious and one slight at the A720(T) westbound slip roads junction and three slight at the A6106 Fordel Mains junction).

Two of the recorded injury accidents involved u-turn manoeuvres. There were no subsequent recorded injury accidents involving u-turn manoeuvres since the completion of the Fordel Mains Link Road South junction improvement.

Road Safety Audits

The RSA process has been followed with Stage 1, 2, 3, 4 and 5 Audits carried out. The ***1YA Evaluation*** reviewed a Stage 4 RSA report that considered accident data one year after the Dalkeith Bypass opened. The Stage 4 RSA was carried out in June 2010 and noted that two of the three personal injury accidents that occurred on the A68(T) Dalkeith Bypass during 2009 involved vehicles apparently performing U-turn manoeuvres. The report suggested remedial works undertaken at the Fordel Mains junction in March 2010 should address the issue. The remedial works at the Fordel Mains junction involved a realignment of the A6106/A68 northbound on/off slip road junction to change the priority manoeuvre as shown in Figure 3.6. These works were to address previous safety issues with traffic on the A6106 travelling to join the A68(T) heading southbound.

Figure 3.6: Realigned A6106/A68 Northbound Slip Road Junction

The Stage 4 RSA report concluded that the recorded accident records on the A68(T), A720(T) and local road network within the vicinity of the project did not highlight any common accident factors and that there was no further evidence of an accident problem that warranted further engineering work. However, it should be noted that only 8 recorded injury accidents were on the A68(T)

Dalkeith Bypass. In addition, while the Stage 4 RSA did not highlight any common accident factors, it should be noted there are clusters of accidents within the built-up area of Dalkeith and also in the vicinity of Sheriffhall Roundabout.

The 3YA Evaluation reviewed a Stage 5 RSA report, undertaken in August 2012, which was prepared for the scheme. The Stage 5 RSA report noted the injury average annual accident rate for all severity of accidents on the A68(T) Dalkeith Bypass during the study period was 15.12 accidents per 100million vehicle kilometres. This is slightly higher than the average rate (2006-2010) for an equivalent trunk road at 13.95 accidents per 100million vehicle kilometres.

The Stage 5 RSA report also highlighted the Fordel Mains junction improvement had been implemented to address recorded injury accidents involving u-turn manoeuvres. However, the report comments that the associated site visit noted tyre marks that suggest u-turn manoeuvres were still being carried out. The site visit also included discussions with traffic police officers, who confirmed excessive speeding does occur and the northbound overtaking prohibition is often breached. However, accident records do not identify recent accidents on A68(T) Dalkeith Bypass where excessive speeds or illegal overtaking was a contributory factor. The Stage 5 RSA report concludes there is no further evidence of an accident problem that warrants further engineering work.

During the 3YA evaluation site visit in August 2014, it was observed that neither the Fordel Mains Junction nor the A6094 Junction had acceleration lanes. In addition, whilst the northbound lay-by is constructed with kerbed island protection, the southbound lay-by has red screed ghost island protection.

Stakeholder feedback

Feedback received included comments regarding the positive safety impact associated with the project. One stakeholder observed that *"The accident statistics that there are less collisions on the old A68 and observations suggest commercial traffic has reduced considerably. I believe there has been an increase in volume of traffic on the A68 since there is no longer the delay of driving through Dalkeith. Some of this due to shift from the A7 to the A68".*

A third stakeholder noted "*There is evidence the Bypass has improved road safety*. *There are some issues with sightlines when using the slip roads onto the A68 Dalkeith Bypass, as they are not fully compliant to DMRB standard (e.g. when trying to join the northbound lane from Dalkeith the position/angle of your vehicle does not provide good visibility to the right)".*

"The accident statistics that there are less collisions on the old A68 and observations suggest commercial traffic has reduced considerably. I believe there has been an increase in volume of traffic on the A68 since there is no longer the delay of driving through Dalkeith. Some of this due to shift from the A7 to the A68".

