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A9 / A96 Connections Study

Transport Appraisal Report

February 2016

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Contents

1 Introduction

1.1 Relevant Background

The Strategic Transport Projects Review (STPR) was published in 2008 following an extensive review of both current and potential future issues with Scotland's transport infrastructure. The STPR set the Scottish Government's transport investment priorities to 2032.

The STPR reviewed both existing and forecast network performance and identified gaps and shortfalls in terms of performance, provision and meeting national objectives. A wide range of possible transport solutions were measured against the priorities defined in the National Transport Strategy. Across Scotland, a total of 29 major packages of work were identified as best serving the needs of Scotland and its regions. One of these recommendations, Intervention 18, was to Upgrade the A96 to Dual Carriageway between Inverness and Nairn, for which the STPR stated:

"***18 – Upgrade A96 to Dual Carriageway between Inverness and Nairn***

This intervention supports the objectives to reduce the accident rate and severity rate on this route and improve connectivity between Inverness and communities to the east. It would include providing a new dual carriageway on the A96 corridor between Inverness and Nairn, giving improved access to Inverness Airport and the future growth areas in the A96 corridor.

A new link connecting the A96 and the A9 (south of Inverness) would provide relief for Raigmore Interchange."

In addition, the objectives set within the STPR for the A9 corridor included:

"Improve the operational effectiveness of the A9 as it approaches Perth and Inverness"

In 2010 Transport Scotland commissioned Jacobs to undertake the A9/A96 Inshes to Nairn Design Manual for Roads and Bridges (DMRB) Stage 2 Study. The A9/A96 Inshes to Nairn study, inter alia, considered the options for a new link connecting Smithton on the A96 with Inshes on the A9. Following this initial work, in February 2012, Transport Scotland and The Highland Council (THC) undertook a joint exhibition on the emerging Local Development Plan proposals and options for a dual carriageway trunk link road between the A9 at Inshes and the A96 at Smithton. The exhibition highlighted a range of issues raised by the public on the scale of the proposals and the severance, accessibility and integration impacts of the scheme. In addition, further traffic modelling work carried out both before and after the public exhibitions has highlighted the degree of inter-dependency between Inshes, Raigmore, Longman and Smithton junctions, and the adjacent local road networks.

In December 2011, the Scottish Government published its Infrastructure Investment Plan (IIP), which contains a commitment to dualling the A96 between Inverness and Aberdeen by 2030 as part of a commitment to complete the dual carriageway network between all Scottish cities by 2030. This is supported by the Scottish Government's 'Scotland's Cities: Delivering for Scotland' which focused on developing and promoting economic growth through the key assets of Scotland's

cities and their regions including the improvement of inter/urban connectivity and reduced journey time between cities.

In view of the feedback from that process, together with the Scottish Government's commitment to upgrade the A96 between Inverness and Aberdeen, Transport Scotland commissioned Jacobs to carry out the development of alternative road based options to the original A9-A96 East Trunk Road Link under the A9/A96 Connections Study which is being undertaken following Scottish Transport Appraisal Guidance (STAG) principles.

The Connections Study has included working extensively with THC and their consultants during the study in relation to the development of the council's development plan and local road proposals, study options and revisions to the council's Moray Firth Transport Model to reflect alternative growth forecasts based on the likely phasing of elements of the Local Development Plan.

In light of this, and to provide confidence to both Transport Scotland and other stakeholders that the most appropriate intervention is identified for the A9/A96 connection, a review of the existing and future year problems, opportunities, issues and constraints has been undertaken. This review has allowed a set of transport planning objectives to be developed and agreed; and from these a range of options developed.

The performance of the options was assessed against the transport planning objectives and the STAG criteria, and Appraisal Summary Tables (ASTs) produced.

Four options were then taken forward to detailed appraisal, with the four options representing specific combinations of the individual options.

Appraisal Summary Tables were prepared to identify the options that best met the transport planning objectives and the STAG criteria. The results of the appraisal process were presented during the public exhibitions held in May and June 2014.

