

**TRANSPORT SCOTLAND**  
**SCOTTISH TRUNK ROAD INFRASTRUCTURE**  
**PROJECT EVALUATION**

1YA Evaluation Report for M80 Steps to Haggs



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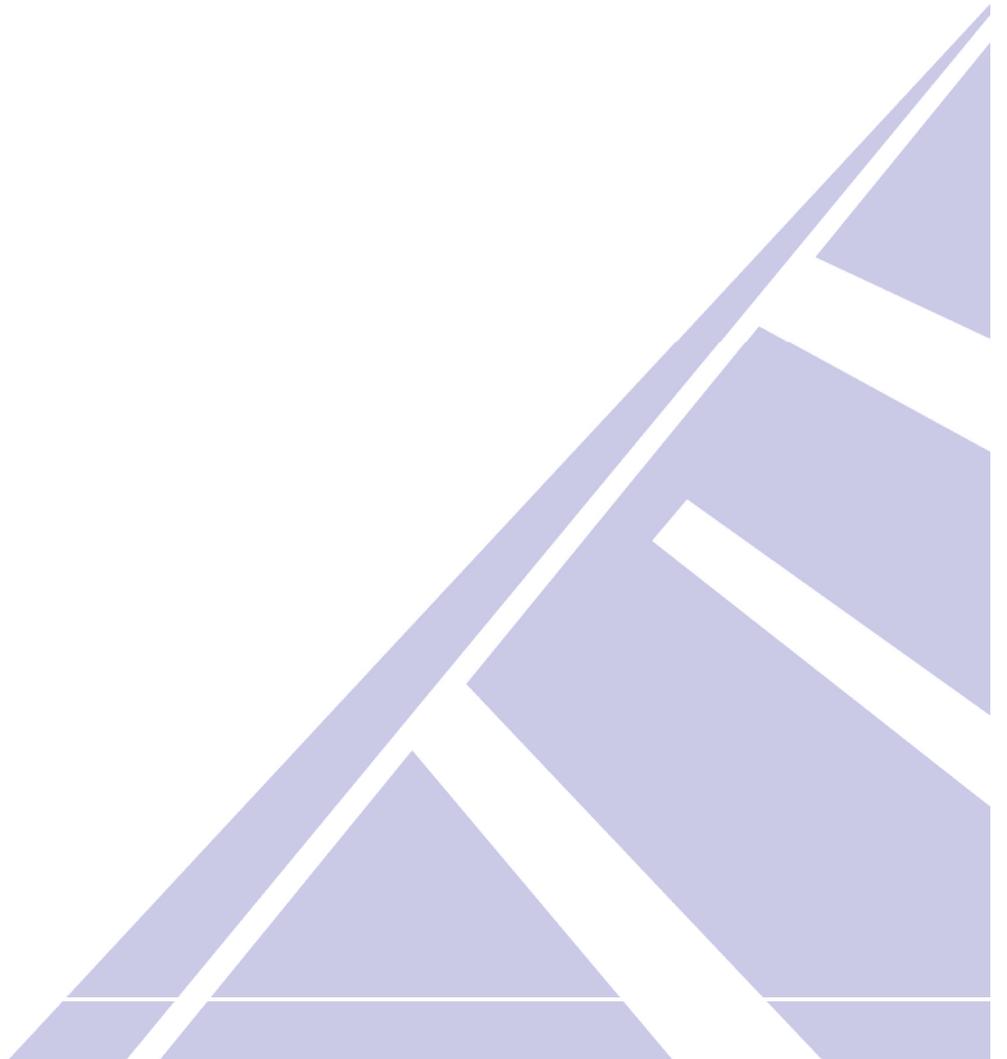
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## **GLOSSARY**

The following abbreviations have been used in this report:

1YA	One Year After
3YA	Three Year After
AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Counter
BCR	Benefit to Cost Ratio
CSTCS	Central Scotland Transport Corridor Studies
D2AP	Dual 2-lane All Purpose Carriageway
D2M	Dual 2-lane Motorway
D3M	Dual 3-lane Motorway
DDA	Disability Discrimination Act
DFT	Department for Transport
DMRB	Design Manual for Roads and Bridges
ES	Environmental Statement
GCVSP	Glasgow and Clyde Valley Structure Plan
HGV	Heavy Goods Vehicle
NPV	Net Present Value
NRTF	National Road Traffic Forecasts
PIA/mvk	Personal Injury Accidents per Million Vehicle Kilometres
PPP	Public-Private Partnership
PVB	Present Value of Benefits
RHA	Road Haulage Association
RSA	Road Safety Audit
STAG	Scottish Transport Appraisal Guidance
STRIPE	Scottish Trunk Road Infrastructure Project Evaluation
SUDS	Sustainable Urban Drainage System
VPD	Vehicles Per Day

# **SUMMARY OF IMPACTS**



# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## **1 PROJECT SUMMARY**

This section provides a short summary of the key findings from this One Year After (1YA) Evaluation report of the M80(T) Stepps to Haggs project.

### **1.1 Operational Indicators – How is the project operating?**

The project is operating safely and broadly as expected. Specific points to note are as follows.

Based on an analysis of data available at the time of the 1YA evaluation, particularly on the section of the M80(T) north of the M73(T) merge, it is considered that the project has not induced notable increases in traffic volumes. Any observed increases are likely to be mainly attributable to general traffic growth over the period of evaluation, which has occurred against a backdrop of reducing flows, more generally, across the wider motorway network in central Scotland.

On the M80(T), to the south of the project, daily traffic volumes have increased by approximately 20%. This can be partly explained by the release of capacity on the M8(T) as a result of the opening of the M74(T) Extension providing an alternative east-west route through Glasgow. This is a particularly attractive route option for trips from areas within the vicinity of the M80(T) between Junction 1 Provan and Junction 4 Mollinsburn.

The improvement has succeeded in significantly reducing the volume of strategic traffic travelling on the A80 within the vicinity of communities at Moodiesburn, Chryston and Muirhead, by up to approximately 37,000 vehicles per day (around 80%).

Localised changes in the proportion of heavy goods vehicles (HGVs) using the route have been observed from the data available from traffic counters located within the study area. Overall, the project has had a positive impact in attracting HGVs to use the M80(T) between the merge with the M73(T) and Junction 7 Haggs. It can be expected that this may have also positively impacted on the volume of HGV traffic using the local road network.

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The removal of traffic bottlenecks (such as Mollinsburn Junction and Crow Wood Roundabout), which led to significant queuing and congestion prior to the opening of the project and the upgrade of the overall standard of the route between Stepps and Haggs from dual carriageway to motorway standard, has resulted in average journey time savings of up to approximately five minutes. Reductions in average journey times are particularly notable for journeys undertaken within the peak periods on the M80(T) between Stepps and Haggs. For example, average journey times have reduced from approximately 19 minutes to approximately 14 minutes in the southbound direction of travel during the AM peak period.

Furthermore, as a result of the project, the reliability of journey times on the M80(T) between Stepps and Haggs has improved. This has been observed, most notably, in the southbound direction of travel during the AM peak hour, with an approximate reduction in journey time variability of up to fifteen minutes.

Analysis of the pre and post opening mean vehicle spot speeds during both peak periods indicate that, overall, there is little difference in mean vehicle speeds on the M80(T) north of the M73(T) merge. There are, however, instances of significant increases in mean vehicle spots speeds. For example, the comparison of the pre and post opening mean vehicle spot speeds on the now bypassed section of the A80 and the M80(T) between Junction 3 Hornshill and Junction 4 Moodiesburn (the Moodiesburn Bypass), shows significant increases of up to approximately 30 mph in both directions of travel during the AM peak. Similar increases in mean vehicle spot speeds were also observed during the PM peak period. The section of the M80(T) directly south of the project, particularly heading northbound from Junction 2 Robroyston, also shows an increase in mean vehicle spot speeds. The opening of the Moodiesburn Bypass and the removal of the need to negotiate the congestion and delays previously experienced at Crow Wood Roundabout prior to the opening of the project, are likely to be contributing towards the increase in mean vehicle spot speeds observed at these locations.

Decreases in vehicle speeds are also observed at the southern extents of the project on approach to the M8(T) at Junction 1 Provan, due to increased traffic at this location. This is attributable to the release in capacity on the M8(T) resulting from strategic traffic transferring from both the M8(T) and M80(T) to the M74(T) which provides a more direct alternative route for east to west trips through Glasgow and M80(T) Stepps to Haggs project combining to attract previously suppressed trips from surrounding areas, such as Robroyston. This is in turn contributing to the higher volumes of traffic merging with the M8(T) at Provan and subsequent impact on congestion on the southbound M80(T) between Junction 2 Robroyston and Junction 2 Provan and lower mean spot speeds observed.

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An assessment of operational conditions on the M80(T) south of Junction 2 Robroyston (outwith the project extents) confirms that traffic queues affect the southbound M80(T), primarily during the AM peak period. This is due to extensive queuing as a result of merging / weaving behaviour observed at the M8(T) / M80(T) Provan merge. The exacerbation of operational issues is not unexpected given the increase in demand on the section of the M80(T) south of the project. It should be noted, however, that operational issues were observed within the vicinity of the M8(T) / M80(T) Provan merge prior to the opening of the M80(T) project. Further queuing and delays are experienced by southbound vehicles on approach to M80(T) Junction 3 Hornshill due to the knock on effect of queuing traffic from Junction 2 Robroyston. As noted, the impact on the flow of traffic during peak periods as a direct impact of the project, in conjunction with the impact of the higher volumes of M80(T) traffic merging with the M8(T) at Provan, are likely to be the key contributing factors to the queuing observed.

With regards to the project's impact on road safety, an assessment of the one year post opening personal injury accidents suggests that there is no discernible change in safety on the M80(T) north of the merge with the M73(T). However, on the section of the M80(T) south of the M73(T), a reduction in the severity and numbers of accidents occurring was observed. The Stage 4 Road Safety Audit (RSA) indicated that the propensity for accidents, specifically relating to lane changing behaviour, have reduced following opening of the project with less queuing and lane changing now taking place.

An examination of pre and post opening accident rates on the sections of the upgraded M80(T) confirmed that the rate of personal injury accidents per million vehicle kilometres (PIA/mvk) were lower post opening when compared to the pre opening rates. Furthermore, the majority of the upgraded sections of the M80(T) route had an accident rate lower than the 2012 national average of 5.38 PIA/mvk. Corresponding post opening reductions in accident severity ratios across the project were also observed when compared to pre opening levels.

At the time of the 1YA evaluation, it can be concluded that observations suggest the project is providing improvements in safety. The 3YA evaluation will provide a clearer picture of the operational safety of the project.

The project has had a positive impact on public transport. While no timetabling changes have been noted, bus operators do note that services are now more reliable and there is greater confidence in services adhering to schedules. Express bus services utilise the Moodiesburn Bypass section of the project and, as a result, no longer serve the communities of Moodiesburn, Chryston and Muirhead. It can, however, be expected that the removal of strategic traffic passing through these communities is also positively impacting on the bus services which do still serve these areas.

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The mitigation that was included within the Environmental Statement (ES) has been implemented on site and is in good condition, although at one location, Mollinsburn Junction, a field boundary hedge was unable to be replaced due to the structural foundations of the piled embankment. A substantial proportion of mitigation measures placed across large expanses of the completed project comprised noise abatement, tree planting and enhancement of habitats to mitigate noise, landscape and visual impacts respectively.

No noise measurements were undertaken as part of the 1YA evaluation, but there was a notable difference observed in noise levels when travelling the route between the new surface of the project and the existing M80(T) surface. A Noise Insulation (Scotland) Regulations Report has been prepared which identified no properties that are experiencing an increase in noise to a level requiring payment of compensation and the provision of noise insulation.

A comparison of actual and forecast traffic flows has revealed that, from a total of sixteen model links examined, actual traffic flows on fourteen links are lower than those forecast with the actual flow on many links being more than 20% lower than forecast. According to Calculation of Road Traffic Noise and the Design Manual for Roads and Bridges (DMRB), this would result in noise impacts 1dB less than forecast given the lower traffic flows. Impacts on air quality would also be expected to be less than presented in the ES as a result of the lower traffic flows.

Landscaping has been carried out across the project, however, tree planting density was found to be sparse in areas compared with other recent projects and some whips had not established well in certain areas. The period for establishment of landscaping features is five years. It is, therefore, expected that over time the features will weather, vegetation will grow and the project will assimilate better into the surrounding landscape, however, it is possible that the planting may not be as affective at screening the road as was intended and the connectivity of the small clumps of trees to other areas of scrub/woodland could have been better.

In the short-term, a further review during the spring / summer is recommended to better confirm the level and success of the planting carried out alongside ongoing monitoring of the planting in the longer term. This should include checking the density of the trees planted and the apparent reduction in hedgerows compared with the ES, and assessing the success of the establishment of the trees and wildflower planting. Depending on the findings, further planting may be needed (e.g. replace failed trees) to ensure the visual screening and habitat connectivity is implemented as proposed.

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A Sustainable Urban Drainage System (SUDS) was implemented as part of the project to minimise the risk of pollution to watercourses via filter drains and a series of retention ponds in addition to extensive habitat creation and improvement measures for protected species.

## **1.2 Process Indicators – How well was the project implemented?**

Process Indicators provide evaluation across the key elements of project cost, programme and process. Commentary against each of these elements is provided within this section.

The decision to invest in the project was made in August 2006. The project was taken forward as a Public-Private Partnership (PPP) project and the M80(T) officially opened to traffic in August 2011. This followed a period of phased opening of different sections between February 2011 and August 2011. Work on the old A80 continued after August 2011 and the official completion date of the project is therefore May 2012. Further work relating to landscape planting was considered as “Excluded Seasonal Works” which enabled further planting to be undertaken through the 2012/2013 planting season.

Indications are that the traffic forecasts adopted as part of the project’s appraisal predicted growth in traffic significantly greater than has been realised. This is, in part, due to a general fall in traffic volumes across the wider trunk road network during the period between the project’s appraisal and 2010 as a result of the economic downturn. It is also likely to reflect the economic forecasts made at that time.

A Cycle Audit was carried out as part of the Stage 4 RSA. A review of the audit identified no specific comments were made with regards to non-motorised users. The design phase of the scheme pre-dated the introduction of the Disability Discrimination Act (DDA) guidance. Therefore, a DDA Audit did not need to be undertaken.

## **1.3 Objectives – Is the project on track to meet its objectives?**

The project objectives sought to reduce delays and congestion and to improve journey time reliability on this heavily trafficked section of the trunk road network, and in doing, so support business activity and future economic development and improve safety within the M80(T) corridor. Reducing the impact on the built and natural environment and lessening the adverse impacts of traffic on people through improved design and effective management of the network were also objectives of the project.

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A review of the performance of the project indicates that it appears to be on track to meet the objectives set. As noted, the mitigation that was included within the ES has been implemented on site and is in good condition. It was observed, however, that some action was required in relation to the establishment of planting and otter fencing and, at one location, (Mollinsburn Junction), a field boundary hedge was unable to be replaced due to the structural foundations of the piled embankment. The accident analysis suggests that the project is operating safely. Improvements in the severity and numbers of accidents occurring on the section of the project south of the M73(T) merge have been observed, with no significant impacts observed north of the merge.

The project is currently providing savings in average journey times of up to five minutes within peak periods and has contributed to an improvement in the reliability of journey times for traffic using this section of the M80(T).

The project is also providing adequate access for freight deliveries. Data available from the traffic counters located within the study area and anecdotal feedback from local businesses suggest that the project has had a positive in terms of attracting HGVs onto the M80(T). This can be expected to have a positive benefit in terms of reducing HGV traffic on the local road network.