"There is evidence the Bypass has improved road safety. There are some issues with sightlines when using the slip roads onto the A68 Dalkeith Bypass, as they are not fully compliant to DMRB standard (e.g. when trying to join the northbound lane from Dalkeith the position/angle of your vehicle does not provide good visibility to the right)".

The speed of vehicles immediately to the south of the A720(T) junction was observed as an area for attention in terms of enforcement by the Police, but not compromising the safety performance of the project.

Safety: Key Findings

An assessment of the one and three year post opening personal injury accidents suggests that the project is operating safely and has had an overall positive impact on road safety.

The Stage 4 RSA observed two of the three personal injury accidents that occurred on the A68(T) Dalkeith Bypass during 2009 involved vehicles apparently performing U-turn manoeuvres. The report suggested remedial works undertaken at the Fordel Mains junction in March 2010 should address the issue. The Stage 4 RSA concluded there was no particular accident issue that warranted further engineering work. The Stage 5 RSA had the same conclusion as the Stage 4 RSA.

3.6 Economy

Transport Economic Efficiency

Traffic flows are a key input to the economic assessment of a project. The comparisons between predicted and actual traffic flows, presented in Section 3.3, can therefore be considered a proxy for whether the predicted economic benefits of the project are likely to be realised. A comparison of actual and predicted travel times also provide a proxy.

Comparison Between Predicted and Actual Traffic Flows

The ***1YA Evaluation*** indicated that predicted 2009 AADT flows on the A68(T) Dalkeith Bypass were between 1.7% lower southbound and 2.5% greater northbound compared to observed 2009 flows. This was considered to be well within accepted limits.

This 3YA Evaluation indicates that predicted 2012 AADT flows on the A68(T) Dalkeith Bypass are between 20.4% lower southbound and 8.1% lower northbound compared to observed 2009 flows. This indicates the Dalkeith Bypass is now attracting more vehicles than predicted, with the variations having increased when compared with 2009 flows.

Comparison Between Predicted and Actual Travel Times

The ***1YA Evaluation*** comparison between 2011 predicted and March 2012 actual travel times indicated that the predicted journey times on the A68(T) Dalkeith Bypass were longer than the average observed journey times on some sections of the routes within the study area.

This 3YA Evaluation has compared 2011 predicted and May 2014 observed travel times and indicates the predicted journey times on the A68(T) Dalkeith Bypass still remain longer than the average observed journey times. For the bypassed route through Dalkeith, predicted journey times remain longer than the average observed journey times, with the exception of the northbound AM peak period. The comparisons support the conclusion that the project can be considered to be operating more effectively than predicted.

Economy: Key Findings

The difference between predicted and actual AADT flows and journey times is likely to have resulted in an underestimation of road user benefits. This suggests that, should these trends continue, the project may deliver benefits over and above that predicted as part of the project's assessment.

3.7 Accessibility & Social Inclusion

Community Accessibility

The project does not have any specific objectives relating to cyclists or other non-motorised users. As such, no cycle or accessibility audits have been undertaken, either for the previous 1YA Evaluation or this 3YA Evaluation.

Roads for All (Equality Act)

The project was implemented prior to the publication of Transport Scotland's *Disability Discrimination Act Good Practice Guidance for Roads* document, which relates to Disability Discrimination Act (2005) (now superseded by the Equality Act (2010)) aspects and requirements. As such, no DDA audits were specifically undertaken. The nature of the project is not expected to present any access issues.