2 Option Development

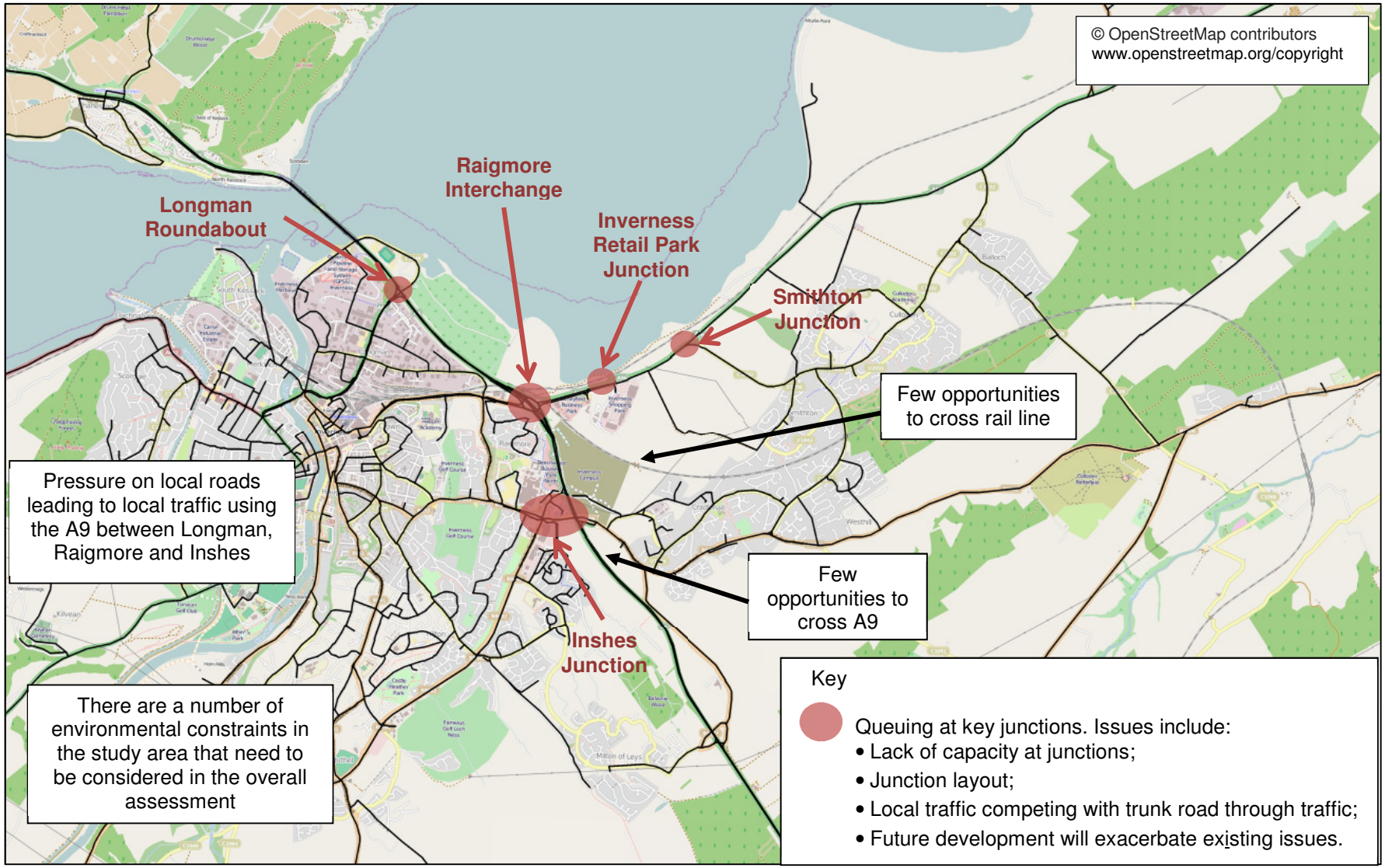
2.1 Problem Identification

The Problems and Objectives report (July 2013) identifies and describes the problems observed on the strategic road network around Inverness using various observed data sources including; Junction Turning Counts (JTC), Automatic Traffic Counts (ATC), journey time data, Bluetooth survey data and queue length surveys. Data was also extracted from The Highland Council's Moray Firth Transport Model (MFTM) to analyse the potential future problems.

The report highlighted key issues affecting the strategic road network and trunk road junctions within the study area. Since the Problems and Objectives report was completed, Longman Junction has been signalised, and the segregated left turns from the A9 to the A82 and the A82 to the Kessock Bridge have been removed. New survey data has been recorded and some of the issues at the junction have changed, however the overall nature of the problems remains the same. The key issues are listed below and presented in Figure 2-1:

- The largest traffic movements at Raigmore Interchange are between the north and the east in the evening peak. There were delays observed on the A9 southbound diverge slips at the traffic signals during the evening peak with similar level of delays at the B865 approach.
- Signalisation of Longman roundabout has reduced the queues in both the AM and PM Peak periods improving the capacity of the junction, however, the planned development to the east of Inverness will increase traffic flows travelling into Inverness and increase the pressure on Longman Roundabout.
- Inshes Roundabout is a six-arm roundabout with insufficient capacity and competing traffic movements with a mixture of local and through traffic. The junction layout together with the signals on the approach arms can be a source of delay.
- There are limited opportunities to cross the A9 Corridor which results in east to west movements crossing the A9 having to use Raigmore Interchange and the B9006 overbridge.
- Although the A96 is currently operating within capacity, the planned development to the east of Inverness will increase the traffic flows on the route, increasing the pressure on the junctions accessing the A96 and Raigmore Interchange. The future developments will increase the pressure on Smithton Roundabout and Barn Church Road which may lead to capacity issues and queuing. This will make it difficult for traffic from future and existing developments to join the A96 from the side road network, whilst increasing the conflict between strategic and local traffic.