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

In conjunction with the M74(T) Extension project (opened in June 2011), the M8(T) Baillieston to Newhouse improvement currently under construction and associated M8/M73/M74 Improvements project (estimated to be completed in 2017), the M80(T) Steps to Haggs project forms part of a series of improvements with the aim of completing the motorway network in Central Scotland.

Together, these improvements can be expected to provide benefits to transport users and help encourage economic development within Central Scotland and beyond with improved connectivity to U.K. and European markets.

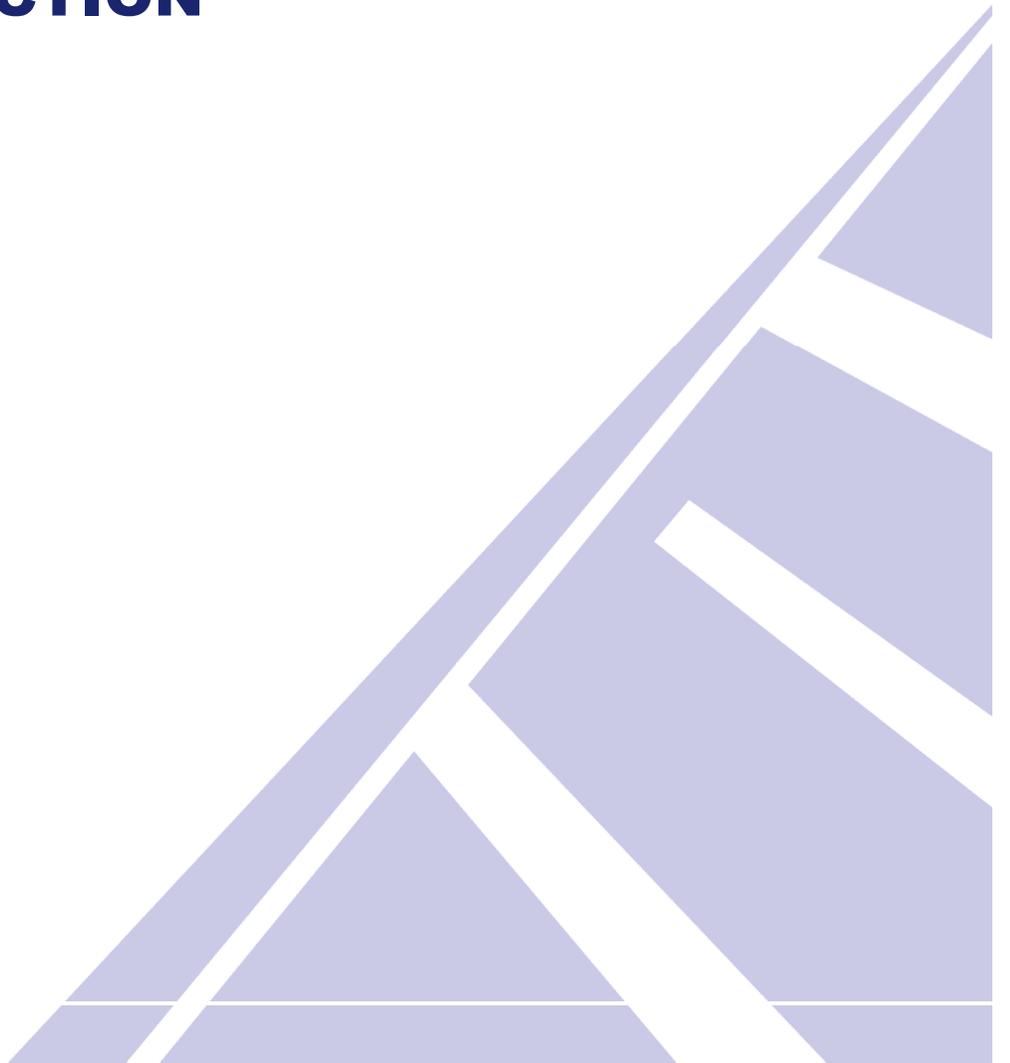
Analysis of observed data has shown that actual traffic volumes and journey time savings were less than predicted as part of the project's appraisal. As a result, the predicted Net Present Value (NPV) of £452.2m and Benefit to Cost Ratio (BCR) of 5.3 may not be realised and the actual NPV and BCR for the project may be lower. However, the economic appraisal for the project also considered a 'zero' traffic growth sensitivity test scenario. The results of this indicate that the project, even under a scenario with no future traffic growth, would continue to provide significant economic benefits to road users and a positive Benefit to Cost Ratio of 3.1.

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The project is therefore considered to be providing benefits to transport users. In conjunction with other measures to complete the motorway network in Central Scotland, the project will help to support future economic development within Central Scotland and beyond and access to employment and other facilities in Central Scotland.

# **INTRODUCTION**



# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## 2 INTRODUCTION

### 2.1 Background to Project Evaluation

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

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

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

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

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

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

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

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

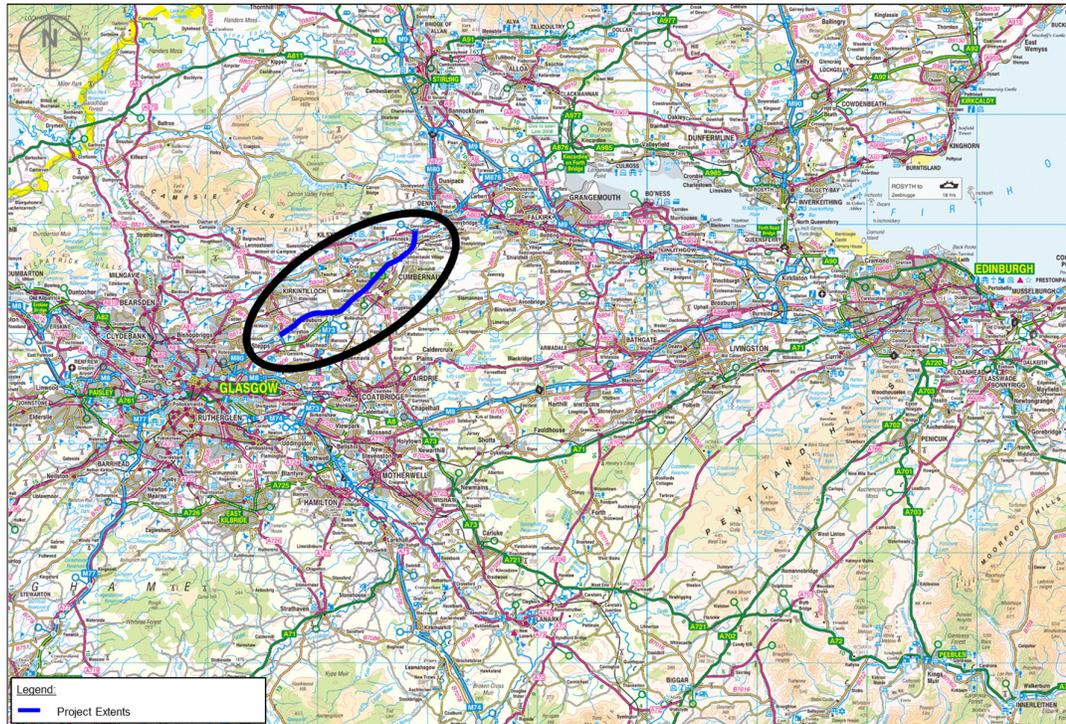
## **2.2 Evaluation Reporting**

As recommended in STRIPE, this report constitutes a One-Year After (1YA) Evaluation Report. It is a standalone report on the M80(T) Steps to Hagsgs Project. The location of the project is presented in Figure 2.1.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

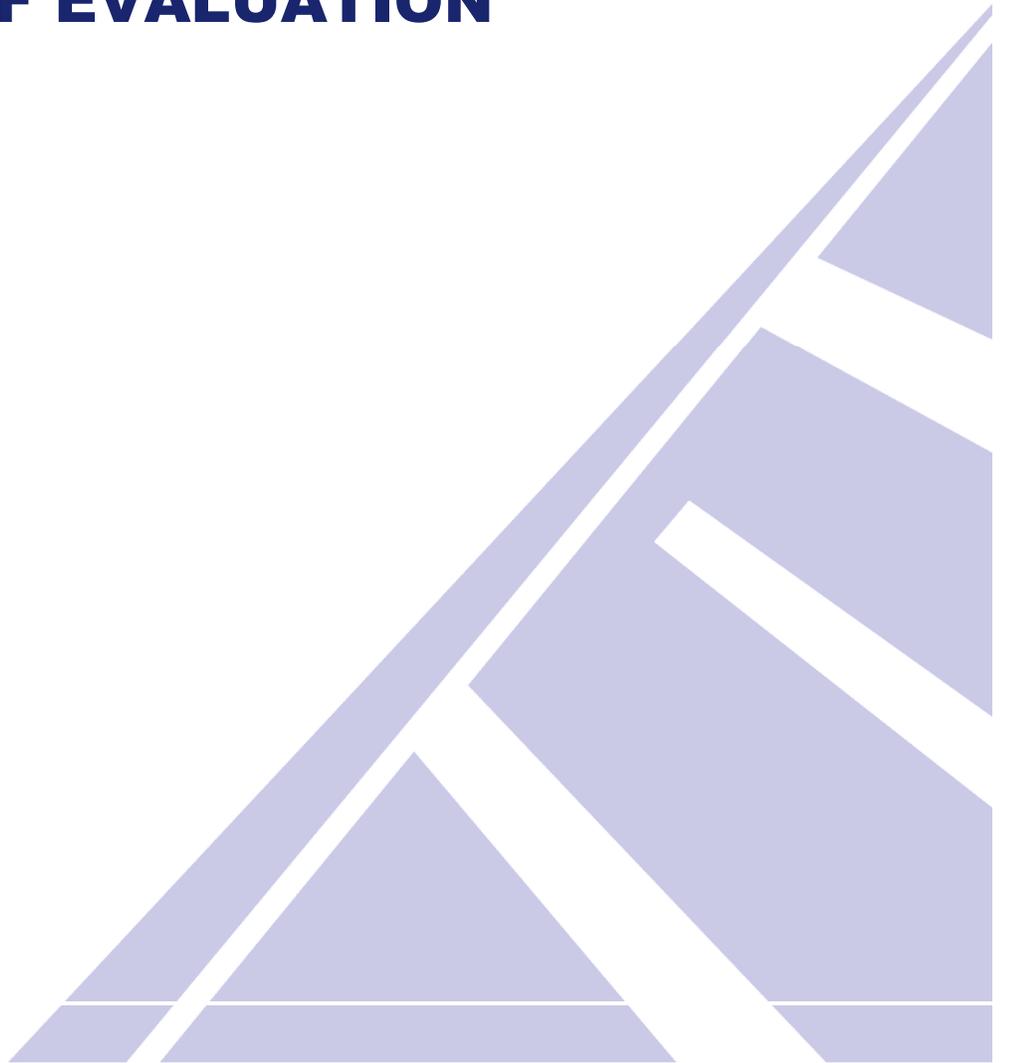
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Figure 2.1: Project Location Plan



The project was opened to traffic in August 2011, however, the opening was phased in stages. The Moodiesburn Bypass section was the first phase to open to traffic in February 2011 with a 40 mph speed limit restriction in place. The project is described in further detail in Section 3. Due to ongoing works following opening, the project was formally completed and considered to be fully operational in May 2012, with the exception of further work relating to landscape planting, considered as “Excluded Seasonal Works”, which enabled further planting to be undertaken through the 2012/2013 planting season. This 1YA Evaluation considers the 1YA evaluation period to be from July 2012 to June 2013.

# **DETAIL OF EVALUATION**



# SCOTTISH TRUNK ROAD INFRASTRUCTURE

## PROJECT EVALUATION

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### 3 PROJECT EVALUATION

#### 3.1 Location

The M80(T) is approximately 33 kilometres in length linking Glasgow with the central Scotland conurbations of Stirling and Falkirk. It extends in a north-easterly direction from the junction with the M8(T) at Provan to the junction with the M9(T) to the south of Stirling and is located across Glasgow City, North Lanarkshire, Falkirk and Stirling Council areas. The route is an important transportation corridor in central Scotland, linking the north and north-east of Scotland with the Central Belt and the M74 / M6 route to the south.

#### 3.2 Project Description

The M80(T) Steps to Haggs project involved the construction of approximately 18 kilometres of both on and off-line dual 2-lane and dual 3-lane motorway, extending from M80(T) Junction 3 Hornshill to M80(T) Junction 7 Haggs.

The project can be considered as three discrete sections which are as follows:

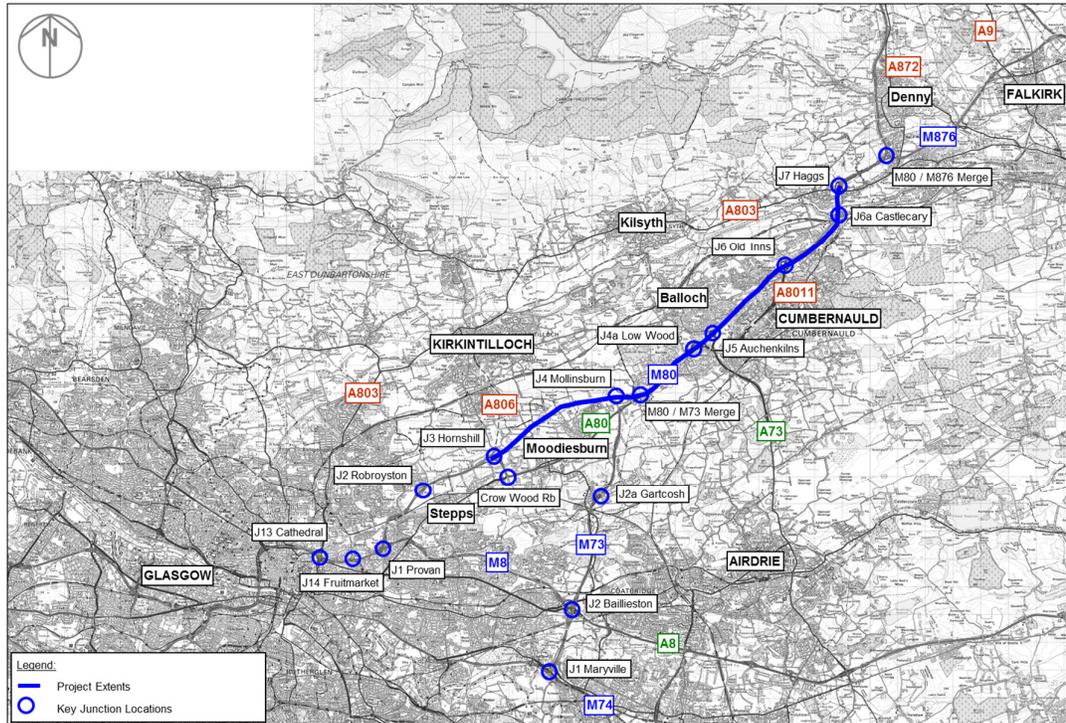
- **Steps to Mollinsburn** (Junction 3 – Junction 4) – approximately 8 kilometres of off-line dual 2-lane carriageway, diverging from the existing M80(T) at Junction 3 Hornshill and re-joining with the existing A80 at Mollinsburn.
- **Mollinsburn to Auchenkilns** (Junction 4 – Junction 5) – an upgrade over approximately 2.7 kilometres of the existing A80 to a dual 3-lane carriageway from the Mollinsburn tie-in to the western side of the previously upgraded Auchenkilns Junction.
- **Auchenkilns to Haggs** (Junction 5 – Junction 7) – an upgrade over approximately 7.3 kilometres of the existing A80, from the eastern side of the previously upgraded Auchenkilns Junction to the existing M80 at Junction 7 Haggs including the introduction of a climbing lane between Castlecary and Haggs on the northbound carriageway and on the southbound carriageway between Castlecary and Old Inns.