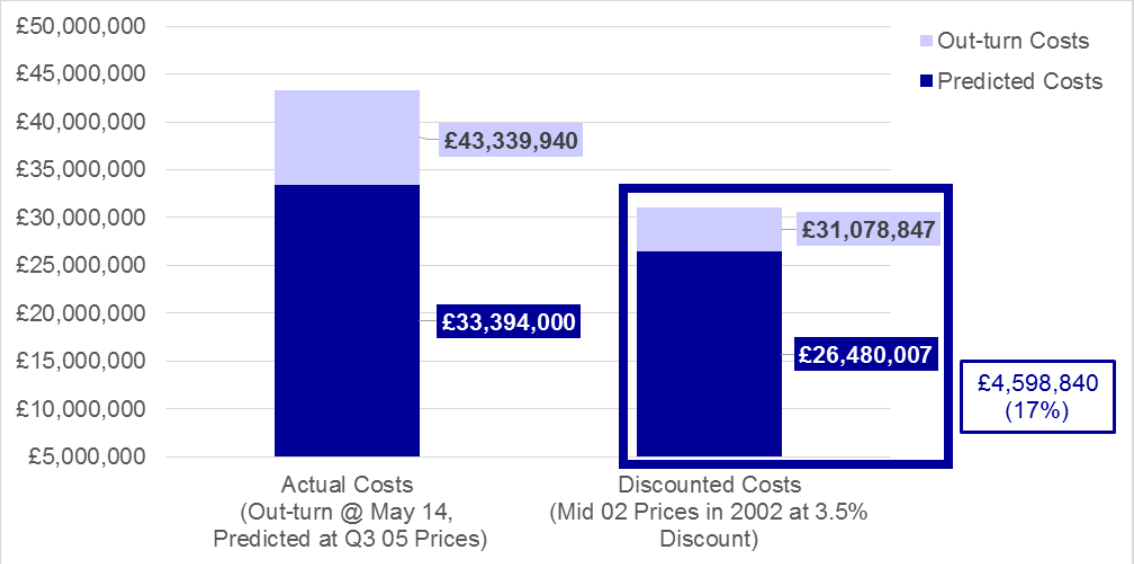
3.8 Cost to Government

Investment Costs

Comparison Between Predicted and Out-turn Costs

The out-turn and predicted project costs for the project are shown in Figure 3.7.

Figure 3.7: Project Cost Summary



The latest comparison indicates that the current out-turn cost for the project, was approximately £4.6m greater than the predicted cost estimate calculated in 2005. This is an approximate 17% increase. The remedial works at the Fordel Mains junction, together with some post-construction cycling infrastructure measures, account for an element of this increase. It should be noted that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. As such, variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

Cost to Government: Key Findings

The out-turn cost of the project is approximately £4.6m. This is 17% greater than was predicted at the time of assessment.

Remedial works at the Fordel Mains junction, together with some post-construction cycling infrastructure measures, have accounted for an element of this increase.

3.9 Value for Money

The project was forecast to achieve a predicted Net Present Value (NPV) of £-4.42m and a Benefit to Cost Ratio (BCR) of 0.88. This reflects the economic appraisal results from the economic model developed during the preparation of the project that did not include the proposed closure of Dalkeith High Street to through traffic. Closure of the High Street was forecast to achieve higher NPV and BCR values but implementation was the responsibility of Midlothian Council, who subsequently decided not to proceed.

The higher than predicted traffic flows and journey time savings discussed in Sections 3.3 and 3.6 suggest that the predicted economic benefits may have been underestimated. Section 3.8 indicates, however, that the out-turn cost was higher than the predicted cost. The overall conclusion is that actual NPV and BCR values for the project can be expected to be less than forecast as a result of the variation in investment costs. It is considered unlikely, however, that the increase in out-turn cost would have affected the original decision to proceed with the project. This is in part attributable to the journey time benefits offered by the A68(T) Dalkeith Bypass and wider the opportunities presented to enhance the environment within Dalkeith town centre as a result of the removal of through traffic.

Value for Money: Key Findings

The NPV and BCR relating to the alternate model (which better reflects the actual improvements that were implemented within Dalkeith town centre) may be greater than predicted at the time of assessment. This is due to the difference between predicted and actual AADT flows and journey times which suggest that the economic benefits of the project have been underestimated.