Figure 2-1 - Key issues on the strategic road network



These problems were used to inform the process of defining the specific objectives for the scheme, which are summarised in section 2.3.

2.2 Future Opportunities

Addressing the problems in the area should provide a number of opportunities to improve public transport and active travel links, particularly between the development area to the east of Inverness and Inverness City Centre. Improving the operation of Longman Junction via grade separation, will make the junction safer for active travel users and pedestrians. Grade separation will remove the A9 through traffic making it easier for pedestrians to cross the A9. The reliability of public transport will also be improved as the operations of both Raigmore and Longman Junctions will be improved. The options considering a new link road between Culloden Road and Smithton junction provide opportunities to facilitate public transport access and active travel links to the development areas to the east of Inverness.

2.3 Transport Planning Objectives

Following the identification and definition of the problems and opportunities affecting the trunk road network within the study area, transport planning objectives were developed. To establish these objectives, a review of the STPR objectives relevant to the study area was undertaken. The problems identified within the study area were 'mapped' to the relevant STPR objectives in order to determine how closely the STPR objectives related to the study area problems. As a result of this mapping process the STPR objectives were refined to be more specific to the study area in order to develop interventions that would meet the objectives and carry out the appraisal.

The Problems and Objectives report (July 2013) identified the following issues:

- **Longman Roundabout**
  - Problem 1A – Conflicting dominant movements:
    - From A9 (north) with A82 to A9 (south) – AM and PM peak; and
    - From A9 (south) to A9 (north) with A82 to A9 (south) and A9 (north) to A82 – PM peak.
  - Problem 1B – Insufficient capacity.

- **Raigmore Interchange**
  - Problem 2 – Convergent dominant movements:
    - From A9 (north) to A96; and
    - From B865 Millburn Road to A96.

- **Inches Roundabout**
  - Problem 3A – Competing movements – through versus local access: and
  - Problem 3B – six-arm layout insufficient capacity.

- **Inches Junction**
  - Problem 4 – Layout and Signalisation issues.

- **Wider Problems**
  - Problem 5A – Capacity pressures on natural local route via Harbour Road / Old Perth Road routing via A9 from Longman to exit at Inches:;

- Problem 5B – Limited cross-corridor opportunities; and
- Problem 5C – Capacity pressures at junctions on A96 approach to Raigmore in 2031.

The following STPR Objectives were mapped to the identified problems to establish the degree of relationship, and the mapping process is illustrated in Table 2.1:

- To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness;
- To reduce the conflict between longer distance and local traffic;
- To improve connectivity, particularly by public transport, between Inverness city centre and the growth area to the east including Inverness Airport;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To improve the operational effectiveness of the A9 as it approaches Inverness.

The STPR objectives are by their nature strategic objectives and relate to the identified problems to a degree. For this study the STPR objectives have been refined based on the evidence from the analysis of the existing and future problems that are specific to the local study area. The following local objectives were established:

- L1 - To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness;
- L2.1 - To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of trunk road junctions;
- L2.2 - Reduce conflicts for longer distance and local traffic for planned development areas to the east;
- L3 - To improve connectivity, particularly by public transport and active travel between Inverness city centre and the growth area to the east including Inverness Airport;
- L4 - To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions;
- L5.1 - To improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout; and
- L5.2 - To improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network.

The specific local objectives are also shown in Table 2-1 to map the refinement from the STPR objectives, and the relationship of the specific objectives to the identified problems.

A number of possible interventions that had the potential to meet the transport planning objectives and address the problems are also included in Table 2.1. These possible interventions were developed further and are described in more detail in Section 3.