The general location of the project, in addition to the key routes and junctions within the study area, is shown in Figure 3.1.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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Figure 3.1: General Location Plan



### 3.3 Rationale for the Project

The M80(T) Steps to Haggs project was implemented to reduce delays and congestion and to improve journey time reliability on this heavily trafficked section of the trunk road network. Improving safety within the M80(T) corridor was also an objective.

In combination with other motorway improvement projects within the Central Belt, including the recently completed M74(T) Extension project and the currently under construction M8(T) Baillieston to Newhouse and associated M8/M73/M74 Improvements project, the M80(T) Steps to Haggs project forms part of a series of improvements with the aim of completing the Central Scotland motorway network. The decision to invest in the scheme was made in August 2006.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE

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### 3.4 Project Objectives

The objectives of the M80(T) Stepps to Haggs project were set as follows:

- To support sustainable economic activity and get good value for money by reducing delays and improving travel time reliability through the provision of good, quick and reliable strategic road links.
- To improve safety in the A80 corridor and reduce the risk of accidents with particular emphasis on reducing conflicts between vehicles and other road users.
- To reduce the impact on the built and natural environment and lessen the adverse impacts of traffic on people through improved design and effective management of the network.
- To complete the central Scotland motorway network by improving the operational characteristics of the road corridor in line with the Scottish Executive's integrated transport policy and Scottish Minister's response to the Central Scotland Transport Corridor Studies (CSTCS).
- To provide adequate access to facilities, in particular to jobs, and adequate accessibility to freight deliveries, consistent with the strategic role of the scheme corridor (linking North and North-East Scotland with the M6 main route to the European markets).

### 3.5 Evaluation Methodology

As set out in Section 1.1, this One Year After report presents the results of a One Year Evaluation of the 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 is on-track to achieving its objectives.

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

This 1YA evaluation has been informed by the analysis of survey data supported by a programme of site visits concluding in February 2014. External stakeholder views were also invited from North Lanarkshire Council, Falkirk Council, East Dunbartonshire Council, Glasgow City Council and the Road Haulage Association in addition to various businesses located within the study area. These are presented within the report.

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## 3.6 The Operation of the Project

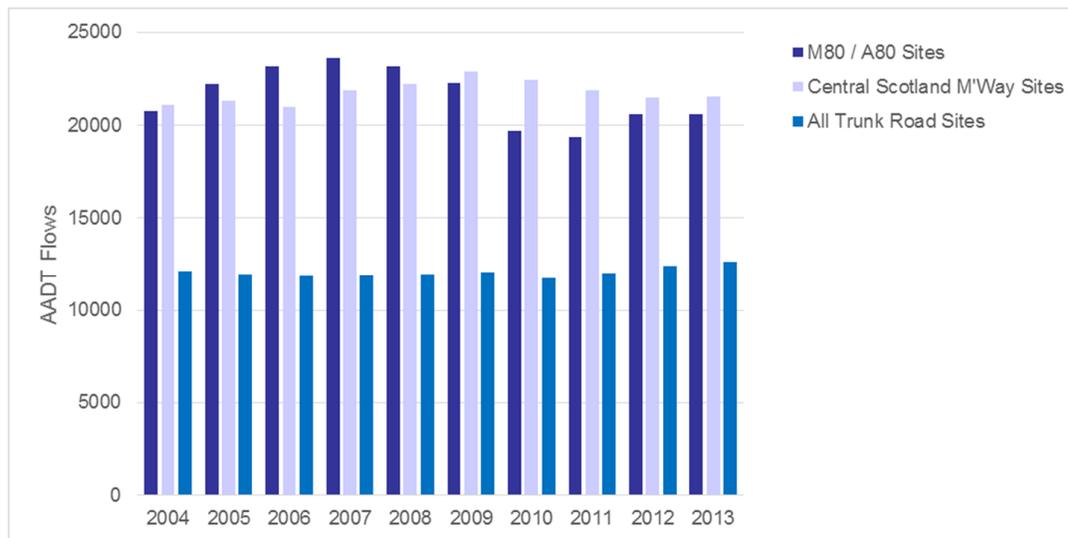
The evaluation is supported by the consideration of pre and post opening comparison of operational indicators, which focuses on network traffic indicators including traffic volumes, travel times and vehicle speeds, presented in the following section.

### 3.6.1 Traffic Volumes

#### *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 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 trends presented in Figure 3.2 indicate that, from the ATCs located on the M80(T) and A80 within the vicinity of the improvement, the M80(T) corridor has seen a general increase in traffic since 2010. An increase in AADT flows of approximately 1,200 vehicles per day (vpd) (around 6%) has occurred since the opening of the project in 2011.

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The available data for the M80(T) corridor indicates an element of background traffic growth, which does not appear to have been reflected across the wider motorway network in central Scotland. AADT flows in central Scotland, show a slightly decreasing trend since the opening of the project by approximately 300 vehicles per day (around 1.5%). The available data for the wider Scottish Trunk Road network, however, appears to reflect the growth in traffic flows within the M80(T) corridor. An increase in AADT flows of approximately 600 vehicles per day (around 5%) was observed since 2011 across the Scottish trunk road network.

## *Comparison Between Pre and Post Opening Traffic Flows*

A comparison between pre and post opening annual average traffic (AADT) volumes (i.e. 2010 to 2012 / 2013 flow levels) has been undertaken within the vicinity of the project. The data is presented in Table 3.1 and in Figure 3.3.

**Table 3.1: Observed AADT Volumes**

Location	Pre Opening (2007 – 2010)	Post Opening (July 2012 - June 2013)	% Difference
<b><i>M80 / M876 North of Scheme Extents</i></b>			
M876 East of M80 / M876 Junction	32,292	35,107	9%
M80 North of M80 / M876 Junction	34,104	33,414	-2%
<b><i>M80 Steps to Haggs Section</i></b>			
M80 J6a (Castlecary) – M80 J7 (Haggs)	69,703	69,826	0%
M80 J6 (Old Inns) – M80 J6a (Castlecary)	64,881	67,244	4%
M80 J5 (Auchenkilns) – M80 J6 (Old Inns)	64,896	64,622	0%
M73 Merge – M80 J4a (Low Wood)	72,910	76,459	5%
M80 J3 (Hornhill) – M80 J4 (Mollinsburn) <i>Moodiesburn Bypass</i>	-	44,196	-
<b><i>Bypassed A80 Section</i></b>			
A80 Cumbernauld Road at Moodiesburn	47,474	10,590	- 78%
<b><i>M80 South of Scheme Extents</i></b>			
M80 J2 (Robroyston) - M80 J3 (Hornhill)	48,945	57,749	18%
M80 J1 (Provan) - M80 J2 (Robroyston)	50,036	61,751	23%

Source: Scottish Roads Traffic Database (SRTDb)

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Figure 3.3: Pre and Post Opening AADT Traffic Flows

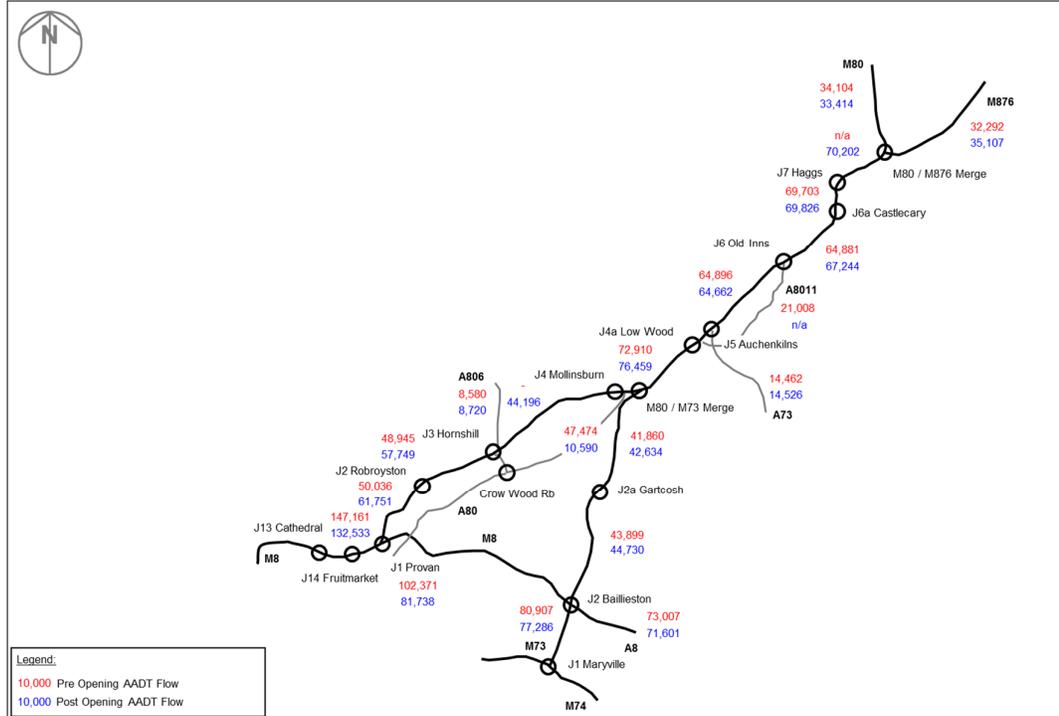


Table 3.1 and Figure 3.3 indicate that since opening, the project has generally experienced limited changes in traffic volumes along its length. The M80(T) now carries approximately 44,000 vpd on the Moodiesburn Bypass, approximately 76,500 vpd between the M73 / M80 merge and Junction 4a Low Wood and between 64,600 vpd and 69,800 vpd on the section between Junction 5 Auchenkilns and Junction 7 Haggis. This reflects growth of between 0% to 5% which, as shown in Figure 3.2, is greater than the level of general growth observed on the wider motorway network in central Scotland.

Following opening, some sections of the project, such as between the M73(T) merge and M80(T) Junction 7 Haggis, have witnessed increases in daily traffic of between approximately 4% and 5%. This represents changes in traffic levels of approximately 3,600 vpd on the section between the M73 / M80 merge and Junction 4a Low Wood and approximately 2,400 vpd on the section between Junction 6 Old Inns and Junction 6a Castlecary. The increases noted occur on sections of the route where the overall capacity has increased as a result of the improvement. On other sections of the project, such as between Junction 5 Auchenkilns and Junction 6 Old Inns and between Junction 6a Castlecary and Junction 7 Haggis, no significant increase in capacity have resulted from the improvement and correspondingly no significant increase in the volume of traffic has been observed.

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Localised variations in traffic volumes may be due to particular issues (such as restrictions in place for traffic accessing the M80(T) at Junction 6a Castlecary, as detailed later in this section). The analysis of long-term traffic data and trends across the Scottish Trunk Road Network presented in Figure 3.2, suggests the increases in traffic volumes within the extent of the project are likely to be attributable mainly to general traffic growth over a period of three years.

Significant changes in traffic levels, however, are witnessed on links outwith but within the vicinity of the project. As would be expected, the M80(T) has led to a significant decrease in traffic of approximately 80% on the bypassed section of the A80 between Mollinsburn and Crow Wood Roundabout. A volume of nearly 50,000 vpd has reduced to 10,000 vpd as a direct result of the project.

Outwith the project extents, traffic volumes have risen by approximately 10% to 35,000 vpd on the M876(T) to the north of the project, near Falkirk. It is considered this reflects traffic rerouting from the adjacent local road network due to the restrictions in place for traffic accessing the M80(T) at Junction 6a Castlecary i.e. southbound traffic is unable to access the M80(T). A rise in the volume of traffic from the Kincardine / Clackmannan area is also a contributing factor, but not considered significant. This conclusion is drawn from analysis of the data which suggests that the increases are not observed along the length of the upgraded section of the M80(T) between the M73 / M80 merge and Junction 7 Haggs.

An assessment of operational conditions on the M80(T) and M876(T), north of the project, indicates that queuing and delays are experienced by drivers travelling on the M876(T) within the vicinity of the merge with the M80(T) in the southbound direction. It is important, however, to recognise that operational issues within the vicinity of the M80 / M876 merge were present prior to the opening of the project.

The operational issues at this location primarily occur during the PM peak from the Falkirk and Kincardine areas due to the layout of the junction where two lanes of traffic on the M876(T) merge into one lane over a short distance prior to the merge with the M80(T). The single lane merge is marked and signposted as a dedicated lane to the A803 to Kilsyth and Bonnybridge. This results in the full length of the merge not being utilised by southbound drivers as there is a propensity to merge as early as possible, resulting in queuing and delays.

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The operational issues noted at this location are likely to be as a direct result of the traffic demands observed, with no significant change in southbound traffic on the M80(T) to the north of the merge but with a significant growth in southbound traffic travelling on the M876(T) to the east of the merge (an increase of approximately 10%). This trend is noted across both the AM and PM peak periods and at an AADT level. The southbound AM and PM peak period and AADT traffic flows on the M876(T) are broadly similar, if not higher, than the southbound traffic flows on the M80(T) within the vicinity of the merge. As the M80(T) has priority over the M876(T) at the merge this may, in part, be a contributing factor towards the queuing and delays noted at this location.

At the southern extents of the M80(T), south of the project extents, along sections north and south of Junction 2 Robroyston, daily traffic volumes have increased by approximately 20% to an average of 60,000 vpd. This increase is likely to be explained by the capacity released on the M8(T) by the opening of the M74(T) Extension and the offer of an alternative east-west route through Glasgow. This release of capacity on the M8(T) is likely to have attracted previously suppressed traffic to the M80(T) from areas such as Robroyston.

An assessment of operational conditions on the M80(T) and M876(T), confirms that traffic queues affect the M80(T) south of Junction 2 Robroyston in the southbound direction of travel. This is primarily during the AM peak due to extensive queuing as a result of merging / weaving behaviour observed at the M8 / M80 Provan merge. Further queuing and delays are experienced by southbound vehicles on approach to M80(T) Junction 3 Hornhill due to the knock on effect of queuing traffic from Junction 2 Robroyston.

The available data indicates that the opening of the Kirkintilloch Link Road in December 2010, located to the north of the M80(T) at Junction 3 Hornhill, has had no notable impact on the volume of traffic on the M80(T) within the vicinity of the project. An increase of only approximately 140 vpd was observed between 2010 and 2012/13 on the Kirkintilloch Link Road.

The changes in daily traffic volumes appear to be mirrored during the AM and PM peak periods with increases on the upgraded sections of the M80(T) between Mollinsburn and Haggs of up to 7%, or approximately 16,000 vehicles over the PM peak period. Figure 3.4a and Figure 3.4b present annual average weekday (Tuesday to Thursday) traffic flow profiles pre and post opening of the project for the sections of the M80(T) between the M73(T) merge and Junction 4a Low Wood and between Junction 6 Old Inns and Junction 6a Castlecary.