The discounted out-turn cost of the project is approximately £4.6m (17% greater) than was predicted at the time of the project's assessment.

While the benefits of the project may have been underestimated, the increase in costs means that overall the NPV and BCR are expected to be less than forecast as a result of the variation in investment costs.

The decision to proceed with the project was based on results incorporating the closure of Dalkeith High Street to through traffic, as this enhanced the environmental and economic case. However, Midlothian Council subsequently decided not to implement this element of the project. It is, however, envisaged that the preparation of the project (which reflected current thinking at the time in regards to improvements within Dalkeith) would have continued, as the main model continued to provide value for money.

Whilst the NPV and BCR are unlikely to be as great as predicted at the time of assessment, the project is expected to continue to provide a benefit to road users in terms of offering a quicker route between Fordel Mains and the A720(T) City of Edinburgh Bypass. The removal of the majority of through traffic from Dalkeith will also have benefits in terms of noise, air quality and general amenity through providing the opportunity to enhance the public realm.

3.10 Achievement of Objectives

As stated in Section 2.3, the ***1YA Evaluation*** concluded that progress was being made to achieving five of the six project objectives. The subsequent decision by Midlothian Council not to close Dalkeith High Street to through traffic, as originally proposed, affected progress of the 6th objective, relating to achieving full economic benefits, as initially forecast. This was primarily viewed in the context of the project at that time.

A summary of the 3YA Evaluation, providing an indication of how the A68(T) Dalkeith Bypass has performed towards achieving its objectives is presented in Table 3.6. This indicates the six objectives have been met. With regard to Objective 6, which relates to achieving good value for money, the 3YA Evaluation is of the opinion that the scheme has achieved this objective, although probably not the full economic benefits as originally predicted.

Table 3.6: Achievement of Objectives

Objective	Commentary	Progress
1. To provide good quick and reliable inter-urban road links.	Average journey times for strategic traffic using the A68(T) Dalkeith Bypass in both directions of travel have reduced significantly in the peak periods, compared with the bypassed route through Dalkeith. Realibility of journey times between Fordel Mains and Sheriffhall Roundabout has decreased, but analysis indicated this was primarily attributable to greater variability on the A720(T) City of Edinburgh Bypass section rather than the A68(T) Dalkeith Bypass.	+ve
2. To improve accessibility from Edinburgh to the Central Borders and the North of England.	The project has facilitated quicker journey times for traffic using the A68(T) Dalkeith Bypass compared to routing through Dalkeith. As such, the project can be viewed to have had a positive impact in terms of improving accessibility and connectivity from Edinburgh to the Central Borders and north of England.	+ve
3. To aid economic prosperity and development by reducing travel costs particularly for business and commercial traffic serving existing and proposed business and commercial developments (including tourism and service industries).	Reduced journey times will provide benefits in terms of travel benefits to road users. A fall in the reliability of journey times will present a negative impact, but overall the project can be considered to be delivering benefit in view of the actual improvement on journey times for traffic travelling between Fordel Mains and Sheriffhall Roundabout.	+ve
4. To improve road safety and contribute towards the Government's overall target of reducing road casualties.	A comparison of three years before and after opening accidents occurring within the vicincity of the project indicates that there has been a reduction in the number and severity of accidents occurring post opening of the project. Anecdotal feedback received from stakeholders observed road safety had improved following the opening of the bypass. The removal of through traffic from Dalkeith was also considered to have provided a number of benefits, including in relation to road safety.	+ve
5. To minimise the intrusion of roads and traffic on communities and on the environment.	Traffic flow data shows that traffic volumes on the bypassed route through Dalkeith remain significantly lower than pre-opening levels. For the A68(T) Dalkeith Bypass, environmental and landscaping measures have been implemented to help the project fit within the existing open landscape. Traffic flows in Dalkeith have decreased by approximately 40%	+ve

