7. Economic Performance of Scheme

7.1 Introduction

7.1.1 The proposed upgrade of the section of the A9 between Pass of Birnam and Tay Crossing forms part of the Scottish Government's commitment to upgrade the A9 to dual carriageway standards between Perth and Inverness. The Investment Case for the upgrading of the entire route and a discussion on the Wider Economic Benefits of upgrading the A9 between Perth and Inverness, are set out in the Case for Investment (CfI) (Transport Scotland, 2016). The rational for dualling the A9 corridor was updated in the latest Outline Business Case (OBC) (November 2023) to reflect the impact of the lower traffic levels associated with the Scottish Government's policy to reduce car kilometres by 20% by 2030. The 'With Policy' forecast scenario presented in this report is consistent with the work presented in the latest version of the OBC, which only considers the 'With Policy' scenario as discussed in Paragraph 5.2.3.

7.1.2 The economics section of this DMRB Stage 3 assessment is not intended to present all the economic benefits that are anticipated to accrue due to the upgrading of the A9 between Perth and Inverness. These are set out in the Case for Investment and the Outline Business Case. The total level of benefits from individual sections of the route on their own will be less than the prorated benefits for the whole route. The economic justification for the dualling of the A9 is therefore set out in the Case for Investment and Outline Business Case, rather than being justified here.

7.1.3 The economic evaluation of the proposed scheme has been undertaken using the Department for Transport's (DfT's) Transport Users Benefit Appraisal (TUBA) version 1.9.17.2 software. This software was developed for the appraisal of transport schemes and calculates travel time savings, changes in vehicle operating costs, changes in indirect tax revenues and greenhouse gas emissions.

7.1.4 The impact the proposed scheme has on the likely number and severity of accidents in the area has been assessed using a spreadsheet tool developed by SYSTRA, which uses accident rates and values taken from DMRB Volume 15 'Economic Assessment of Road Schemes in Scotland', Section 1 (The NESA Manual) and traffic flows output from the A9 Dualling Traffic Model (A9DTM:15).

7.2 Method of Appraisal

7.2.1 Inputs to TUBA are the number, time and distance of zone-to-zone trips for the Do-Minimum and Do-Something options. This data was obtained from the A9DTM:15. The project benefits are calculated by comparing, for each pair of zones, the total costs of travel (including travel time, and vehicle operating costs) for the Do-Minimum and Do-Something scenarios.

7.2.2 The components of the impacts have been assessed as follows:

- ***Transport Economic Efficiency (TEE)*** – The assessment of Transport Economic Efficiency benefits has been undertaken with a Fixed Trip Matrix using the A9DTM:15 linked to TUBA; and
- ***Accidents*** – Analysis of accidents on a project-by-project basis is spreadsheet based.

7.2.3 In accordance with DMRB guidance, the benefit stream is calculated for a 60-year appraisal period. TUBA calculates the benefits for the period 2036 to 2095 (inclusive).

7.2.4 As indicated in Paragraph 7.1.1, the economic assessment presented in this chapter uses the 'With Policy' forecast scenario to be consistent with the work presented in the latest version of the OBC.

7.3 Construction and Maintenance Costs

7.3.1 The derivation of the construction costs is set out in Chapter 3 (Description of the Proposed Scheme) of this report, and these assume that construction of the section of the A9 between Pass of Birnam and Tay Crossing is likely to commence in 2028 and be completed in 2032. These costs include:

- Pre-construction phase costs;
- Construction phase costs (including non-recoverable VAT);
- Risk, opportunity and uncertainty;
- Optimism Bias; and
- Inflation through to the end of the construction phase, which is taken as up to and including Quarter 2 2032.

7.3.2 For the purposes of scheme appraisal, it has been assumed that a significant proportion of the journey time benefits arising from dualling the A9 Pass of Birnam to Tay Crossing section, will likely be offset by delays incurred during the construction of other projects on the A9 that are later in the programme. On the basis that 2036 will be the first year of full programme operation, the benefits arising have been assessed over a 60-year period from 2036 to 2095 (inclusive). Note that the end date differs from the CfI for the whole dualling programme, due to a change in the programme since the CfI was published in 2016.