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Figure 3.4a: Pre and Post Opening Traffic Flow Profiles (M73(T) Merge to J4a Low Wood)

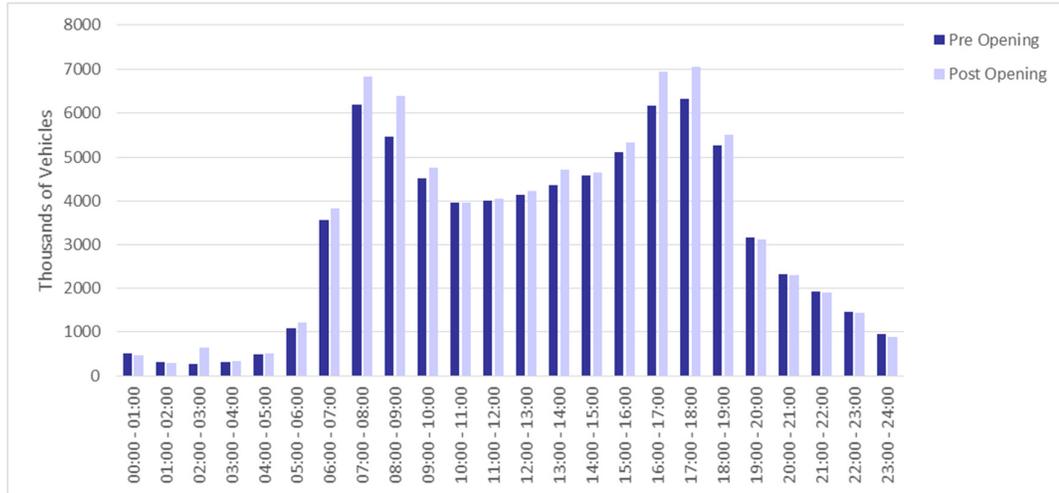


Figure 3.4b: Pre and Post Opening Traffic Flow Profiles (M80(T) J6 Old Inns to J6a Castlecary)

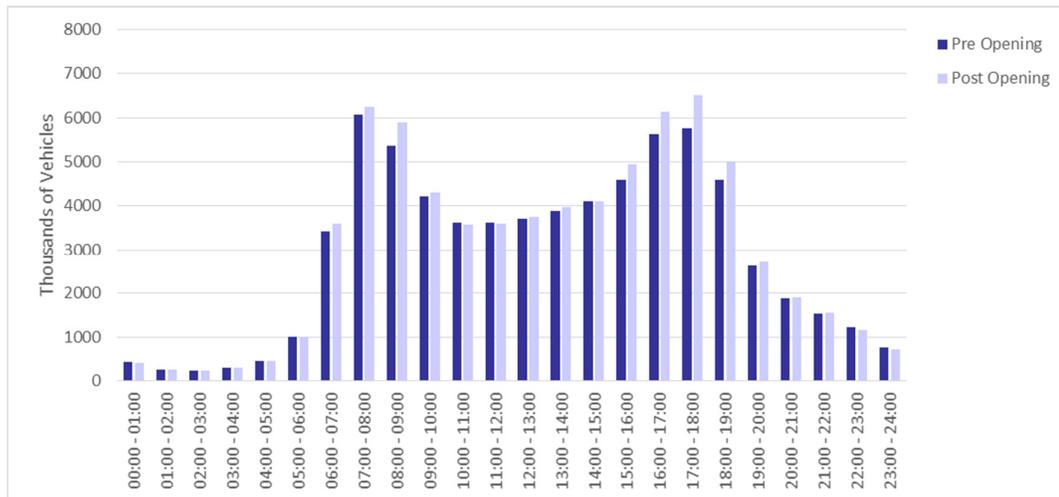


Figure 3.4a and Figure 3.4b indicate the annual average weekday traffic flow profiles for the sections of the M80(T) examined have increased across the whole day and the increase during the AM and PM peak periods is more pronounced. Analysis of the available long-term traffic data and trends across the Scottish Trunk Road Network indicates this increase is likely to be accounted for by general traffic growth rather than induced traffic as a result of the project. The AM peak period attracts approximately 13,000 vehicles, which is a lower volume of traffic when compared to the PM peak period, but both peak periods exhibit similar growth levels.

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Traffic volumes on the M80(T) within the vicinity of Junction 2 Robroyston increase from approximately 9,000 and 11,000 vehicles to approximately 11,000 and 13,000 vehicles during the AM and PM peak periods respectively. This exhibits similar high traffic volume increases of approximately 8,800 vpd (around 20%) at the AADT level following the opening of the project.

A screenline analysis of traffic volumes on the bypassed A80 and on the M80(T) Moodiesburn Bypass suggests an overall increase in traffic following opening of the project of up to approximately 7,300 vpd (around 15%). This may be due, in part, to the improvement in the operational characteristics of the bypassed A80 and the removal of significant volumes of through traffic from Crow Wood Roundabout, resulting in more local trips joining the M80(T) from the communities at Moodiesburn, Muirhead and Chryston.

Traffic volumes on the section of the M80(T) between Junction 6 Old Inns and Junction 6a Castlecary increase from approximately 12,700 and 14,500 vehicles to approximately 13,100 and 15,600 vehicles during the AM and PM peak periods respectively and exhibits a similar increase of approximately 2,400 vpd (around 4%) at the AADT level. This is likely, in part, to be as a result of traffic rerouting from the adjacent local road network (i.e. Castlecary Road) to join the M80(T) at Junction 6 Old Inns, due to the restrictions for traffic accessing the M80(T) in place at Junction 6a Castlecary. As a result, the higher volume of traffic merging with the M80(T) at Junction 6 Old Inns may, in part, account for the operational issues relating to queuing and congestion which have been observed within the vicinity of the junction.

Traffic data on the local roads within the vicinity of the project was analysed to ascertain the impact, if any, of the project upon the roads managed by the Local Authorities, namely North Lanarkshire Council, Falkirk Council, East Dunbartonshire Council and Glasgow City Council. While there are a number of traffic counters located within the study area for which data was provided by the various Local Authorities, the data was largely incomplete and as such, firm conclusions as to the impact of the project on the surrounding local roads could not be made at the time of the 1YA Evaluation. Collection of additional local data as part of the 3YA Evaluation will provide the opportunity for further analysis of the impact of the project on the local road network.

A more detailed comparison of pre and post opening traffic flows within the vicinity of the project is presented in Appendix B.

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### 3.6.2 *Predicted Traffic Volumes*

#### *Comparison Between Predicted and Actual Traffic Flows*

When looking at predicted traffic volumes, indications are that actual traffic growth has fallen significantly short of the assumed growth forecasts adopted as part of the project's appraisal. The general fall in traffic volumes observed across the trunk road network during the period between the project's appraisal and 2010, result in observed traffic volumes being less than forecast, with year on year growth being less than forecast. As such, the traffic growth forecasts applied as part of the project's appraisal have significantly over estimated the then future 2010 traffic flows within the study area.

The traffic forecasting for the project was undertaken using a version of the Central Scotland Transport Model (CSTM3A), updated specifically for the purposes of the assessment of the project. The CSTM3A model was a spatially detailed multi modal model covering central Scotland and consisting of separate road traffic and public transport passenger assignment models.

In terms of the project's future year forecasts, a number of assumptions were made during the modelling process that are likely to have an impact on overestimating the future levels of traffic. These included key demographic, economic and planning forecasts utilising both the Glasgow and Clyde Valley Structure Plan (GCVSP) and Structure Plan forecasts. The assumptions also included income growth forecasts, fuel price forecasts and public transport service provision and fare assumptions.

### 3.6.3 *HGV Traffic Volumes*

#### *Comparison Between Pre and Post Opening HGV Proportions*

A component of one of the Transport Planning Objectives was to provide adequate accessibility to freight deliveries, consistent with the strategic role of the scheme corridor. The evaluation therefore compared the proportion of HGVs before the project opened in 2010 and after its opening in 2013 as an indicator as to the level of freight being moved through the corridor. The comparison of pre and post opening proportion of Heavy Goods Vehicles (HGV) is presented in Table 3.2.

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**Table 3.2: Observed HGV Proportions**

Location	Pre Opening (2007 – 2010)	Post Opening (July 2012 - June 2013)	% Difference
<i>M80 Stepps to Haggs Section</i>			
M80 J6a (Castlecary) – M80 J7 (Haggs)	6%	7%	1%
M80 J6 (Old Inns) – M80 J6a (Castlecary)	5%	8%	3%
M80 J5 (Auchenkilns) – M80 J6 (Old Inns)	6%	8%	2%
M73 Merge – M80 J4a (Low Wood)	6%	7%	1%

Source: Scottish Roads Traffic Database (SRTDb)

Based on information available, localised changes in the percentage of HGVs using the route have been observed. This is most notable between Junction 6 Old Inns and Junction 6a Castlecary, where a 3% increase in HGV traffic was observed after the project opened. While this increase may, in part, be attributable to a change in arrangements for vehicles accessing the motorway network at Junction 6 Old Inns and Junction 6a Castlecary (i.e. no access for northbound traffic at Junction 6a), the available information does suggest an increase in the percentage of HGVs using the route between the M73(T) merge and Junction 7 Haggs. Increases in the percentage of HGVs of the magnitude noted in Table 3.2 equate to an actual increase of between approximately 20 and 40 vehicles per day.

Overall, the project is having a positive impact in terms of improving access for freight and achieving its objective in relation to supporting sustainable economic activity and providing adequate access to facilities, jobs, and adequate accessibility to freight deliveries. The project can also be expected to have a positive impact through the removal of freight traffic from the local road network.

A more detailed comparison of the pre and post opening proportion of HGVs within the vicinity of the project is presented in Appendix B.

## Traffic Volumes: Key Findings

Based on analysis of the available long-term traffic data and trends across the Scottish Trunk Road Network, the M80(T) project is unlikely to have induced significant increases in traffic along its length. Any observed increases are likely to be attributable to either localised issues or background traffic growth over the period of the evaluation. It is worth noting, however, that the M80(T) corridor has seen a general increase in traffic volumes since 2010 against a backdrop of reducing flows, more generally, across the wider motorway network in central Scotland.

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Increases in daily traffic volumes on the section of the upgraded M80(T) between the M73(T) merge and Junction 7 Haggs of approximately 4% to 5% were observed. This represents a change in traffic levels of approximately 3,600 vpd and 2,600 vpd on the sections between the M73 / M80 merge and Junction 4a Low Wood and between Junction 6 Old Inns and Junction 6a Castlecary respectively.

Other sections, such as between Junction 5 Auchenkilns and Junction 6 Old Inns and between Junction 6a Castlecary and Junction 7 Haggs have seen no significant increase in capacity as a result of the improvement and, subsequently, no significant increase in the volume of traffic.

It is noted that increases in traffic, within the extent of the project, occur primarily on sections of the route where the overall capacity has increased as a result of the improvement.

At the northern extents of the project, localised increases in traffic volumes have been observed following opening of the project resulting in localised operational issues. On the section of the M80(T) between Junction 6 Old Inns and Junction 6a Castlecary, increases in traffic volumes of approximately 4% are likely to be explained, in part, by the rerouting of traffic from Junction 6a Castlecary to Junction 6 Old Inns as a result of the restrictions on traffic accessing the M80(T) in place at Junction 6a Castlecary. A rise in traffic from the Kincardine / Clackmannan area is also an expected contributing factor.

Outwith the extents of the project, increases in traffic of approximately 10% on the M876(T) within the vicinity of the merge with the M80(T) are observed. Congestion is observed during peak periods both prior to and following the opening of the project at this location.

At the southern extents of the M80(T), outwith the extents of the project, daily traffic volumes have increased by approximately 20%. This can be partly explained by the release of capacity on the M8(T) resulting from the opening of the M74(T) extension providing an alternative east-west route through Glasgow. This release in capacity on the M8(T) is likely to have attracted previously suppressed traffic to the M80(T) from areas such as Robroyston. As a result more traffic is observed at Junction 1 Provan and Junction 2 Robroyston.

The project has, however, succeeded in significantly reducing the volume of strategic traffic travelling via the bypassed A80 within the vicinity of the communities at Moodiesburn, Chryston and Muirhead, with reductions of approximately 80%.

The available data suggests that the project has had a positive impact on the proportion of HGVs using the M80(T), positively contributing to improving access for freight and removing HGVs from the local road network.

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While actual traffic growth has fallen significantly short of the assumed growth forecasts adopted as part of the project's appraisal and the general fall in traffic volumes observed during the period between the project's appraisal and 2010 have resulted in observed traffic volumes being less than forecast, it is notable that the M80(T) corridor has seen a general increase in observed traffic volumes since 2010 against a backdrop of reducing flows, more generally across the wider motorway network in central Scotland..

## 3.6.4

### *Journey Times*

#### *Comparison Between Pre and Post Opening Journey Times*

Journey times have been compared pre and post opening of the project. Pre-opening journey time surveys were carried out over three years (2005, 2006 and 2007) and along three routes which were as follows:

- Route 1 - A80, in both directions of travel, between Stepps and Haggs (Junction 2 Robroyston to Junction 7 Haggs);
- Route 2 - Westfield Road / Eastfield Road, in both directions of travel, between Moodiesburn and Castlecary; and
- Route 3 - A8011, via Cumbernauld and Mollinsburn, in both directions of travel, between Moodiesburn and Old Inns.

Data collected prior to the opening of the A80 Auchenkilns junction upgrade project, which opened in November 2005, has not been included within this evaluation. This is due to operating conditions, such as journey times, delays and congestion on the A80 and surrounding network changing significantly following the upgrade of the junction and, therefore, data collected prior to the opening of the junction upgrade does not provide a suitable baseline on which to evaluate the impact of the M80(T) Stepps to Haggs project.

Post opening journey time surveys were carried out in October and November 2013 to provide an indication of the changes in average journey times along the M80(T) and on the surrounding local road network within the vicinity of the project. The routes surveyed were consistent with those from the pre-opening surveys, where possible, in order to provide a consistent basis on which to evaluate the impact of the project. The exception to this was Route 1 which followed the route of the M80(T) Moodiesburn Bypass rather than the now bypassed section of the A80 between Crow Wood and Mollinsburn. Route 2 was extended to include the bypassed section of the A80.

The pre-opening and post opening journey time survey routes are presented in Figures 3.5a and 3.5b respectively.