Objective	Commentary	Progress
	following the opening of the bypass. This decline has positive benefits in terms of the local environment within the town. Overall the project is considered to be providing benefits in terms of general well-being for residents of Dalkeith.	
6. To use the limited resources available as effectively as possible to achieve good value for money for both taxpayers and transport users.	The decision to proceed with the project was based on the option which included the construction of the bypass as well as the closure of Dalkeith High Street to through traffic. This option forecast a positive NPV and BCR. Following public consultation, the decision was taken not to close the High Street to traffic and instead enhancements to the streetscape and traffic calming measures were brought forward. The NPV and BCR projected for the option which reflected the resulting proposals as closely as possible projected a BCR of 0.88 and NPV of -£4.42m. Although the out-turn cost was slightly higher than the predicted cost, the overall conclusion is that actual NPV and BCR values for the project may be greater than expected with more traffic using the bypass than forecast and journey time savings also higher than predicted.	=

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

3.11 Evaluation Summary

The evaluation of the project indicates that traffic flows on the bypassed route through Dalkeith have reduced significantly following the opening of the bypass and this continues to be the case. Journey times on the bypass continue to be significantly lower than for the bypassed route. The project has also resulted in a noticeable reduction in the number and severity of personal injury accidents.

The out-turn cost for the project was approximately 17% higher than the 2005 predicted cost. It is considered unlikely that this would have affected the original decision to proceed with the project.

Stakeholder consultation was undertaken. Feedback received suggests stakeholders generally consider the project has been successful.

The evaluation indicates that the six project objectives have been achieved. Whilst the project may have cost more than predicted, journey times on this section of A68(T) have improved, together with its accident record. More traffic is also using the route compared to volumes predicted with benefit for Dalkeith through the removal of through traffic. The project is positively contributing to the overall operation of the A68(T) to improve accessibility from Edinburgh to the Central Borders and between the Scottish Borders and the wider Central Scotland area and beyond. With regard to Objective 6, which relates to achieving good value for money, the 3YA Evaluation is of the opinion that the scheme has achieved this objective, although probably not the full economic benefits as predicted.

Appendix A: Environment

A ENVIRONMENT

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 Evaluation for the A68(T) Dalkeith Bypass. 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 May 2011, Report to Transport Scotland, Halcrow Group Ltd 2011

Purpose and Methodology

The purpose of the 3YA Evaluation 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. Recommendations to improve the effectiveness of the mitigation are also identified.

The methodology used for the 3YA environmental review selected relevant aspects of the STRIPE[1] 'Three Years After' methodology that comprised:

- A desk study review of the project objectives, Environmental Mitigation Report (EMR)[2] and 1YA Evaluation to identify the likely key issues to be evaluated during the 3YA Evaluation and any questions remaining from the 1YA Evaluation.
- A site visit – to give an overview of the mitigation implemented and with observations focused on any issues raised by the 1YA Evaluations rather than to repeat a visit to every feature that was confirmed as being present and in good condition.
- A report setting out the key issues from the 1YA Evaluation, 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.

[1] Transport Scotland Scottish Trunk Road Infrastructure Project Evaluation (STRIPE). Final Guidance August 2013.
[2] A68(T) Dalkeith Northern Bypass Environmental Mitigation Report W A Fairhurst & Partners January 2006

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 Evaluation, given in Section A2 below.

The observations made during the 3YA site visit focussed on these key issues, and are described in Section A3. Following this is Table A1 which sets out all of the mitigation proposed and the 3YA observations made against each of the mitigation measures, with the associated 1YA observations to aid comparison.

The report concludes with a summary of recommendations regarding further studies and suggestions for improving the effectiveness of the environmental mitigation where appropriate.

A.2 ENVIRONMENTAL FINDINGS

Project Objectives

The project involved the construction of a 5.4 kilometre bypass to the north of Dalkeith between the A68(T) at Fordel Mains and the A720(T) Edinburgh City Bypass. It also included 2.6 kilometres of single carriageway and a 2.8 kilometre southbound climbing lane between the junctions with the A6094 Salters Road and A6106 Fordel Mains.