7.3.3 To ensure that there is no discontinuity between the capital expenditure and the realisation of benefits, for economic appraisal purposes, the spend profile for this project has been redefined such that 2035 is the last year of construction (capital) expenditure and therefore the expenditure profile for appraisal purposes is assumed to be three years later than as set out in Chapter 3 (Description of the Proposed Scheme). The later construction timescale means that additional construction price inflation must be incorporated within the construction cost estimates for

economic assessment compared to the estimates set out in Chapter 3 (Description of the Proposed Scheme). All preparation costs prior to 1 March 2025 have been removed from the appraisal as 'sunk' or non-recoverable cost.

7.3.4 In line with transport appraisal guidance on the economic assessment of transport schemes (TAG Unit A1.2 Scheme Costs (Department for Transport, May 2024)), the adjusted costs inclusive of optimism bias and additional construction price inflation have been deflated to 2010 prices using the Consumer Price Index (CPI) based Gross Domestic Product (GDP) Deflator Index, set out in the WebTAG Databook published by the Department for Transport (November 2024). As with the benefits stream, these costs are then discounted at a rate of 3.5 per cent per annum for the first 30 years, from the assessment year (2025) and 3.0 per cent per annum thereafter until 2095.

7.3.5 The Present Value of Costs is the difference between the construction and operation and maintenance cost for the Do-Something and Do-Minimum scenarios. The breakdown is summarised in Table 7.1.

7.3.6 For operation and maintenance costs, these costs have been added to the costs included in Chapter 3 (Description of Proposed Scheme) and an optimism bias figure of 46% has been applied to these operation and maintenance costs as per the Supplementary Green Book Guidance on Optimism Bias (HM Treasury, 2003) and TAG Unit A1.2 Scheme Costs (Department for Transport, May 2024).

OPTION	DO SOMETHING	DO MINIMUM	DIFFERENCE
Capital Cost (incurred prior to 2036)	£178 million	£13 million	£166 million
Operation and Maintenance Cost (incurred post 2035)	£35 million	£19 million	£16 million
Total Cost (1 March 2025 – 31 December 2095)	£213 million	£31 million	£182 million

Table 7-1: Present Value of Construction, Operation and Maintenance Costs (2010 Prices and Values)

Table Notes:

1. *Figures rounded to the nearest £1m*
2. *Figures may not sum due to rounding*

7.4 Accidents

7.4.1 The impact on accidents has been assessed for the project using default rates / costs from DMRB Volume 15 'Economic Assessment of Road Schemes in Scotland', Section 1 (The NESA Manual) in both the Do Something and the Do Minimum scenarios. NESA recommends that, where possible, accident rates derived from local data should be used: however, this data must be taken from periods '…when conditions on the road have been broadly unchanged'. The introduction of the Average Speed Camera system in October 2014 was intended to improve safety: conditions pre- and post-2014 have therefore not remained 'relatively unchanged', and so accidents from before October 2014 cannot be used in the calculation of local accident rates. Guidance states that for

local accident rates "Local data should normally cover the five years previous to the NESA assessment", and for local severity splits "Data covering all available accident history, with a minimum of five years must be supplied".

7.4.2 Although it is now more than five years since the introduction of Average Speed Cameras on the A9, the route has been subject to frequent traffic management and speed restrictions in the following years due to advance works contracts at various locations, the construction of the Luncarty to Birnam and Kincraig to Dalraddy phases of the A9 Dualling and the impact of travel restrictions imposed during the COVID-19 pandemic. It is therefore debatable whether conditions during the last decade could be considered 'relatively unchanged'. As such, default rates have been used. The proposed project has been compared to the Do-Minimum scenario.

ACCIDENT SEVERITY	ACCIDENTS SAVED PER YEAR (2036)	ACCIDENTS SAVED PER YEAR (2051)
FATAL	0.2	0.5
SERIOUS	0.7	0.5
SLIGHT	1.2	-1.3
ALL SEVERITIES	2.1	-0.3

Table 7-2: Impact of the Scheme on Safety during the Operational Period

7.4.3 Table 7-2 indicates that the average number of accidents forecast each year is anticipated to decrease by about two accidents per annum under the Do-Something in 2036, compared to the Do-Minimum Scenario. However, the difference in total accident numbers between the Do-Minimum and Do-Something is anticipated to be negligible by 2051.

7.4.4 The proposed scheme is expected to result in a reduction in the number of fatal and serious injury accidents with these categories reducing by about one accident per annum in both 2036 and 2051. This means that the project is anticipated to deliver both a reduction in accidents and accident severity in the opening year, but the benefit in the design year would only be a reduction in severity.