Table 2-1 Objective Mapping

Problems	STPR Objectives					Specific Local Objectives						
	1	2	3	4	5	1	2.1	2.2	3	4	5.1	5.2
	To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	To reduce the conflict between longer distance and local traffic.	To improve connectivity, particularly by public transport, between Inverness city centre and the growth area to the east including Inverness Airport.	To promote continuing reduction in accident rates and severity rates across the strategic transport network.	To improve the operational effectiveness of the A9 as it approaches Inverness.	To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of Trunk road junctions.	Reduce conflicts for longer distance and local traffic for planned development areas to the East.	To improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport.	To improve the safety for motorised and non-motorised users by reducing the accident rate at Trunk road junctions.	To improve the operational performance of the Trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inches and the Smithton Roundabout.	Improve the operational performance of the secondary network and junctions where this may improve the operation of the Trunk road network.
1A: Dominant movements delayed by conflicting traffic streams at Longman Roundabout.												
1B: Insufficient capacity at Longman Roundabout.												
2A: Convergent dominant movements from: A9 N to A96 and Millburn Rd to A96 at Raigmore Interchange.												
2B: Cluster of slight injury accidents around the gyratory at Raigmore Interchange.												
3A: Competing movements: through traffic versus local access at Inshes Roundabout.												
3B: Six-arm layout: insufficient capacity at Inshes Roundabout.												
4: Layout and Signalisation issues at Inshes junction.												
5A: Capacity pressures on natural local route via Harbour Road / Old Perth Road, routing via A9 from Longman to exit at Inshes.												
5B: Limited cross-corridor opportunities (Effectively limited to B865 / A96 or B9006).												
5C: Capacity pressures forecast at junctions on A96 approach to Raigmore Interchange in 2031.												

2.4 Do Minimum and Reference Case

Transport Scotland and THC recognised that the development aspirations in the current Highland Wide Local Development Plan, and the subsequent Inner Moray Firth Local Development Plan would generate significant growth in the demand for travel in future years.

In recent years the changes in the economy has affected the Highland area in the same way as the rest of the UK, with house building and the employment market slowing, however the population of Inverness has continued to grow. As a result, the development forecasts previously set out by THC are not likely to be fully realised over the same timescale, particularly in zones that have been designated as large areas of employment. The renewable industry has however continued to grow, with jobs being created on the Cromarty Firth, around Nigg and to a lesser extent in Ardesier.

In response to this, three revised planning scenarios that better reflect forecasts following the economic downturn were developed to reflect the emerging Housing Needs and Demand Assessment (HNDA) being undertaken by THC. The three scenarios will allow the options to be tested with varying levels of growth and will give an understanding of how the network will operate under each growth scenario. This will help to identify areas of the network that may need to be modified to cope with the increase in demand.

THC's Planning Data for Low, Mid and High alternative scenario development note (May 2013) contains further details of each growth scenario and is provided in Appendix A. The basis of each of the planning scenarios is contained in the following sub-sections.

2.4.1 Low Demand Scenario

The low demand scenario assumes the same annual level of house build-out rate in the period between 2011 and 2016 as has been observed during the period 2009-2013. The build-out rate is expected to increase between 2016 and 2021 to take account of growth associated with the University of Highlands and Islands (UHI) Campus and the renewables industry in Nigg. Post 2021, there is a gradual decline in house build-out rates reflecting the general trend reported in the Highland Council HNDA.

In each scenario the growth in employment associated with the renewables industry at Nigg, the Port at Invergordon and the UHI campus have been accounted for. Over the next 20 years, the low growth scenario assumes an increase in jobs at Nigg, Invergordon and the UHI campus. For assessment purposes, it is also assumed that there is marginal growth in employment at most of the existing industrial, commercial and business sites in the area over the same period. Table 2-2 and Table 2-3 below details the Low Demand Scenario figures for the Inner Moray Firth model area.

Table 2-2 – Number of new houses in each scenario between 2011-2031 and 2011-2036 – Low Demand Scenario

Summary of the Number of New Houses							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Low	3,366	4,212	3,503	3,137	2,413	14,218	16,631

Table 2-3 – Number of new jobs in each scenario between 2011-2031 and 2011-2036 – Low Demand Scenario

Summary of the Number of New Jobs							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Low	2,219	2,290	1,535	1,605	1,380	7,649	9,029

2.4.2 Mid Demand Scenario

The mid demand scenario assumes a modest increase in house building between 2011 and 2016, and then significantly higher levels between 2016 and 2031, with a decline in house building between 2031 and 2036. The new houses are allocated first to active sites and then to those with planning permission and developer interest. Active sites are those that are currently being developed, or currently have the same land-use as future development allocations.

In addition, further employment growth is assumed to be centred on existing industrial, commercial and business sites in the area. Employment at the Invergordon and UHI campus has been assumed to remain at the same level as the low growth scenario, however employment at Nigg is expected to increase further. Table 2-4 and Table 2-5 below details the Mid Demand Scenario figures for the Inner Moray Firth model area.