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Figure 3.5a: Pre Opening Journey Time Routes

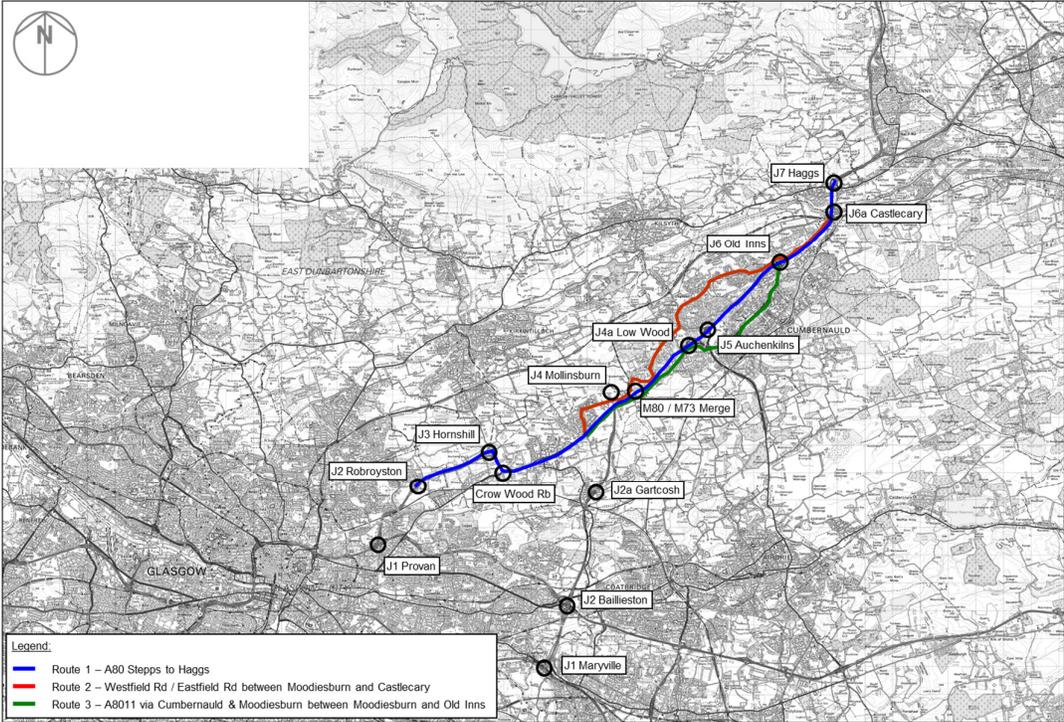
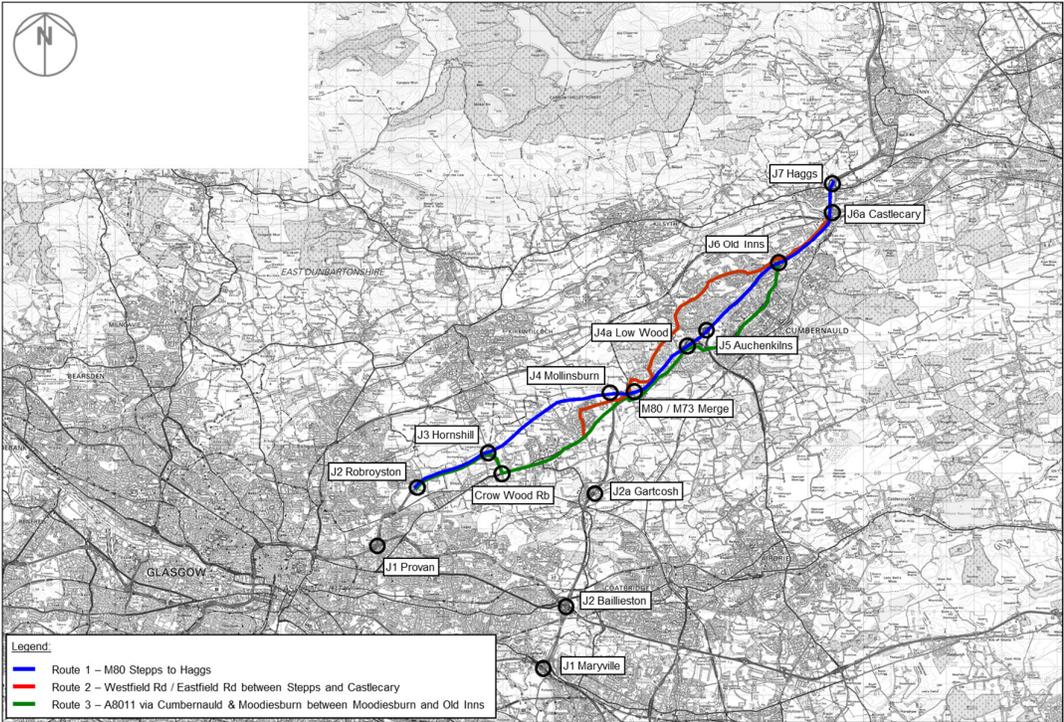


Figure 3.5b: Post Opening Journey Time Routes



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The average pre and post opening journey times along with the savings in travel time for Route 1 are shown in Table 3.3.

**Table 3.3: Average Journey Times - Route 1, A80 / M80 J2 Robroyston to J7 Haggis**

Direction	Average Journey Time		Time Savings (mins / secs)	% Saving
	Observed Pre Opening (2005 – 2007)	Observed Post Opening (2013)		
<b>AM Peak</b>				
Northbound	15 mins 35 secs	14 mins 06 secs	1 mins 29 secs	10%
Southbound	18 mins 41 secs	13 mins 39 secs	5 mins 02 secs	27%
<b>Inter Peak</b>				
Northbound	14 mins 59 secs	11 mins 39 secs	3 mins 20 secs	22%
Southbound	15 mins 38 secs	11 mins 28 secs	4 mins 10 secs	27%
<b>PM Peak</b>				
Northbound	16 mins 05 secs	12 mins 44 secs	3 mins 21 secs	21%
Southbound	16 mins 05 secs	13 mins 05 secs	3 mins	19%

The comparison between pre and post opening average journey times presented in Table 3.3 indicates savings of up to 5 minutes in the AM peak period between Junction 2 Robroyston and Junction 7 Haggis in the southbound direction of travel. The average pre opening journey time of approximately 19 minutes has reduced to approximately 14 minutes post opening of the project, suggesting a journey time saving of nearly 30%.

Corresponding journey time savings have been recorded during both the inter peak and PM peak periods. Savings of approximately 3 to 4 minutes, (20%) were observed after the opening of the project.

Further examination of the average journey time savings along the route indicates that the majority of the savings are experienced on the section south of Junction 4a Low Wood and particularly in the southbound direction. This can account for up to 4 minutes of the total savings accrued. Pre and post opening average journey times on the section of the M80(T) between Junction 4a Low Wood and Junction 7 Haggis are broadly comparable.

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An assessment of operational conditions on the M80(T) and M876(T) confirms that delays are mainly observed on the M80(T) during the AM peak within the vicinity of Junction 6 Old Inns in the northbound direction of travel and within the vicinity of Junction 3 Hornshill in the southbound direction of travel. During the PM peak, delays are mainly observed within the vicinity of Junction 7 Hags and at the M80 / M876 merge in the southbound direction of travel. While delays are observed at certain sections of the route during the peak periods, significant improvements in overall journey times and journey time reliability have been observed following opening of the project.

It is likely that as a result of the improvement and the removal of traffic bottlenecks on the M80(T), such as the Crow Wood Roundabout, that traffic is able to flow more freely along the route. As a result, operational issues noted at a few locations along the route, including within the vicinity of Junction 6 Old Inns, may be exacerbated. The slip road arrangements at the Old Inns Junction have significantly improved as a result of the project, however, the capacity of the mainline within the vicinity of the junction has not been altered. This suggests that the combined effect of traffic being able to access the M80(T) junction more easily and to travel unimpeded on the M80(T) itself may be contributing to the operational issues observed at this location.

Journey time savings of the same magnitude as the PM peak period are not observed in the northbound direction of travel during the AM peak period, with savings of approximately 1.5 minutes observed post opening of the project. The magnitude of the savings within this period may, in part, be explained by queuing / delays occurring near to Junction 6a Castlecary. It is understood that the uphill gradient combined with poor lane discipline associated with the on slip at Junction 6 Old Inns at this location may inhibit the flow of traffic and lead to delays during the peak period.

An assessment of operational conditions on the M80(T) and M876(T) indicates that poor lane discipline and weaving behaviour on the northbound M80(T) within the vicinity of Junction 6a Castlecary to Junction 7 Hags may result in an increase in journey times through this section. A contributing factor to this is the lane discipline of HGVs leading to undertaking by other vehicles and, subsequently, queuing and delays.

Average post opening journey times of approximately 11.5 minutes were observed during the relatively free flow conditions of the inter peak period. Given average journey times of between approximately 13 minutes and 14 minutes are observed during the AM and PM peak periods, it is therefore plausible to assume that vehicles on an average weekday may experience journey time delays along the corridor between Junction 2 Robroyston and Junction 7 Hags of approximately 2 minutes during the peak periods.

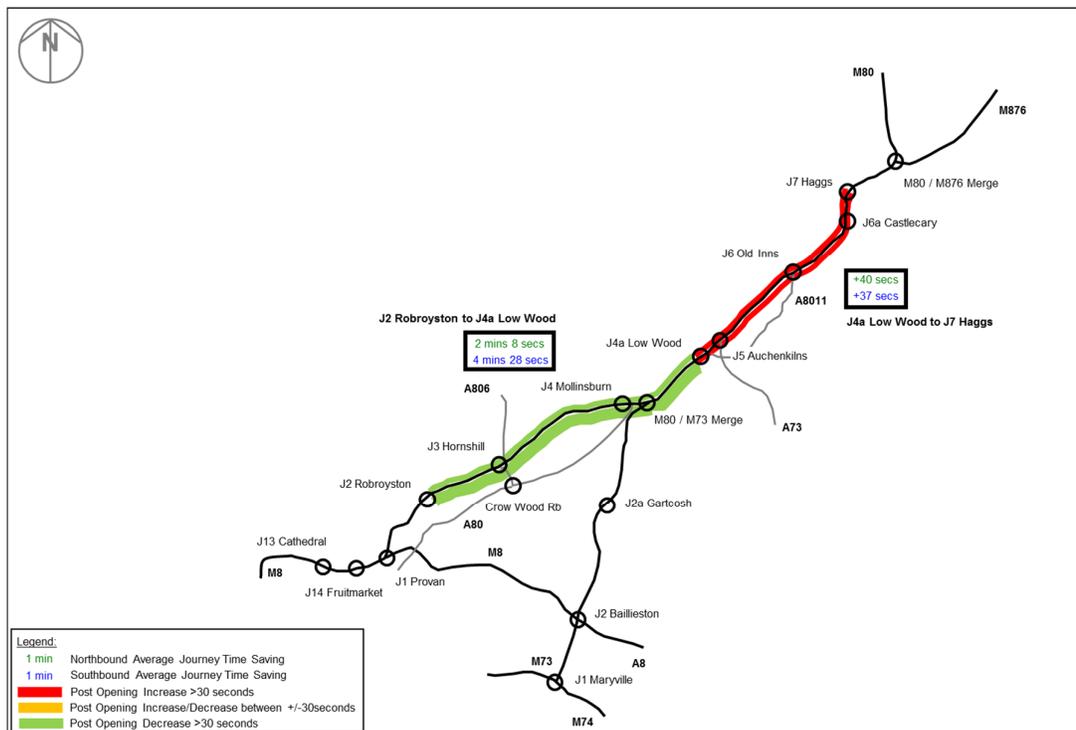
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Operational delays have been observed to occur at different locations along the extent of the project during peak periods. For example, vehicles travelling in the southbound direction on the approach to Junction 6 Old Inns during the AM period have been observed to use the inside auxiliary lane (designated for the A8011 Cumbernauld) to perform undertaking manoeuvres. These vehicles subsequently merge back into the M80(T) mainline close to the off-slip causing braking by other vehicles and subsequent delays to mainline through traffic.

The comparison of pre and post opening journey times for Route 1 in the AM, IP and PM periods are presented in Figures 3.6a, 3.6b and 3.6c respectively. The post opening journey times covered the section of the route between Junction 2 Robroyston and Junction 7 Haggs as this corresponded with the extent of the pre survey data. The journey time analysis is therefore focused on the extent of the project only to allow a pre and post opening comparison.

**Figure 3.6a: Comparison of Pre & Post Opening Journey Time Savings (AM Period)**



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Figure 3.6b: Comparison of Pre & Post Opening Journey Time Savings (IP Period)

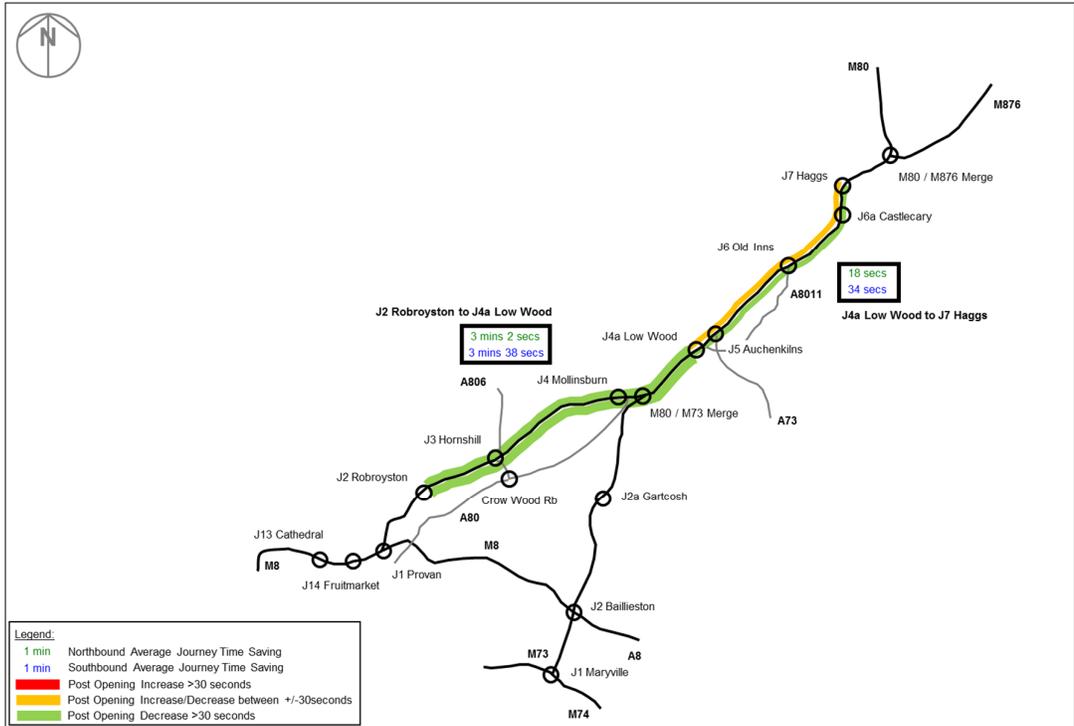
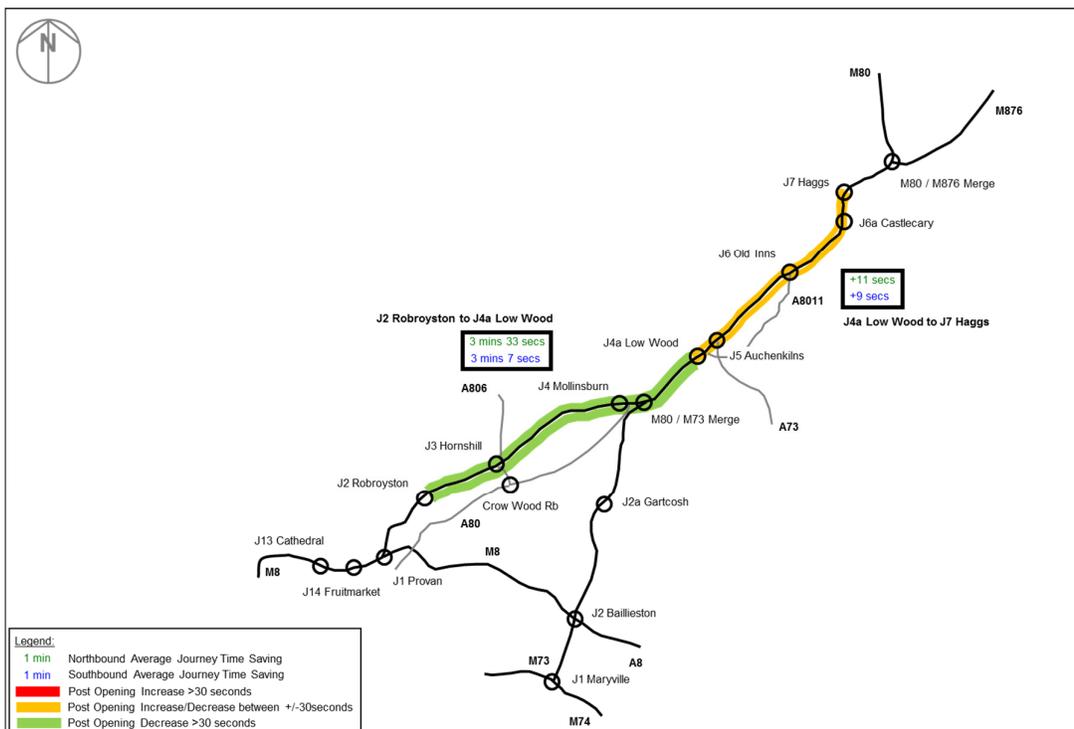


Figure 3.6c: Comparison of Pre & Post Opening Journey Time Savings (PM Period)



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Examination of the observed journey times recorded for the two journey routes parallel to the M80(T) - Route 2 (along Westfield Road / Eastfield Road) and Route 3 (along the A8011 Cumbernauld / Mollinsburn), indicates that average journey times have increased by between 30 seconds to 1 minute or 10% of the route journey duration. Increases of this magnitude are not considered significant nor unexpected given the day to day variation in journey times on routes of an urban nature. In addition, local road network changes, namely the introduction of traffic signals at Mollinsburn where the local road network ties into the motorway network within the vicinity of M80(T) Junction 4 and M73(T) Junction 3, can also be expected to be a contributing factor. From the journey time information gathered, it is evident the introduction of several signalised junctions at this location as a result of the project may have added an additional delay for local road users, although the magnitude of this delay is not considered to be significant.