The project set out to improve the operation of the road network through reducing traffic routing through Dalkeith and improving safety, among other objectives. One of the six objectives was “To minimise the intrusion of roads and traffic on communities and on the environment”.

Key Issues to be Reviewed

The 1YA Evaluation concluded that the majority of measures committed within the EMR were in place and were providing appropriate levels of mitigation. These included:

- Use of the existing landscape and topography to fit the project into the wider landscape;
- Noise mitigation measures within the vicinity of Smeaton Burn;
- Hedgerow and woodland planting; and
- Measures for the protection of mammals including badgers and otters.

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

- Noise - investigate the acoustic fencing observed during the 1YA site visit but had not been mitigation committed to pre-construction

- Biodiversity & habitats – including artificial bat roosts and mammal fencing
- Landscape/planting - including whether the 1YA recommendations for hedgerow planting had been implemented

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

Noise and vibration

The EMR did not identify the need for any acoustic fencing to be included as part of the project design. The 1YA Evaluation reviewed data from 2009 noise surveys, to assess the level of noise impact on properties within the vicinity of the Dalkeith Bypass and to establish whether any noise insulation measures were required. The review concluded that none of the 21 properties, identified as potentially being subject to changes in noise levels as a result of the project, satisfied the criteria where noise insulation compensation would be required.

However acoustic fencing was subsequently installed at three locations after the completion of the scheme. The 1YA Evaluation identified several gaps beneath the noise fencing at the Smeaton Burn site. During this 3YA Evaluation, no issues were observed with any of the fences (as shown in Figures A.1 and A.2).

Figure A.1: Acoustic fence

Figure A.2: Acoustic fence

Water quality, drainage and flood defence

The major river crossing constructed over the River Esk was visited during the 3YA site visit via Dalkeith Country Park, which was a major aspect of the sensitive design to minimise impacts on the river as shown in Figure A.7. Several culverts were constructed as part of the environmental mitigation to carry burns under the road (e.g. Smeaton Burn and Bellyford Burn). These were reported in the 1YA Evaluation as not having any issues, so were not visited again during the 3YA site visit. Filter drains were installed along the length of the scheme and were seen to be free of debris.

Biodiversity and habitats

A number of mitigation measures were identified in the EMR, most of which were checked during the 1YA Evaluation and observed to be successfully implemented. One issue raised in the 1YA Evaluation was a vandalised section of mammal fencing at the Bellyford Burn underpass, which was creating a gap in the fence and reducing the effectiveness of the mitigation. Visual inspections during this 3YA site visit and a comparison with the photographs taken during the 1YA visit suggest that this section of fence is still missing, and the effectiveness of the mitigation measure continues to be impaired as shown in Figure A.3. The responsibility for repairing this may lie with the landowner if it is a boundary fence. However, the remaining mammal fencing was visually inspected at various points along the carriageway and was found to be in good condition elsewhere. (See Figures A.4 and A.5.)

Figure A.3: Missing section of the mammal fence by the underpass at Bellyford Burn

Figure A.4: Mammal fencing along the carriageway

Figure A.5: Mammal fencing

Another issue raised by the 1YA Evaluation was the absence of any artificial bat roost at the River Esk crossing which had been a commitment in the EMR. A return visit to this location and inspection from underneath the crossing (see Figures A.6 and A.7) as part of the 3YA site visit could not locate any artificial bat roosts and concluded that these have either not been included as part of the scheme or were located elsewhere.

