

Detailed Appraisal		Intervention D14: A9 Upgrading from Dunblane to Inverness						
Estimated total Public Sector Funding Requirement:		<i>Capital Costs/grant</i>			First Phase: £500m - £1bn Subsequent Phases: £1.5bn - £3bn			
		<i>Annual Revenue Support Present</i>			-			
		<i>Value of Cost to Gvt</i>			First Phase: £250m - £500m			
		<i>BCR/PVB</i>			First Phase: 0.75 - 1.25 / £250m - £500m			
Summary Impact on STAG Criteria	Environment Safety Economy Integration Accessibility and Social Inclusion	---	--	-	0	+	++	+++
(Judgement based on available information against a 7pt. scale.)								
Intervention Description:								
<p>The Government is committed to the dualling of the A9 between Dunblane and Inverness. This intervention considers the full dualling of the A9 between Dunblane and Inverness within the STPR period.</p> <p>This intervention supports the objectives to promote journey time reductions between Inverness and the Central Belt, improve the operational effectiveness of the A9, reduce the severity of accidents and address driver frustration.</p> <p>The first phase of this intervention would consist of :</p> <ul style="list-style-type: none"> Grade separation of all junctions on the A9 from Keir Roundabout to south of Broxden Roundabout; Dualling the A9 between Perth and Blair Atholl; Grade separation of Broxden Roundabout and Inveralmond Roundabout; and Implementation of climbing lanes, 2+1 sections and junction improvements between Blair Atholl and Inverness. <p>The subsequent phases of this intervention would consist of :</p> <ul style="list-style-type: none"> Dualling the A9 between Aviemore and Inverness; and Dualling the A9 between Blair Atholl and Aviemore. 								
Summary: Rationale for Selection								
<p>Many of the accidents on the A9 between Dunblane and Perth in recent years have occurred at the at-grade junctions. These accidents are often serious or fatal and removal of these would significantly reduce the accident rate and accident severity on this route.</p> <p>The grade separation of Broxden and Inveralmond Roundabouts would remove the congestion at these locations contributing to reduced journey times, improved journey time reliability and improved road safety.</p> <p>The A9 between Perth and Blair Atholl is the most heavily trafficked stretch of the A9 north of Perth. Dualling this section would have the most significant impact on reducing journey times and improving journey time reliability. This would also contribute to a consistent carriageway standard along this section of the A9.</p> <p>The introduction of climbing lanes is also expected to improve safety since evidence elsewhere suggests that the introduction of climbing lanes can result in a significant reduction in accidents, of up to 50 per cent, on single carriageway routes.</p>								

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Dualling the A9 between Blair Atholl and Inverness would further reduce journey times and improve journey time reliability between Perth and Inverness, as well as provide a consistent carriageway standard along the whole of A9 between Perth and Inverness. This is a lightly trafficked section of the A9 and is therefore considered in subsequent phases. Aviemore to Inverness is more heavily trafficked than Blair Atholl to Aviemore and would therefore take priority in future phases.

This intervention is expected to provide a significant contribution to the Government's Purpose of increasing sustainable economic growth. In addition to this, the national objectives of promoting journey time reductions between the Central Belt and Inverness and the reduction in accident rates are contributed to by this intervention. This intervention also addresses the corridor specific objectives of improving the operational effectiveness of the A9, on approaches to Perth, and addressing issues of driver frustration.

The environmental impacts this intervention has on several biodiversity sites and designated landscapes have been identified at the strategic level as part of the Strategic Environmental Assessment and Appropriate Assessment. Appropriate mitigation and avoidance measures have been identified and will be further refined should this intervention be taken forward.