An assessment of operational conditions on the M80(T) and M876(T) indicates that sporadic operational issues have been observed on the surrounding trunk road network out with the extents of the upgraded section of the M80(T) between Stepps and Haggs. These incidences are largely contained within the vicinity of Junction 7 Haggs and at the M80 / M876 merge, in the southbound direction of travel, during the PM peak. Given the operational issues observed at these locations following opening of the project and described in Section 3.6.1, it is reasonable to conclude that it is likely the change in demand and operational characteristics of the network upgraded as part of the project may have an indirect impact on operating conditions on the surrounding trunk road network.

## *Stakeholder Feedback*

The Road Haulage Association (RHA) stated that it was the view of its members that the project has indeed reduced journey times, congestion and driver stress on this section of the motorway network. In conjunction with the M74(T) Extension project, the project is considered to have enabled easier access to Glasgow and Central Scotland.

## **Journey Times: Key Findings**

An examination of the journey time savings along the M80(T) route indicates that, despite increases in traffic volumes along certain sections of the route of between 6% and 20%, the project has provided significant average journey time savings of between three and five minutes (up to approximately 30%) throughout the AM, IP and PM periods.

The most significant time savings are experienced on the section of the M80(T) south of Junction 4a Low Wood. This reflects the construction of the

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Moodiesburn Bypass and the subsequent capacity improvements resulting from the upgraded route and the removal of delay and congestion at Crow Wood Roundabout.

On the section of the M80(T) north of Junction 4a Low Wood, time savings are less significant. A small increase in average journey times is noted on the section of the route within the vicinity of Junction 6 Old Inns which corresponds with the operational issues observed at this location and driver behaviour leading to undertaking manoeuvres on the off-slip to the A8011.

A detailed analysis of average pre and post opening journey times on each of the three journey time routes examined, is presented in Appendix B.

## 3.6.5 Journey Time Reliability

### *Comparison Between Pre and Post Opening Journey Time Reliability*

The available pre and post opening minimum and maximum journey times on the M80(T) have been compared to evaluate the project's impact on the reliability of journey times on the M80(T) between Stepps and Haggs.

The reliability of journey times has been assessed in terms of the change in the range of differing times as well as the standard deviation of journey times observed pre and post opening of the project, in-line with current Department for Transport (DfT) Transport Appraisal Guidance. The comparison of pre and post opening minimum and maximum journey times is presented in Table 3.4.

**Table 3.4: Journey Time Reliability - Route 1, A80 / M80 J2 Robroyston to J7 Haggs**

Direction	Journey Time Range (mins)		Diff (mins)	Standard Deviation (mins)		Diff (mins)
	Pre Opening (05 – 07)	Post Opening (2013)		Pre Opening (05 – 07)	Post Opening (2013)	
<b>AM Peak</b>						
Northbound	12 mins	9 mins	3 mins	3 mins	3 mins	-
Southbound	23 mins	9 mins	14 mins	4.5 mins	2.5 mins	2 mins
<b>Inter Peak</b>						
Northbound	1-2 mins	1-2 mins	-	0.5 mins	0.5 mins	-
Southbound	1-2 mins	1-2 mins	-	0.5 mins	0.5 mins	-
<b>PM Peak</b>						
Northbound	8 mins	4 mins	4 mins	1.5 mins	1 min	0.5 mins
Southbound	9 mins	2.5 mins	6.5 mins	1.5 mins	1 min	0.5 mins

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While an assessment of operational conditions on the M80(T) and M876(T) confirms that delays still occur on the upgraded M80(T) route (specifically within the vicinity of Junction 6 Old Inns in the northbound direction of travel and within the vicinity of Junction 3 Hornhill in the southbound direction of travel during the AM peak), the findings presented in Table 3.4 suggest a significant improvement in journey time reliability across both the AM and PM peak periods. This is particularly apparent during the AM peak period in the southbound direction of travel towards Glasgow. The duration of pre opening journey times varied by up to 23 minutes and by approximately 9 minutes post opening.

In the AM and PM peak periods, there is an improvement in journey time reliability in both the northbound and southbound directions of travel. The standard deviation of journey times improves by up to 2 minutes in the AM peak period, in the southbound direction of travel. While reductions in journey times are observed during the inter peak period, the journey time range during this period is relatively unaffected by the project due to the free flow traffic conditions observed pre and post opening during this period.

The improved journey reliability and reduction in journey time are as a result of the route enhancement and the subsequent reduction in factors likely to cause random delays such as accidents, queuing when traffic volumes are at or beyond link capacity and breakdowns, the impact of which are now reduced due to the provision of a hard shoulder along the length of the project.

## **Journey Time Reliability: Key Findings**

The variability in journey times has significantly reduced from 23 minutes to 9 minutes. This can be mainly be attributed to the road standard and capacity improvements having a positive effect on the operation of the M80(T) corridor.

An examination of the journey time reliability of the M80(T) route suggests that while localised operational issues have been noted at a limited number of locations along the M80(T), both within and outwith the extents of the improvement, the project has had a significant improvement in journey time reliability, particularly during the AM peak period, in the southbound direction of travel towards Glasgow.

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### 3.6.6 *Predicted Journey Times*

#### *Comparison Between Predicted and Actual Journey Times and Journey Time Savings*

As noted in Section 3.6.2, the traffic forecasting for the project was undertaken using a version of the Central Scotland Transport Model (CSTM3A), updated specifically for the purposes of the assessment of the project. Forecasts of predicted journey times under the Do-Something scenario i.e. with the M80(T) scheme and predicted journey time savings were derived from the CSTM3A model outputs for the section of the M80(T) route between Junction 3 Hornhill and Junction 7 Haggs.

The comparison of the available predicted and actual journey times indicates that the predicted journey times are generally greater than the observed journey times. Predicted journey times are between approximately 3 minutes to 4.5 minutes (between 23% and 29%) higher across the AM, IP and PM peak periods.

A comparison of predicted and actual journey time savings, indicates that the predicted journey time savings are generally greater than the observed journey time savings. Predicted journey time savings are between approximately 4 minutes and 7.5 minutes higher in the AM and PM peak periods respectively.

The variations in predicted and actual journey times and journey time savings is consistent with the finding that forecast post opening vehicle flows were considerably higher than the actual post opening vehicle flows. The higher forecast of traffic flows will have had a subsequent impact on the accuracy of the predicted journey times within the traffic model.

### 3.6.7 *Vehicle Speeds*

#### *Comparison Between Pre and Post Opening Vehicle Speeds*

Mean vehicle spot speeds have been calculated from the available ATCs within the study area to provide an indication of changes in mean vehicle speeds.

The pre opening mean vehicle spot speeds used for the comparison have been taken from May and October 2008 as this is prior to the commencement of the construction works related to the project. Post opening mean vehicle spot speeds are taken from May and October 2013. May and October are considered as neutral months which provide a suitable basis on which to compare pre and post opening mean spot vehicle speeds.

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The pre and post opening mean vehicle spot speed comparisons for May 2008 and 2013 for the AM and PM peak periods are shown in Table 3.5a and Table 3.5b respectively. The comparison of pre and post opening vehicle spot speeds for both October 2008 and 2013 is presented in Appendix B.

**Table 3.5a: Observed AM Mean Vehicle Spot Speeds (mph)**

Location	Direction	Pre Opening (2008)	Post Opening (2013)	Difference
<b><i>M80 Steps to Haggs Section</i></b>				
M80 J6a (Castle Cary) – M80 J7 (Haggs)	Northbound	59	63	4
	Southbound	64	60	-4
M80 J6 (Old Inns) – M80 J6a (Castle Cary)	Northbound	60	59	-1
	Southbound	60	62	2
M80 J5 (Auchenkilns) – M80 J6 (Old Inns)	Northbound	58	57	-1
	Southbound	64	61	-3
M73 Merge – M80 J4a (Low Wood)	Northbound	60	61	1
	Southbound	61	65	4
M80 J3 (Hornshill) – M80 J4 (Mollinsburn) Moodiesburn Bypass	Northbound	-	65	-
	Southbound	-	66	-
A80 Cumbernauld Road at Moodiesburn	Northbound	36	41	5
	Southbound	37	41	4
<b><i>M80 South of Scheme Extents</i></b>				
M80 J2 (Robroyston) - M80 J3 (Hornshill)	Northbound	50	62	12
	Southbound	59	56	-3
M80 J1 (Provan) - M80 J2 (Robroyston)	Northbound	60	56	-4
	Southbound	58	42	-16

Source: Scottish Roads Traffic Database (SRTDb)

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**Table 3.5b: Observed PM Mean Vehicle Spot Speeds (mph)**

Location	Direction	Pre Opening (2008)	Post Opening (2013)	Difference
<b>M80 Steps to Haggs Section</b>				
M80 J6a (Castle Cary) – M80 J7 (Haggs)	Northbound	60	56	-4
	Southbound	59	60	1
M80 J6 (Old Inns) – M80 J6a (Castle Cary)	Northbound	61	61	0
	Southbound	52	57	5
M80 J5 (Auchenkilns) – M80 J6 (Old Inns)	Northbound	59	58	-1
	Southbound	60	57	-3
M73 Merge – M80 J4a (Low Wood)	Northbound	57	60	3
	Southbound	57	64	7
M80 J3 (Hornhill) – M80 J4 (Mollinsburn) Moodiesburn Bypass	Northbound	-	64	-
	Southbound	-	67	-
A80 Cumbernauld Road at Moodiesburn	Northbound	27	40	13
	Southbound	39	41	2
<b>M80 South of Scheme Extents</b>				
M80 J2 (Robroyston) - M80 J3 (Hornhill)	Northbound	46	59	13
	Southbound	61	60	-1
M80 J1 (Provan) - M80 J2 (Robroyston)	Northbound	57	54	-3
	Southbound	57	50	-7

Source: Scottish Roads Traffic Database (SRTDb)

The speed data analysis tends to confirm the journey time findings in that there is little change to mean vehicle spot speeds on the northern sections of the project. There are, however, some notable mean vehicle spot speed increases on the southern sections of the project, particularly between M80(T) Junction 2 Robroyston and the M73(T) merge, which can be directly attributed to the provision of the Moodiesburn Bypass section of the project, where the majority of the savings in journey times afforded by the project are generated.

Within the extents of the project, the section between the M73(T) merge and Junction 4a Low Wood has seen a notable increase in mean vehicle spot speeds. This is expected to reflect the improvement in the route capacity and operating conditions post opening within the vicinity of the M80 / M73 merge and should be considered against the increases in traffic volumes of up to 5% following opening of the project on this section of the route.

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A comparison of mean vehicle spot speed data available for the section of the now bypassed A80 within the vicinity of the communities at Moodiesburn, Muirhead and Chryston with the M80(T) between Junction 3 Hornshill and Junction 4 Moodiesburn (the Moodiesburn Bypass), where national speed limits apply, indicates that post opening mean vehicle spot speeds are significantly greater (by up to 26 mph) on the Moodiesburn Bypass. Prior to the opening of the project, this section of the A80 was subject to operational problems associated with the more urban nature of the route, the traffic bottleneck at Crow Wood Roundabout, a 50 mph speed limit which applies over a significant section of the route and a section with a 30 mph speed limit within the vicinity of Moodiesburn. The post opening data suggests there has been significant positive impact on mean vehicle speeds across this section of the project.

Significant mean vehicle spot speed increases of approximately 12 mph and 13 mph are observed in the northbound direction in both AM and PM peaks between Junction 2 Robroyston and Junction 3 Hornshill. It is likely that a combination of, the opening of the Moodiesburn Bypass; a change in speed limit (from 50 mph to the national speed limit); the realignment of the route and the removal of the need to negotiate the Crow Wood Roundabout, may have contributed towards increases in mean vehicle spot speeds at this location through a reduction in the congestion and queuing that were associated with this section of the route prior to the opening of the project.

To the south of the project between Junction 1 Provan and Junction 2 Robroyston, post opening mean vehicle spot speeds have reduced by between 7 mph to 16 mph, particularly in the southbound direction of travel. The impact of the higher volumes of M80(T) traffic merging with the M8(T) at Provan and the subsequent impact on congestion on the southbound M80(T) between Junction 1 Provan and Junction 2 Robroyston are likely to contribute, at least in part, to the lower mean spot speeds observed at this location.

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### Vehicle Speeds: Key Findings

An examination of pre and post opening mean vehicle spot speeds suggests that overall, there is little change to mean vehicle speeds across the section of the upgraded M80(T) between Stepps and Haggs to the north of Junction 4a Low Wood.

There are, however, some notable localised increases in mean vehicle spot speeds, particularly on the section of the project within the vicinity of the M80 / M73 merge. It can be expected that improvements to the route capacity and, subsequently, operating conditions have contributed to greater mean vehicle spot speeds.

Mean vehicle spot speeds on the Moodiesburn Bypass section of the route are significantly greater (up to 26mph) than the pre opening mean vehicle spot speeds observed on the now bypassed A80 within the vicinity of the communities at Moodiesburn, Muirhead and Chryston. This suggests that the project has had a significant positive impact on mean vehicle speeds across this section of the project.

There are also significant localised observed increases in mean vehicle spot speeds on the trunk road network outwith the extents of the project, particularly in the northbound direction of travel between M80(T) Junction 2 Robroyston and Junction 3 Hornshill. This is also likely to be a direct result of the project's impact on congestion and the removal of traffic bottlenecks.

Conversely, localised decreases in mean vehicle spot speeds were observed, particularly in the southbound direction of travel where the M80 merges with the M8 at Junction 1 Provan outwith the extents of the project. The decreases noted at this location are likely due, in part, to the higher volumes of M80(T) traffic merging with the M8(T) at Provan and the subsequent impact on congestion on the southbound M80(T) between Junction 1 Provan and Junction 2 Robroyston.

It can be concluded that, the project has provided improvements in mean vehicle speeds within the extent of the Stepps to Haggs section which contribute to the time savings discussed in Section 3.6.4

The full comparison of pre and post opening vehicle spot speeds for both May and October 2008 and 2013 is presented in Appendix B.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## 3.7 Safety

### *Comparison Between Pre and Post Opening Personal Injury Accident Numbers*

One of the objectives of the project was to improve safety in the A80 corridor and reduce the risk of accidents with particular emphasis on reducing conflicts between vehicles and other road users. The 1YA evaluation, therefore, has analysed the accident statistics pre and post opening to identify any discernible improvements in road safety.

Due to the network management associated with the construction of the project the accident data for the period 2008 to 2011 may not be representative of normal network conditions and instead pre opening data for the period 2005 to 2008 has been analysed and used as the basis of the project's safety evaluation. A summary of the personal injury accident data is shown in Table 3.6.