7.4.5 Overall, these benefits are expected to accrue due to the upgrade of 8.4 km of single carriageway, to dual carriageway, along with the provision of associated grade separation at Birnam, and Dalguise, a new roundabout at Dunkeld and a small number of left in/left out junctions and accesses, with the most notable being at The Hermitage.

7.5 Results

7.5.1 The anticipated cost of the scheme is included in Table 3-4 within Chapter 3 (Description of the Proposed Scheme) of this report. This is in then-year prices assuming scheme opening in 2032. The cost in Table 7-3 is in 2010 values and prices discounted to 2010 and assumes a scheme opening in late 2035, immediately prior to the first year of full programme operation (2036).

METRIC	VALUE
Present Value of Benefits (PVB)	£33 million
Present Value of Costs (PVC)	£182 million
Net Present Value (NPV)	-£149 million
Benefit Cost Ratio (BCR)	0.2

Table 7-3: Economic Performance (2010 values and prices discounted to 2010)

Table Notes:

1. *Figures rounded to the nearest £1m*

7.5.2 The benefits in Table 7-3 do not include several benefits that have only been calculated at the programme level. Full details of these were first presented in the Case for Investment (Transport Scotland, 2016). These include construction and maintenance benefits (£162 million for the corridor as a whole); Driver frustration benefits (£430 million for the corridor as a whole); benefits from a reduction in incident related delays (£21 million for the corridor as a whole); and Wider Economic Benefits (£210 million for the corridor as a whole). In total, the Case for Investment identified £823 million pounds of benefits for the corridor as whole that are not included in Table 7-3 for the Pass of Birnam to Tay Crossing project. All figures in the Case for Investment are expressed in 2010 values and prices discounted to 2010.

7.5.3 The figures presented in the Case for Investment have been updated in the latest Outline Business Case (OBC) (November 2023) prepared for Transport Scotland to reflect the impact of the lower traffic levels associated with the 'With Policy' forecast scenario presented in this report. Under the lower levels of traffic in the 'With Policy' forecast scenario, driver frustration benefits are estimated to be worth £228 million for the whole corridor, with Wider Economic Benefits being valued at £206 million for the whole corridor. These are again expressed in 2010 values discounted to 2010.

7.5.4 As such, the economic performance of the Pass of Birnam to Tay Crossing project is not fully reflected in Table 7-3 and the justification for the A9 Dualling Programme as whole, of which this project is one part, is presented in the Case for Investment and subsequent Outline Business Case. It is the Case for Investment and the subsequent Outline Business Case that provides the economic justification for taking forward the Pass of Birnam to Tay Crossing project.

7.6 Summary

7.6.1 This chapter reports an evaluation of the economic costs and benefits of the proposed Pass of Birnam to Tay Crossing project of the A9 Dualling Programme.

7.6.2 The economic appraisal program TUBA was used for the evaluation. This assesses the economic effects of changes to trips due to journey cost changes resulting from the introduction of a road scheme. Traffic data for input into TUBA was derived from the A9DTM:15 S-Paramics Model for the Pass of Birnam to Tay Crossing section.

7.6.3 Analysis of accidents was undertaken using a spreadsheet-based approach in line with the work undertaken in the Case for Investment and subsequent Outline Business Case, giving a projected overall reduction in accidents of approximately two accidents per year on this section of the A9. There is also a reduction in the severity of future accidents, with some accidents that would have resulted in fatal and serious injury accidents resulting in only slight injuries.

7.6.4 A summary of the PVB, PVC, NPV and BCR is presented in Table 7-3 and gives an overall BCR of 0.2.

7.6.5 The Pass of Birnam to Tay Crossing project forms part of the Scottish Government's commitment to upgrade the A9 to dual carriageway between Perth and Inverness. The total level of benefits from sections of the route / individual schemes will be less than the benefits for the whole route, i.e. the full A9 dualling. As such this assessment does not capture all the economic benefits that may arise because of progressing this project and the focus for economic justification for this scheme is presented in the Case for Investment and subsequent Outline Business Case.

7.6.6 The Case for Investment identifies £823 million pounds of benefits (in 2010 prices and values) for the corridor as whole, which are not included in Table 7-3 of economic performance for the Pass of Birnam to Tay Crossing project. It is the Case for Investment and subsequent Outline Business Case that provides the economic justification for taking forward the Pass of Birnam to Tay Crossing to project.

7.7 References

AECOM (April 2016). A9 Dualling Traffic Model 15 Model Development Report.

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