Table D14.1.1 STPR Objectives

STPR Objectives	
<p><u>STPR Objective 9.1:</u> To address current and forecast rail overcrowding into Glasgow.</p> <p><u>STPR Objective 9.2:</u> To improve the efficiency and reliability of the operation of the southern sections of the M80 on approach to Glasgow, particularly for priority vehicles.</p> <p><u>STPR Objective 9.3:</u> To reduce the severity of accidents occurring to the national average.</p> <p><u>STPR Objective 6.3:</u> To address issues of driver frustration relating to inconsistent road standard, with attention to reducing accident severity.</p> <p><u>STPR Objective 9.4, 6.4, Perth 1:</u> To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres.</p> <p><u>STPR Objective 6.1:</u> To reduce journey time and increase opportunities to travel between Inverness and Perth (and hence onto the Central Belt).</p> <p><u>STPR Objective 6.2:</u> To improve the operational effectiveness of the A9 as it approaches Perth and Inverness.</p> <p><u>STPR Objective Perth.1:</u> To contribute to reducing the emissions per person kilometre.</p>	<p>9.1: Neutral - This intervention does not address this objective.</p> <p>9.2: Neutral - This intervention does not address this objective.</p> <p>9.3: Strongly Positive – Cross carriageway manoeuvres have been identified in a number of studies as contributing to safety issues on the section of A9 between Dunblane and Perth. The grade separation of key junctions on the A9 between Broxden and Keir roundabouts and the closure of all central reserve gaps would effectively remove conflicts, which would lead to a reduction in the number of severe accidents.</p> <p>Grade separation of Keir, Broxden and Inveralmond roundabouts would result in a reduction in accident numbers, by reducing incidents relating to shunting and overturning. Reducing the conflict between local and longer distance traffic would also contribute to reducing the potential for accidents at the at-grade roundabout junctions.</p> <p>6.3: Positive – Dualling more sections of the A9 and adding more 2+1 sections would improve the standard of parts of the route between Perth and Inverness. Accident severity rates would be improved as safer overtaking opportunities afforded by the improvements.</p> <p>9.4, 6.4, Perth 1: Strongly Positive – Grade separating Keir, Broxden and Inveralmond roundabouts would reduce the conflict between local traffic and strategic traffic, resulting in reduced journey times between the Central Belt and Aberdeen/Inverness. This journey time improvement would not allow commuters to achieve an effective working day when travelling between the Central Belt and Aberdeen/Inverness, however commuters from intermediate settlements could benefit from the improved journey time. Reduction in delays at each junction would contribute to economic benefits through improved connectivity for business between these centres. This intervention would provide significant reductions in journey times, including bus service journey times, and improved reliability on the A9 between Dunblane and Inverness, improving connectivity for business between Inverness and the Central Belt. The improvements between Dunblane and Perth would also provide significant benefits for business travel between Aberdeen and the Central Belt.</p> <p>6.1: Positive – Dualling of the A9 between Perth and Blair Atholl and further sections towards Inverness, would reduce journey times between Inverness and Perth by approximately 10-15 minutes. Removing delays caused by accidents would provide more reliable journey times along the dual sections.</p> <p>6.2: Positive – Construction of 2+1, dual sections and grade separation of Inveralmond Roundabout would provide significant journey time benefits, improving journey time reliability and would result in more efficient operation of the A9.</p> <p>Perth.1: Neutral – Grade separation of the Broxden and Inveralmond roundabouts would result in reduced levels of congestion on the A9, with a corresponding reduction in emissions at the local level. However, this reduction could be offset by a slight increase in traffic volume and higher speed on the dual carriageway, leading to increased emissions.</p>