**Table 3.6: Accident Data Summary**

Location	Pre Opening (2005 – 2008)		Post Opening (2013)	Projected Difference
	3 Year Total	Ave/Year		
M80(T) Blackhill to Stepps	32	11	7	-4
A80/M80(T) Stepps to Mollinsburn	40	13	0	-13
A80/M80(T) Mollinsburn to Old Inns	43	14	14	0
A80/M80(T) Old Inns to Hags	17	6	3	-3
Total - Trunk Routes	180	60	44	-16
Total - Local Routes	252	84	84	0
Total - Wider Study Area*	1,048	349	269	-80

Notes: \*'Total –Wider Study Area' includes accidents occurring within all defined zones plus all routes within wider zone i.e. B/C class routes and unclassified routes. See Appendix B for zone details

Although only one year of post opening accident data is available, early indications suggest that the project is having a beneficial impact on safety on the section of the project from Stepps to Junction 4 at Mollinsburn. Where pre opening data reported an average of 13 accidents per year on this section, there were no recorded accidents in the one year post opening period. These results can be explained, in part, by the inherent safety benefits attributable to the higher standard of the upgraded route.

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It is noted, however, that the total number of accidents occurring on the section from Junction 4 Mollinsburn to Junction 6 Old Inns indicates no discernible change between pre and post opening, with 14 accidents (one serious and thirteen slight) recorded in the one year post opening period compared to an annual average of 14 accidents pre opening. Analysis of the available data, however, suggests that the severity of accidents occurring on this section has reduced such that no fatal accidents occurred following the opening of the project.

Consideration of the accident rates for the trunk road sections evaluated, identified reductions have been observed in the one year post opening period, including:

- A reduction from 8.194 to 7.581 Personal Injury Accidents per 100 million vehicle kilometres (PIA/100mvk) between Junction 4 Mollinsburn and Junction 6 Old Inns;
- A reduction from 6.001 to 2.901 PIA/100mvk between Junction 6 Old Inns and Haggs;
- A reduction from 8.090 to 4.864 PIA/100mvk between Blackhill and Stepps; and
- A reduction from 11.619 to 0 PIA/100mvk between Stepps and Mollinsburn.

The initial one year post opening findings indicates accident rates for the trunk road sections evaluated are less than the national average for 2012 (5.38 PIA/100mvk). The one exception to this is the section of the M80(T) between Junction 4 Mollinsburn and Junction 6 Old Inns, with an accident rate of 7.581 PIA/100mvk. This includes the heaviest trafficked section of the M80(T) between the M73(T) merge and Junction 4a Low Wood, with approximately 76,500 vpd travelling on this section of the route following opening of the project. While the nature of the route at this location (the merge of the M73(T) and M80(T) carriageways) could, in part, account for the higher accident rate occurring on this section due to merging and weaving behaviour, the Stage 4 RSA confirmed that the occurrence of accidents associated with this type of driver behaviour had reduced following opening of the project.

In addition to accident rates, accident severity rates have also been calculated for the trunk road sections and are presented within Table 3.7.

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**Table 3.7: Accident Severity Summary**

Location	Pre Opening (2005 – 2008)			Post Opening (2013)		
	Fatal	Serious	Slight	Fatal	Serious	Slight
M80(T) Blackhill to Stepps	0.031 (1)	0.031 (1)	0.938 (30)	0.000 (0)	0.143 (1)	0.857 (6)
A80/M80(T) Stepps to Mollinsburn	0.025 (1)	0.150 (6)	0.825 (33)	0.000 (0)	0.000 (0)	0.000 (0)
A80/M80(T) Mollinsburn to Old Inns	0.047 (2)	0.116 (5)	0.837 (36)	0.000 (0)	0.071 (1)	0.929 (13)
A80/M80(T) Old Inns to Higgs	0.059 (1)	0.235 (4)	0.706 (12)	0.000 (0)	0.000 (0)	1.000 (3)

The data presented in Table 3.7 indicates that, in addition to a reduction in accident rates, a corresponding reduction in accident severity was also observed within the vicinity of the project after opening.

While, at this stage, it is too early to fully determine the inherent safety of the project, it is apparent from the analysis undertaken that the project is operating safely. The 3YA evaluation will provide for a fuller and more detailed picture of the operational safety of the project.

### *Road Safety Audits*

The Road Safety Audit (RSA) process has been followed with Stage 1, 2, 3 and 4 Audits having been carried out. The Stage 4 RSA indicated that the most common causation of accidents throughout the M80(T) project related specifically to lane changing with drivers failing to look properly as well as rear end shunt collisions relating to slow moving or queuing traffic. The occurrence of these types of collisions is observed to have reduced following opening of the scheme with less queuing and lane changing taking place.

Of particular note were observations in relation to illegal manoeuvres at the Castlecary Northbound on-slip. A recommendation was made by the audit team to extend the current double white lining, with the designer identifying the need to discuss this with the relevant authority. A further instance of potentially unsafe U-turn manoeuvres was noted east of the Castlecary southbound off-slip with the recommendation to discuss with the local authority. Anecdotal evidence suggests that illegal manoeuvres are still being carried out at these locations as a result of traffic attempting to avoid right hand turn restrictions on the local road network.

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Discussions between Transport Scotland and the local authority have taken place to develop an appropriate solution(s) to the observations highlighted within the RSA. Proposals are currently being developed to remove the bus gates at Castlecary and to provide an element of traffic calming on the local road network.

### *Stakeholder Feedback*

Police Scotland offered feedback on the project for the purposes of this Evaluation report. Consultations were held with Police Scotland – Traffic Management, Scottish Trunk Roads to discuss the police perspective on the project, in terms of safety.

The project is considered to have had a positive benefit to the network through reducing congestion and, subsequently, driver frustration which can lead to accidents. It was noted that access for emergency service vehicles has greatly improved following the opening of the project due to the provision of a hard shoulder along the majority of the length of the scheme. It was also felt the communities of Moodiesburn, Chryston and Muirhead are likely to have seen an improvement in road safety due to the significant reduction in the number of vehicles using this section of the now bypassed A80.

It was suggested that, in the opinion of Police Scotland, there may be a potential issue with the carriageway road markings within the vicinity of the Castlecary to Old Inns section of the M80(T), in the southbound direction, where the carriageway markings are such that the nearside lane is signed as a slip road to the A8011, Cumbernauld.

Police Scotland were of the view that gradients across this section of the route are such that the operation of the road could have been improved by altering the lane markings or signing the nearside lane as a 'crawler' lane for HGVs and other slow moving vehicles which tend to travel in either the middle or offside lane. Other vehicles may also use the nearside lane to undertake vehicles in the middle and offside lanes, which could lead to operational issues. Transport Scotland are currently undertaking a review of operational issues on the M80(T) / M876(T).

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### Safety: Key Findings

An assessment of the one year post opening personal injury accidents suggests that despite the increases in both traffic volume and vehicle speeds across the upgraded sections of the route, the project is operating safely.

On the section to the south of the M80 / M73 merge, improvements in the severity and numbers of accident occurring within this section were observed. No particular improvements in safety were noted on the M80(T) north of the merge with the M73(T).

An examination of accident rates and accident severity rates on the upgraded sections of the M80(T) route confirmed that the rate of personal injury accidents per million vehicle kilometres (PIA/mvk) were lower post opening when compared to the pre opening rates across the extents of the project. Furthermore, the majority of the upgraded sections of the M80(T) route had an accident rate lower than the 2012 national average, with the exception of the section between Junction 4 Mollinsburn and Junction 6 Old Inns.

The RSA indicated that the propensity for accidents specifically relating to lane changing behaviour, with drivers failing to look properly, as well as rear end shunt collisions relating to slow moving or queuing traffic, have reduced following opening of the project with less queuing and lane changing taking place.

The 3YA evaluation will provide a clearer picture of the operational safety of the project, however, it can be concluded at this early stage the project is operating safely.

## 3.8 Economy

### 3.8.1 Transport Economic Efficiency

The comparisons between predicted and actual traffic flows and travel times, can be considered a proxy for whether the predicted economic benefits of the project are likely to be realised. This overestimation of traffic volumes noted previously is likely due to the combination of the general economic downturn and the assumptions that were made during the modelling process for the project.

Similarly, the comparison of predicted and actual journey time savings indicates that the predicted journey times savings on the M80(T) between Junction 3 Hornshill and Junction 7 Higgs may be up to 7.5 minutes greater than the actual journey time savings observed in 2013 following opening of the project.

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This would suggest that benefits accrued as a result of improvements in traffic flow and journey time savings may be lower than predicted as part of the project's appraisal. However, it is noted that the economic appraisal results, under the high growth scenario adopted for the project, offered significant user benefits, that such overestimations are unlikely to significantly diminish the predicted economic benefits of the project. The low growth scenario undertaken as part of the project's economic appraisal, also indicated that the project offered significant user benefits. Again, the magnitude of the benefits is such that any overestimations are unlikely to significantly diminish the predicted economic benefits.

The economic appraisal for the project also considered a 'zero' traffic growth sensitivity test scenario. The results indicated that, even under a scenario with no future traffic growth, the project would provide significant economic benefits to road users, supporting the view that the overestimation of traffic flows and journey time savings are unlikely to significantly diminish the predicted economic benefits of the project.

## 3.8.2 *Wider Economic Benefits*

### *Stakeholder Feedback*

An extensive consultation exercise was undertaken involving local authorities, organisations and local businesses within the area to establish any actual or perceived impacts as a result of the project.

The Road Haulage Association (RHA) stated that it was the view of its members that the project has reduced journey times, congestion and driver stress on this section of the motorway network. In conjunction with other projects, including the M74(T) Extension, the project has also enabled easier access to Glasgow and central Scotland.

Falkirk Council suggested that, purely on a subjective basis, passing trade at Higgs has seen improvement since the opening of the project. East Dunbartonshire Council commented that traffic flows had decreased in the area which may suggest a decrease in passing trade in local areas adjacent to the M80(T). There was however no evidence to suggest that this was attributed the project and may be as a result of wider effects, such as the general economic downturn or the impact of the opening of the Kirkintilloch Link Road. North Lanarkshire Council advised that there had been a number of representations from businesses within Mollinsburn and Muirhead indicating a decrease in passing trade, however, no data was provided to support these representations.

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Feedback suggested that most staff working for the businesses consulted, resided within relatively close proximity of the workplace and tended to avoid the strategic road network for home to work trips and hadn't therefore noticed any real changes in impacts on travel time. No impacts were identified surrounding changes in staff travel modes and / or route choice for home to work trips.

While no impacts were noted from any of the consultees with regards to deliveries, likely due to the majority of deliveries being undertaken out with peak times, the feedback provided suggested that there was a perception that the project has improved accessibility to Glasgow which may have reduced the number of people shopping locally in areas such as Cumbernauld. The project is also considered to have removed passing trade, particularly from communities now bypassed by traffic as a result of the improvements.

## **Economy: Key Findings**

Actual user benefits may be less than predicted due to observed traffic flows and journey time savings being less than forecast.

Whilst the benefits for the project may be less than predicted, it should be noted, however, that the project's economic appraisal considered a 'zero' traffic growth sensitivity test scenario. The results of this scenario suggested that the project, even under a scenario with no future traffic growth, would continue to provide significant economic benefits to road users.

Given the high level of user benefits predicted for the project, the project is providing notable economic benefits to road users.

## **3.9 Integration**

### *3.9.1 Policy Integration*

The project's assessment took cognisance of the policy environment at the time, which was against the adoption of a 'predict and provide' approach to the provision of roads infrastructure. As such, it is considered that the decisions made that were made were in-line with the Scottish Executive's integrated transport policy and Scottish Minister's response to the Central Scotland Transport Corridor Studies (CSTCS) applied at that time.

## **Integration: Key Findings**

The project was assessed in-line with the Scottish Executive's integrated transport policy and Scottish Minister's response to the Central Scotland Transport Corridor Studies (CSTCS) applicable at that time.

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## 3.10 Accessibility & Social Inclusion

### 3.10.1 Community Accessibility

#### *Public Transport Network and Services*

Table 3.8 summarises bus services operating within the vicinity of the project before and after opening.

**Table 3.8: Bus Service Operations**

Service Number	Operator	Pre Opening		Post Opening	
		Service Frequency (peak hr)	Places served	Service Frequency (peak hr)	Places served
X4/FX4	First Bus	2	- Abronhill - Condoratt - Cumbernauld (central) - Moodiesburn	Service no longer in operation	N/A
X5/FX5	First Bus	2	- Abronhill - Chryston - Condoratt - Cumbernauld (central) - Moodiesburn	2	- Abronhill - Condoratt - Cumbernauld (central)
X37	First Bus	1	- Bonnybridge, - Chryston - Condoratt - Cumbernauld (central) - Moodiesburn - Westerwood	1	- Bonnybridge - Chryston - Condoratt - Cumbernauld (central) - Moodiesburn - Westerwood
X39	First Bus	1	- Banknock - Bonnybridge - Chryston - Condoratt - Cumbernauld (central) - Denny - Moodiesburn - Westerwood	1	- Banknock - Bonnybridge - Chryston - Condoratt - Cumbernauld (central) - Denny - Moodiesburn - Westerwood
X80	First Bus	2	- Abronhill - Chryston - Condoratt - Cumbernauld (central) - Moodiesburn	Service no longer in operation	N/A

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Service Number	Operator	Pre Opening		Post Opening	
		Service Frequency (peak hr)	Places served	Service Frequency (peak hr)	Places served
X85	First Bus	2	- Kirkintilloch (west) - Lennoxtown - Lenzie - Milton of Campsie	2	- Kirkintilloch (west) - Lennoxtown - Lenzie - Milton of Campsie
X86	First Bus	1 (peak hour only)	- Lennoxtown	1 (extended peak hour only)	- Kilsyth - Kirkintilloch (east) - Kirkintilloch (west)
X87	First Bus	2	- Kirkintilloch (east) - Kirkintilloch (west) - Lenzie	2	- Kirkintilloch (east) - Kirkintilloch (west) - Lenzie
X20	Stagecoach	Daily	- Abronhill - Chryston - Condoratt - Cumbernauld (central) - Moodiesburn	Service no longer in operation	N/A
X24	Stagecoach	1	- Cumbernauld	1	- Cumbernauld (Central)
X25/X25 A	Stagecoach	3	- Abronhill - Cumbernauld (Central) - Moodiesburn	4	- Abronhill - Cumbernauld (Central)
X26	Stagecoach	1	- Cumbernauld	1	- Cumbernauld (Central)
X27	Stagecoach	1	- Cumbernauld	1	- Cumbernauld (Central)

Analysis of the bus network indicates that First Bus has modified significant parts of its network operations within the study area, particularly in and around the Cumbernauld area. Discussions with Strathclyde Passenger Transport identified this to be attributable to the closure of the First Bus Cumbernauld depot and financial considerations.

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In addition, in May 2013 First Bus introduced the SimpliCITY network, which brought significant changes to the First Bus network. Stagecoach has, in parallel, increased service provision, especially in Cumbernauld. Analysis also suggests that, in recent years, smaller operators have increased the number of bus services in the area, most notably Fisher Tours and McColls Coaches.