Figure A.6: Crossing over River Esk – no evidence of artificial bat roosts

Figure A.7: Crossing over River Esk – no evidence of artificial bat roosts

Similarly, 'hop-over points' were to be provided to repair flight lines used by owls and other birds. The EMR states that a 'hop-over point' can be provided by preserving existing tall trees close to the road boundary or by planting trees and managing them so that they develop as tall tree cover. It is not obvious from a review along the length of the carriageway (see Figure A.8) during the 3YA site visit that any hop-over points were planted. Certainly any new trees planted for this purpose have not yet reached a height to serve this purpose.

Figure A.8: View of carriageway looking north west

Some areas of the grass verges were dominated by ruderal vegetation, reducing species richness. This is illustrated in Figures A.9 and A.10.

Figure A.9: Ruderal vegetation on the nearest verge

Figure A.10: Example of an area of grass embankment dominated by ruderal vegetation

On the day of the 3YA site visit, two birds of prey were observed on the highway boundary fences and at various locations across the extent of the bypass. This indicates that the road verges and surrounding vegetation are likely to form foraging habitats supporting more than one raptor.

Landscape and visual amenity

Overall, it is considered that the scheme now sits well within the wider landscape of the surrounding farmland. It is expected that over time the features will weather, vegetation will grow and the scheme will assimilate better into the surrounding landscape after the five year establishment period. The main observation during the 3YA site visit was that planting was generally better established towards the western extent of the scheme and on the southern side of the carriageway more than towards the east and the northern side.

Planting of native tree species and hedgerow has been carried out along the carriageway and whilst mostly successful as shown in Figure A.11, there are locations where maintenance and possibly further planting will be required. There are areas where individual trees (see Figures A.12 and A.13) were planted that do not help tie the scheme into the wider landscape. There are also gaps in hedgerows where planting has failed to establish which is illustrated in Figure A.14, which lessens the value from both a visual and a biodiversity point of view.

Figure A.11: Successful planting along the carriageway

Figure A.12: Example of less well established planting on the northern side of the carriageway

Figure A.13: Example of isolated tree planting

Figure A.14: Native hedgerow and mammal fence

In general, the planting aids to reduce the visual impact on the road user. For example, there is planting to screen the acoustic fence in the Smeaton Burn area (although not for the fence located in the south east of the scheme). However, on the steeper slope of the grass embankment, there are areas of exposed aggregate that sit less well with the wider landscape.

Vehicle Travellers

Gateway features at the entrance of Dalkeith Country Park and a stone wall at Fordel Mains were completed as part of the project. These were checked as part of the 1YA and 3YA site visits. Both were built to match existing boundary walls and fit well within the wider landscape, adding local character to the landscape mitigation as illustrated in Figure A.15.

Figure A.15: Gateway feature at Dalkeith Country Park

Any new issues identified

This 3YA Evaluation has identified that actual traffic flows are up to 20% higher in places compared with the predicted volumes. Further analysis is recommended to identify any potential air quality impacts as a result and the requirement or otherwise for further study or mitigation.

Mitigation measures – detailed observations

An update of the observations as part of this 3YA Evaluation relating to individual mitigation measures provided in the 1YA Evaluation can be found in Table A.1.

Recommendations

The following recommendations are presented for consideration:

- Follow up analysis to identify any potential impacts on air quality, as a result of traffic flows being 20% higher than predicted at certain locations along the extent of the project, following the STRIPE methodology.
- Confirm responsibility to repair the damaged mammal fencing at Bellyford Burn underpass to ensure the effectiveness of this mitigation measure.
- Review the condition of the existing planting and the apparent absence of “hop-over points” for large birds. The review should check in particular the northern side and towards the eastern end of the project, and where necessary to supplement the planting of trees and hedges where it is found to have failed or is sparse/missing and not in line with the commitments made in the EMR.
- Confirm whether the reason for the omission of artificial bat roosts has been recorded, or needs to be remedied.