Table D14.1.2 STAG Criteria

STAG Criteria		
Criteria:	Assessment Summary:	Supporting Information:
Environment:	Major Negative Impact	<p>The upgrading of the A9 between Perth, Blair Atholl and Inverness along with junction improvements have the potential for major adverse effects, particularly with respect to biodiversity, cultural heritage and landscape interests. The A9 crosses a number of internationally designated sites for nature conservation and, as identified in the Appropriate Assessment, there is the potential for major adverse effects in the absence of mitigation. A number of nationally important sites for cultural heritage importance, and their settings, especially Scheduled Monuments and A listed buildings, could be adversely affected by the dualling or road widening due to their proximity to the A9. However, the scale of effects is unclear until the exact location and design of the engineering works are known.</p> <p>There are nine Special Areas of Conservation, six Special Protection Areas, one Ramsar, ten SSSIs and one National Nature Reserve that are either crossed by or are in close proximity to the A9 and would be adversely affected by the intervention. Major adverse impacts on the landscape are also likely as the A9 currently cuts through the northwest of the Cairngorms National Park and National Scenic Area and the integrity of these sites would be affected by the upgrading. Several other National Scenic Areas are also within close proximity to the intervention, including Loch Tummel and the Rivers Tay, Tummel and Garry, which may be affected. As the dualling would also require construction works across major rivers, there could be potential detrimental effects on the water environment although it is expected that all works would be undertaken in accordance with environmental regulation with particular regard to the Controlled Activities Regulations (CAR) which would mitigate the potential effects.</p> <p>It was envisaged that there could be an improvement in local air quality, particularly around the Inveralmond and Broxden junctions, both of which lie within the Perth Air Quality Management Area (AQMA), however, the scale of effects is not expected to be substantial. Further moderate negative effects are envisaged for CO₂e emissions as increased traffic speeds could increase levels. Noise levels are expected to increase and this could adversely affect noise sensitive receptors within the vicinity of the A9.</p>
Safety:	Major Benefit	<p>Accident rates on the section of the A9 between Dunblane and Perth are lower than the national rate for a dual carriageway road; however, the severity of accidents is an issue on this route with a number of fatal accidents attributed to manoeuvres through gaps in the central reserve. The proposed grade separation of a number of junctions along the route and the closure of all central reserve gaps would effectively result in grade separation of the route which would give a significant reduction in the number of fatal accidents on this section. Studies confirm that the number of fatal accidents in recent years has been significantly greater than expected, with 19 fatal accidents on this section of the A9 from 2000-2004 against an expected nine, based on national rates for this road type. Based on accident data provided (1996-2005), the A9 between Stirling and Perth has the highest fatal accident rate of all dual carriageways on the trunk road network. Accident statistics suggest that the grade separation of the route between Keir and Broxden Roundabouts would save approximately two fatal accidents per year and bring the severity rate down to national levels.</p> <p>Grade separation of this route and the proposed grade separation of Broxden and Inveralmond roundabouts would also provide road users with a consistent standard of provision on the strategic network, as both the A90 and M9 at their northern and southern extents are grade separated routes.</p> <p>This intervention at Broxden and Inveralmond roundabouts would reduce the conflict between through trips and trips entering and leaving at the junctions. There have been approximately 40 accidents on the trunk road network at or near Broxden from 1996-2005, and approximately 30 accidents at or near Inveralmond during the same period. This equates to approximately 15 per cent of all accidents between Keir and Inveralmond occurring at or near the two junctions. The number of accidents at the junctions would reduce, due to overturning and shunt type accidents at the roundabouts being reduced.</p>