Key points to note in relation to the impact of the project on bus operations, include:

- The project has allowed for a more reliable express bus network from Cumbernauld to/from Glasgow. While scheduled journey times have not changed, First Bus indicated the project has resulted in bus services being much more reliable. Whereas previously, services would have significant lag times built in (at Buchanan Bus Station in Glasgow) and typically arrive 20 minutes late in the peak, there is greater confidence now that schedules are adhered to.
- Several routes (X4/FX4 and X5/FX5) now exit/join the M80(T) at Junction 4a, whereas previously they served Moodiesburn and merged with the M80(T) at Junction 3.
- Local bus services, i.e. those not running on the motorway network, have been reduced across the study area. These impacts are not attributed to the project but are due, largely, to First Bus selling its Cumbernauld depot and the subsequent withdrawal/reduced services pattern of services in May 2013.
- In addition, the Moodiesburn Bypass section of the M80(T) and corresponding removal of traffic from the A80 should help to improve the reliability of bus services (X37 and X39) travelling via the A80 in Moodiesburn.

## *Cycle Audit*

A Cycle Audit was carried out as part of the Stage 4 RSA. No specific comments were made with regards to non-motorised users. It can be expected, however, that the project by removing strategic traffic from the communities of Moodiesburn, Muirhead and Chryston in particular will have positively contributed to the pedestrian and cycle environment in these locations and in doing so maximise the benefits and opportunities from the significant number of paths and rights of way within the vicinity of the project.

It is expected that most benefit to non-motorised users, and in particular, cyclists, has been on the section of the bypassed A80 route between Stepps and Mollinsburn which forms part of the Glasgow to Cumbernauld Cycle Commuter Route. The significant reduction in the volume of traffic using this section of the route and widening of the shared-use footway along the A80 can be expected to have significantly enhanced conditions for non-motorised users.

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## *Stakeholder Feedback*

Feedback was also sought on the degree with which the project impacted upon cycling. It was suggested that whilst there is no evidence to support an increase in walking / cycling, observations were that the upgraded Strathkelvin Walkway / Cycleway was well used between Moodiesburn and Kirkintilloch and the various new / upgraded paths or upgraded public rights of way alongside the M80(T) were also well used. It was noted that the footway on Lindsaybeg Road over the M80(T) makes it easier for pedestrians to travel north of Muirhead / Chryston.

### *3.10.2 Comparative Accessibility*

#### *DDA Audit*

The design phase of the project pre-dated the introduction of the Disability Discrimination Act (DDA) guidance. Therefore, a DDA Audit was not required to be undertaken.

#### **Accessibility & Social Inclusion: Key Findings**

The project has allowed for a more reliable express bus network from Cumbernauld to Glasgow. In using the Moodiesburn Bypass section these services do bypass some of the local communities, but in removing strategic traffic from the local road network the project is considered to also provide a positive impact in terms of the operation of the bus services which still serve the communities of Moodiesburn, Muirhead and Chryston.

A Cycle Audit was undertaken for the project as part of the Stage 4 RSA. No specific comments were made with regards to non-motorised users, however, it is likely that access for cyclists has been improved following opening of the project, specifically on the section of the A80 now bypassed by the project.

The design phase of the project pre-dated the introduction of the DDA guidance. Therefore, a DDA Audit was not required to be undertaken.

## **3.11 Cost to Government**

### *3.11.1 Investment Costs*

The M80(T) Steps to Haggs project was taken forward as a Public-Private Partnership (PPP) project. A full financial evaluation was undertaken prior to the award of this PPP contract.

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### 3.12 Value for Money

#### 3.12.1 Initial Indications

The evaluation against 'Value for Money', only considers the likely benefits realised as a result of the project. The economic appraisal results for the project predicted a Present Value of Benefits (PVB) of £558.0m, Net Present Value (NPV) of £452.2m and Benefit to Cost Ratio (BCR) of 5.3 under the high traffic forecast scenario.

Based on the comparisons presented in previous sections, which suggest that the benefits (PVB) may have been overestimated, the NPV and BCR of the project are likely to be lower than predicted.

As a sensitivity test, the economic appraisal for the project considered a 'zero' traffic growth scenario which predicted a PVB of £325.4m, NPV of £219.7m and BCR of 3.1. The results of the 'zero' traffic growth scenario suggests that, despite actual traffic growth having not achieved the levels predicted, the project is delivering user benefits and the resultant growth observed would not have affected the decision to proceed.

Furthermore, the project forms part of a series of improvements with the aim of completing the central Scotland motorway network. In doing so, the project will help the transport network support future economic development within central Scotland and beyond with improved connectivity to U.K. and European markets.

#### **Value for Money: Key Findings**

Although the NPV and BCR are unlikely to be as great as predicted, the high level of user benefits predicted for the project mean that despite actual traffic growth having not achieved the levels predicted, the project is delivering user benefits and the resultant growth observed would not have affected the decision to proceed.

It is considered, therefore, that given the level of traffic growth and the journey time savings likely to be realised as a result of the improvement, that the project will continue to provide significant benefits to road users.

The project also forms part of a series of improvements with the aim of completing the Central Scotland motorway network. In doing so the project will help support future economic development within Central Scotland and beyond with improved connectivity to U.K. and European markets.

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### 3.13 Environment

The following section provides a summary of the assessment of environmental mitigation measures proposed for the M80(T) Stepps to Haggs project. A fuller report is provided in Appendix C.

#### *Review of Environmental Mitigation Measures*

The environmental mitigation measures originally proposed for the project were obtained from the project's Environmental Statement (ES)<sup>1</sup>. A review of the environmental mitigation measures was carried out in February 2014, as well as a review of the landscape plans and as-built scheme plans.

Following this review a site visit was undertaken to establish whether or not the proposed mitigation measures, as set out in the Schedule of Committed Mitigation within the ES, had been implemented.

The ES for the project proposed mitigation measures to address impacts under the following criteria:

- Noise and Vibration
- Water Quality, Drainage and Flood Defence
- Geology
- Biodiversity and Habitats
- Landscape and Visual Amenity
- Agriculture and Soils
- Cultural Heritage
- Physical Fitness
- Land Use

A substantial proportion of mitigation measures proposed within the ES concerned either noise abatement, in the form of barriers and bunds, or tree planting, to compensate, create or enhance habitats or to mitigate landscape and visual impacts. These measures were implemented across the length of the project. A spot check of the measures at different locations was undertaken during the site visits to provide an overview of the measures within the context of the project overall. A selection of these mitigation measures were then inspected in more detail.

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<sup>2</sup> M80 Stepps to Haggs Environmental Statement (Jacobs, 2004)

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## *Findings*

The mitigation that was included within the ES has been implemented on site and is in good condition, although at one location, Mollinsburn Junction, a field boundary hedge (commitment LV2) was unable to be replaced due to the structural foundations of the piled embankment.

Noise mitigation, including acoustic screening and use of low noise surfacing, was present on site and noise bunds and noise barriers were in place throughout the length of the scheme at various locations. No noise assessment was undertaken, but a notable decrease in noise was observed when travelling on upgraded sections of the M80(T) during the site visit. Planting at these locations was also included which will provide additional screening over time. The lower than forecast traffic flows can also be expected to reduce the noise impact forecast at the time of the scheme assessment.

An extensive Sustainable Urban Drainage System (SUDS) was implemented as part of the scheme in addition to extensive habitat creation and improvement measures for protected species present in the area, including bats, otters and badgers. Mammal tunnels, otter ledges and otter fencing were present on site in locations where the highest occurrence of otter activity had been observed.

Tree planting in addition to native woodland planting, shrubs, hedgerows and grass seeding was evident across the length of the scheme, and comprised one of the major mitigation components. While the impact on land take and agriculture and soils was minimised through the scheme design to mitigate against potential adverse environmental impacts, an element of land take was required, primarily within the vicinity of the Moodiesburn Bypass. The site visit confirmed that land was re-graded and re-instated to agricultural use, where appropriate.

However, the site inspection did identify a hedge that was unable to be replaced (see above), and some issues relating to the poor establishment of tree planting in certain areas. Information from the contractor has advised that a shortfall in tree planting was addressed under Excluded Seasonal works in the 2012/2013 planting season. This will be evaluated again at the 3YA evaluation. The poor establishment of plants in certain areas has been noted and raised with the Contractor to be addressed and will continue to be monitored throughout the Establishment Period. Also, observations have been made about the possible unsuitability of the design of the fence by the utility buildings at Dalshannon, which is near an area of known otter activity with fences that would direct otters towards the otter ledge.

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## Environment: Key Findings

The mitigation measures included within the ES that can be observed during the operation stage have been implemented and were seen to be in good condition, although at one location (Mollinsburn Junction), a field boundary hedge (commitment LV2) was unable to be replaced due to the structural foundations of the piled embankment. A substantial proportion of mitigation measures placed across large expanses of the completed scheme comprised noise abatement measures and planting to compensate, create or enhance habitats or to mitigate landscape and visual impacts. A selection of these noise or planting measures were inspected in detail.

A comparison of actual and forecast traffic flows has revealed that, from a total of sixteen model links examined, actual traffic flows on fourteen links are lower than those forecast with the actual flow on many links being more than 20% lower than forecast. According to Calculation of Road Traffic Noise and the DMRB, this would result in noise impacts 1dB less than forecast given the lower traffic flows. Impacts on air quality would also be expected to be less than presented in the ES as a result of the lower traffic flows.

Measures taken to protect otters were in place, although recommendations to investigate the suitability of the fence design at the utility buildings near an area of known otter activity at Dalshannon (by the otter ledge) are made to be included in the 3YA evaluation. Extensive drainage measures have been constructed to minimise the risk of pollution to watercourses via filter drains and a series of retention ponds.

Landscaping has been carried out across the scheme. Information from the contractor has advised that a shortfall in tree planting was addressed under Excluded Seasonal works in the 2012/2013 planting season. This will be evaluated again at the 3YA evaluation. The poor establishment of plants in certain areas has also been noted and raised with the Contractor to be addressed and monitored throughout the Establishment Period. The landscaping establishment period is five years following completion. As such, it is expected that over time the features will weather, vegetation will grow and the scheme will assimilate better into the surrounding landscape and issues relating to the success of the establishment of the planting will be addressed (e.g. replace failed trees) to ensure the visual screening and habitat connectivity is implemented as proposed.

The following actions are recommended to improve the effectiveness of the implemented mitigation:

- **Biodiversity & Habitats:** review of the provision for otters at the utility buildings near Dalshannon, through investigating the fencing design used and road kill /wildlife-related RTA data during the 3YA evaluation.

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- **Landscape & Visual Amenity:** continue to monitor the establishment of planting.

### 3.14 Progress Towards Achieving Objectives

Specific indicators to measure the performance of the project against its objectives have not been developed. Therefore, an initial indication of how the project is progressing towards achieving its objectives is based on the pre-opening data available, supplemented by post opening data collected as part of the evaluation.

#### *Initial Indications*

A summary of the evaluation, providing an indication of how the project is progressing towards achieving its objectives, is presented in Table 3.9.

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**Table 3.9: Progress Towards Achieving Objectives**

Objective	Commentary	Progress
<p>To support sustainable economic activity and get good value for money by reducing delays and improving travel time reliability through the provision of good, quick and reliable strategic road links</p>	<p>A comparison of the reliability of journey times across the improvement pre and post opening of the project indicates there have been notable improvements in the reliability of journey times following the opening of the project, particularly within the peak periods.</p> <p>The economic appraisal results for the project predicted a PVB of £558.0m, NPV of £452.2m and BCR of 5.3 under the high traffic forecast scenario. The overestimation of traffic volumes and journey time savings forecast compared to the actual volume of traffic and journey time savings realised following opening of the project mean the NPV and BCR of the project are likely to be lower than predicted.</p> <p>As a sensitivity test, the economic appraisal for the project considered a 'zero' traffic growth scenario which predicted a PVB of £325.4m, NPV of £219.7m and BCR of 3.1 This suggests that even under a zero growth scenario the project would continue to provide significant user benefits and adoption of this growth scenario as the basis of the project's assessment would not have affected the decision to proceed with the project</p> <p>Although 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 significant benefit to road users and also forms part of a series of improvements with the aim of completing the Central Scotland motorway network to improve connectivity and support future economic development.</p>	<p>=</p>
<p>To improve safety in the A80 corridor and reduce the risk of accidents with particular emphasis on reducing conflicts between vehicles and other road users</p>	<p>An assessment of the one year post opening personal injury accidents and a review of the Stage 4 RSA report, suggests that the project is operating safely.</p> <p>Comparisons of pre and post opening accident rates and accident severity rates on the upgraded sections of the M80(T) route confirm that the post opening rate of personal injury accidents per million vehicle kilometres (PIA/mvk) were lower across the extents of the project. Furthermore, the majority of the upgraded sections of the M80(T) route have an accident rate lower than the 2012 national average, with the exception of the section between Junction 4 Mollinsburn and Junction 6 Old Inns.</p> <p>The Stage 4 RSA noted that the most common causation of accidents throughout the M80 scheme related specifically to lane changing with drivers failing to look properly as well and rear shunt collisions relating to slow moving or queuing traffic. The occurrence of these types of collisions has reduced following opening of the scheme with less</p>	<p>+ve</p>

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Objective	Commentary	Progress
	queuing and lane changing taking place.	
To reduce the impact on the built and natural environment and lessen the adverse impacts of traffic on people through improved design and effective management of the network.	<p>The measures committed within the Environmental Statement have been implemented on site and are in good condition. Whilst a variation from the proposed mitigation measures has been identified (a field hedge could not be replaced), it is not considered to have had a material detrimental impact on the general integration of the project into its surroundings, and the success of planting establishment will be addressed/monitored, as discussed within Appendix C.</p> <p>The project provided a bypass of the communities at Moodiesburn, Chryston and Muirhead. It can be expected that, as a result of the significant reductions in the volume of traffic travelling on the bypassed A80 within the vicinity of these communities, adverse impacts as a result of traffic on local residents are likely to have significantly reduced.</p>	+ve
To complete the central Scotland motorway network by improving the operational characteristics of the road corridor in line with the Scottish Executive's integrated transport policy and Scottish Minister's response to the Central Scotland Transport Corridor Studies (CSTCS).	<p>The project provided a motorway standard route from Stepps to Haggs. While localised operational issues have been identified following opening of the project, the improvement has, largely, had a significant positive impact on the flow of traffic. For example, the project has facilitated the removal of traffic bottlenecks at Crow Wood Roundabout and at the M80 / M73 merge. This has resulted in significant average journey time savings (between three and five minutes) and significant improvements in journey time reliability (reductions in variability from 23 minutes to nine minutes) across the extents of the project and has positively influenced safety on the M80(T)</p> <p>In conjunction with the M74(T) Extension project, the M8(T) Baillieston to Newhouse project and associated M8/M73/M74 network improvements, the M80(T) between Stepps and Haggs project contributes towards the completion of the central Scotland motorway network.</p>	+ve
To provide adequate access to facilities, in particular to jobs, and adequate accessibility to freight deliveries, consistent with the strategic role of the scheme corridor (linking North and North-East Scotland with the M6 main	<p>The upgraded section of the M80(T) between Stepps and Haggs supports economic development in Central Scotland and the wider area. The project provides for improved access to employment, education opportunities, healthcare, shopping and leisure facilities throughout Central Scotland and beyond as a result of reduced and more reliable journey times.</p> <p>The project has allowed for a more reliable express bus network from Cumbernauld to Glasgow. In using the Moodiesburn Bypass section of the project, these services</p>	=

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Objective	Commentary	Progress
route to the European markets).	<p>bypass the communities of Moodiesburn, Muirhead and Chryston, however, in removing strategic traffic from the local road network, the project is considered to also provide a positive impact in terms of the operation of the bus services which still serve local communities within the vicinity of the project.</p> <p>Anecdotal evidence from businesses located within the area suggests that access and the reliability of journey times (a key factor for freight) have improved following the opening of the project.</p>	

- Key:
- +ve Initial indication(s) that objective may be achieved
  - = Progress towards achievement of objective cannot be confirmed at this time
  - Initial indication(s) that objective may not be achieved