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

Mitigation Measure Proposed in the ES	***1 YA Comments***	***3 YA Comments***
Biodiversity and habitat		
Road safety and safeguarding protected species by the provision of special fencing.	Mammal fencing provided but area of vandalism requires repair.	Mammal fencing provided but area of vandalism requires repair.
Hop-over points to provide safe passage for bats and owls through maintenance of existing woodland close to road boundary and its reinforcement with native tree planting.	No comment.	No evidence of hop-over points.
To provide artificial bat roosts for Daubenton's and Pipistrelle bats to compensate for any loss of potential tree roost sites.	Bat roosts could not be located.	A return visit to this location as part of this 3YA sit visit could not locate any of these roosts. This included inspection from underneath the crossing.
Landscape and visual amenity		
Screening woodland with specimen tree planting	All mitigation recommended has been implemented though some of the hedge planting at Fordel Mains was in poor condition.	Generally planting towards the western extent of the scheme has been more successful than towards the east and on the south of the carriageway more than on the northern side. There are areas that would benefit from further planting.
Native woodland planting block linked to existing features with hedgerows		
Native hedgerow and shrubs with specimen tree planting		

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;
- Integration;
- 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, overtaking opportunities 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 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 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.
Stakeholder Feedback	Obtained from SEStran, Midlothian Council, Police Scotland, and BEAR Scotland

Overtaking Opportunities

Post Opening Overtaking Opportunities

Commentary on overtaking opportunities is provided for projects that have specific objectives relating to the improvement of overtaking levels. In this instance, there are no project objectives related to overtaking levels and, therefore, this aspect has not been assessed. A general observation has been included in the evaluation, based on carriageway standard and engineering judgement.

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

Data Sources	
Post Opening Overtaking Conditions	Judged from carriageway standard and engineering consideration.

Travel Times

Comparison Between Pre and Post Opening Travel Times

A comparison between pre and post opening travel times has been carried out where travel time information is readily available. Where such information is not available, changes will 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 where predicted and post opening travel time information is readily available.

Data Sources	
Pre Opening Travel Times	Confirmed through pre opening survey information collected to support the project's economic assessment.
Post Opening Travel Times	Confirmed through post opening survey information.
Predicted Travel Times	Obtained from the pre-tender economic assessment undertaken during the project's preparation.
Stakeholder Feedback	Obtained from SEStran, Police Scotland, and BEAR Scotland

B.3 ENVIRONMENTAL

Mitigation Measures

A review of the environmental mitigation measures implemented during construction has been undertaken 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 Mitigation Report produced during the project's preparation.
Implemented Mitigation Measures	Confirmed through site visit.

Noise and Air Quality

A comparison of traffic flows pre and post opening has been used as a proxy for the potential impact of the project on noise and air quality.

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 to provide an 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 its first 3 years of operation.

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 demonstrates 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, where available, to confirm whether there is any evidence that the project is not operating safely and where any 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 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.

Commentary on the impact of the project on local economic development has been provided where any anecdotal feedback is available.

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.

B.6 INTEGRATION

Commentary on Transport Integration and Policy Integration is provided for projects that have specific objectives relating to the Integration criterion. In this instance, there are no project objectives related to integration and, therefore, this criterion has not been assessed.

B.7 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.

In this instance, there are no project objectives related to Accessibility & Social Inclusion and, therefore, this criterion has not been assessed.

Data Sources	
Stakeholder Feedback	Obtained from BEAR Scotland

B.8 COSTS TO GOVERNMENT

Investment Costs

Comparison Between Predicted and Out-turn Costs

A comparison between predicted and out-turn costs has been undertaken 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.9 VALUE FOR MONEY

Initial Indications

Based on the evaluation of economic benefits and project costs outlined in Sections 3.6, 3.8 and 3.11, 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.

B.10 ACHIEVEMENT OF OBJECTIVES

The evaluation includes an indication of how well the project has met its objectives. Where specific indicators to measure the project's performance against its objectives have not been developed, an indication of how well the project achieved 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.
Stakeholder Feedback	Obtained from Police Scotland, and BEAR Scotland