		<p>Different safety concerns have been identified on the northern section of the A9, between Perth and Inverness, where an increase in safer overtaking opportunities would result in a reduction in accident and severity rates on this route. National statistics indicate that there are 50 per cent less accidents on typical rural single carriageways that have a climbing lane. Although both accident and fatal accident rates on this section of the A9 are lower than the national rate for this road type, a number of accident clusters, including fatal accidents north of Dunkeld and south of Pitlochry, have been identified. A number of these clusters would be removed and the intervention could reduce the potential for similar clusters to form on these sections in the future.</p>
Economy:	Moderate Benefit	<p>Transport Economic Efficiency (TEE): The reduction in both the number of accidents and the number of severe accidents on the southern and northern sections would provide significant accident savings. Recent studies on the section of the A9 between Keir and Broxden roundabouts support this, with accident savings of up to £65m over 60 years.</p> <p>The grade separation of Keir, Broxden and Inveralmond roundabouts would result in journey time savings for trips on the A9 and M90 and also for trips using the A93 and A912 into Perth. Journey time reliability would also be improved due to reduced conflict and congestion at the junctions. Appraisal of the junction improvements at Broxden and Inveralmond indicates travel time savings of between £100m-£250m.</p> <p>The combined improvements of Phase 1 would provide benefits of between £250m and £500m, with a benefit cost ratio of 0.75-1.25, thus overall providing value for money.</p> <p>Wider Economic Benefits (WEBs): Significant improvements to journey time, reliability and quality would have a positive impact on the efficiency and productivity of businesses which use the route commercially between the Central Belt and Inverness/Aberdeen. Benefits will accrue from lower cost of travel for freight and business users, improved access to customers and suppliers, improvements to competitiveness by addressing issues of remoteness, improved business to business interaction and communication and widening of labour catchment areas.</p> <p>Economic Activity and Location Impacts (EALIs): Grade separation of Broxden and Inveralmond roundabouts would encourage growth in Perth and areas to the north and east which would benefit the local, regional and national economy. Improved access to Perth and areas to the north and east would result in more efficient movement of people and goods with improved productivity. Improvements to accessibility would assist in the development of tourism industries in the region and increase the attractiveness of the region to inward investors. Other sectors which are expected to benefit significantly include manufacturing, construction, retail and distribution industries which rely on the route for movement of goods as well as sectors such as life sciences for which the proposal will improve access to international travel links and assist in the recruitment of high skilled professionals. The impacts of upgrading the A9 are potentially significant for all sectors and settlements served by the route.</p>
Integration:	Minor Benefit/Minor Negative Impact	<p>Transport Integration: This intervention would not have an effect on transport integration.</p> <p>Transport and Land Use Integration: This intervention would not affect the need to travel. The provision of grade separation at Broxden and Inveralmond roundabouts and the reduced journey times would enhance development opportunities in west Perth and the north of Scotland in line with local, regional and national policies.</p> <p>Policy Integration: This intervention would not support the road traffic reduction aspirations as it would improve quality of travel through the strategic network which may promote the use of car.</p>
Accessibility and Social Inclusion:	Minor Benefit	<p>Community Accessibility: Although a number of rural dwellings between Dunblane and Perth will have to travel further due to closures in the central reserve, access to the A9 will be via safer, grade separated junctions.</p>

		Comparative Accessibility: This intervention would improve access to Perth and the north of Scotland from the Central Belt and further afield.
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Table D14.1.3 Key Strategic Outcomes

Key Strategic Outcomes (KSOs)		
Objective:	Assessment Summary:	Supporting Information:
Improve Journey Times and Connections:	Moderate Benefit	<p>This intervention would improve journey times and reliability for strategic trips between the Central Belt and Aberdeen/Inverness as grade separating the at-grade junctions at Keir, Broxden and Inveralmond would reduce the delays currently experienced by strategic trips conflicting with local trips.</p> <p>Previous work undertaken at Broxden Roundabout indicates that queuing levels, particularly at the M90 and A9 west arms could be at critical levels by year 2018. Reducing the conflict between the main strategic movements and local trips could provide a combined saving for both junctions of approximately 5-10 minutes in total during peak periods.</p> <p>Increase in dual carriageway provisions and 2+1 sections would result in increased average speeds on the A9, thus reducing journey times. Connections between the Highlands and Central Scotland would also be improved by the increased road standard provided. Journey times between Perth and Inverness are expected to decrease by approximately 10-15 minutes.</p>
Reduce Emissions:	Neutral/Minor Benefit	<p>As a reduction in congestion is forecast through junction improvements, it is envisaged that there could be an improvement in local air quality, particularly around the Inveralmond and Broxden roundabouts, both of which lie within the Perth Air Quality Management Area. While the proposed dualling would reduce congestion in some locations along the route, especially around Calvine, which could lead to a minor improvement in local air quality, an increase in the volume and speed of vehicles could give rise to an increase in CO₂e emissions. The scale of effect is not expected to be substantial.</p>
Improve Quality, Accessibility and Affordability:	Moderate Benefit	<p>This intervention has the potential to improve the quality of journey between the Central Belt and Aberdeen/Inverness by reducing congestion and allowing a smoother journey with less stop-start conditions. Delays at junctions can lead to driver stress, therefore by removing such delays at Keir, Broxden and Inveralmond, the quality of travel would improve for both strategic trips travelling through and local trips accessing Perth, including local and long distance journeys made by bus. Keir Roundabout is the first at-grade junction on the principal route between the national border and the north/northeast of Scotland.</p> <p>Severance issues relating to accessibility to certain rural dwellings along the A9 between Keir and Broxden may be impacted by the closure of gaps in the central reserve. However, grade separation of the route would provide road users with an improved quality of journey as the route would be consistent with the grade separated trunk roads at either end of the route. Improvements to road standard between Perth and Inverness would improve the quality of travel throughout the corridor, particularly for strategic trips. This intervention is not expected to impact on affordability.</p>

Table D14.1.4 Scottish Government's Strategic Objectives

Scottish Government's Strategic Objectives		
Objective:	Assessment Summary:	Supporting Information:
Safer and Stronger:	Moderate Benefit	<p>Junction improvements and removal of cross carriageway manoeuvres between Keir and Broxden would reduce the potential for severe accidents. Accident clusters at Balhaldie, Auchterarder, Dalreoch and Upper Cairnie on the southern section and clusters north and south of Calvine, at Pitlochry and Dunkeld would be removed due to the proposed work. This intervention would not have an effect on the quality, accessibility and affordability of public transport. It would reduce the potential number of accidents at the at-grade roundabouts along the route. Grade separation of the junctions would effectively extend the recently completed grade separated route between Dundee and Perth. This would contribute towards a level of consistency along this strategic link between the Central Belt and the north of Scotland, thus potentially reducing safety issues on the route.</p> <p>The provision of a dual carriageway and 2+1 sections would result in a reduction in road accident rates. Severity rates would also be reduced at the sections which are improved from single carriageway to dual or 2+1.</p>
Smarter:	Minor Benefit	This intervention would improve access to education facilities in areas between Dunblane and Inverness, as well as improving access to educational facilities in the Central Belt from the Highlands.
Wealthier and Fairer:	Moderate Benefit	This intervention would improve journey times and journey reliability, improving opportunities in employment, business, leisure and tourism. Transfer of goods via road between the Central Belt and the north and north east of Scotland would be improved as delays at the at-grade junctions are effectively removed and carriageway provision is increased. Reduced delays at Keir, Broxden and Inveralmond would improve travel for both strategic and local commuters and business users in the area.
Greener:	Neutral/Minor Benefit	This intervention could have a possible minor benefit on local air quality. However, this intervention would not significantly promote the use of public transport.
Healthier:	Neutral	This intervention of works would not have any significant impact on promoting healthier forms of transport or access to health services.

Table D14.1.5 Implementability Appraisal

Implementability Appraisal	
Technical:	<p>This intervention on the southern section of the route between Dunblane and Perth would be straightforward from a technical point of view, with no new technologies involved. Significant engineering works would be required at Broxden junction, and at Inveralmond the urban nature of the surroundings could constrain design solutions.</p> <p>There are a number of technical risks associated with this intervention in the section between Perth to Inverness, due to the number of environmentally important sites within close proximity to the proposed improvements. The design would need to include measures to ensure construction limits any potential impact on these sites.</p>
Operational:	<p>The responsibility for operational issues on the proposed measures in this intervention would remain with Transport Scotland and its maintenance contractors.</p>
Public:	<p>This is a high profile intervention, with significant public interest at both local and national levels. There could be a high degree of protests and objections from environmental groups due to the potential impact on scenic areas. Due to the closure of priority junctions between Dunblane and Perth, that would result in lack of direct access to the A9, a degree of local public opposition is a potential issue. It is possible that inhabitants of rural dwellings, which will have reduced access to their properties, may have negative feelings towards the intervention.</p> <p>A considerable degree of disruption to local trips during construction is anticipated, however in general the intervention is considered to be accepted by the public as it would improve journey times and safety and decrease the delay caused by congestion at junctions.</p>