Table 2-4 – Number of new houses in each scenario between 2011-2031 and 2011-2036 – Mid Demand Scenario

Summary of the Number of New Houses							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Mid	3,416	5,055	5,110	4,447	2,457	18,028	20,485

Table 2-5 – Number of new jobs in each scenario between 2011-2031 and 2011-2036 – Mid Demand Scenario

Summary of the Number of New Jobs							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Mid	2,745	3,066	2,441	2,428	1,426	10,678	12,104

2.4.3 High Demand Scenario

The high demand scenario is based on the high migration scenario in the HNDA, modified to include an increase in employment and housing associated with the renewables industry in Nigg and a corresponding decrease at the development sites along the A96. This decrease has been included to balance the overall employment and housing in the Highland Wide Plan.

The employment at Invergordon and the UHI remains the same as the low growth scenario. Employment at Nigg is assumed to increase compared to the Mid Demand Scenario. There are also additional employment opportunities allocated to existing industrial, commercial and business sites in the area as well as expansion areas such as the Airport Business Park. Table 2-6 and Table 2-7 below details the High Demand Scenario figures for the Inner Moray Firth model area.

Table 2-6 – Number of new houses in each scenario between 2011-2031 and 2011-2036 – High Demand Scenario

Summary of the Number of New Houses							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
High	4,003	6,439	5,739	4,809	2,272	20,990	23,262

Table 2-7 – Number of new jobs in each scenario between 2011-2031 and 2011-2036 – High Demand Scenario

Summary of the Number of New Jobs							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
High	3,005	4,090	2,920	2,648	1,935	12,661	14,596

2.4.4 New Housing and Jobs Summary

Table 2-8 and Table 2-9Table 2-7 below summarise the overall figures for the Inner Moray Firth model area

Table 2-8 – Number of new houses in each scenario between 2011-2031 and 2011-2036

Summary of the Number of New Houses in each Scenario							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Low	3,366	4,212	3,503	3,137	2,413	14,218	16,631
Mid	3,416	5,055	5,110	4,447	2,457	18,028	20,485
High	4,003	6,439	5,739	4,809	2,272	20,990	23,262

Table 2-9 – Number of new jobs in each scenario between 2011-2031 and 2011-2036

Summary of the Number of New Jobs in each Scenario							
Scenario	**11 to 16**	**16 to 21**	**21 to 26**	**26 to 31**	**31 to 36**	**total 2011 to 2031**	**total 2011 to 2036**
Low	2,219	2,290	1,535	1,605	1,380	7,649	9,029
Mid	2,745	3,066	2,441	2,428	1,426	10,678	12,104
High	3,005	4,090	2,920	2,648	1,935	12,661	14,596

2.4.5 Transport Modelling - Do Minimum Option

The Moray Firth Transport Model (MFTM) was used for the study assessment as the traffic modelling and economic appraisal tool. The MFTM is a 4 Stage multi-modal model, including highway, bus and rail public transport networks and was developed using the VISUM software. The model coverage includes Inverness and the A96 corridor, covers all major commuting catchments to the city and strategic movements from the rest of Scotland. In terms of geographical and network coverage the model extends north to Tain, south to Dalwhinnie, east to Granton on Spey and west of Garve.

The Base model was calibrated to a base year of 2009, with forecast years available for 2016 and 2031, and represents the following time periods:

- morning peak, 08:00 - 09:00; and
- evening peak, 17:00 -18:00.

THC provided Jacobs with the MFTM Do Minimum scenario models that included network improvements around Inverness at:

- Dalcross Station – the train station serves Inverness Airport and also provides a park-and-ride facility for commuters to Inverness together with a new circular bus service linking Dalcross rail station and Inverness Airport;
- New Inverness to Nairn rail service;
- Dualling of A96 between Inverness Shopping Park and Smithton Roundabout together with upgrading Barn Church Road to two lanes approximately 1km from Smithton Roundabout;
- Inshes Junction Improvements – proposed by THC, modifications of the existing 6 arms roundabout layout to 4 arms signalised junction including left turn bypass lanes. The new Police Headquarters access directly onto Sir Walter Scott Drive and the provision of a new signalised access junction to Inshes Retail Park from Culloden Road;
- Culloden Road – modification of A9 southbound slip/Culloden Road junction to accommodate an access road to new Beechwood campus;
- Old Perth Road – modernisation of Old Perth Road/Culcabock Road corridor;
- Longman Roundabout – signalisation of three main approaches (A9 south, A9 north and A82), priority approach at the Stadium Road only for heavy goods vehicles and public transport, and segregated left turn only lane between Stadium Road and A9 south for all traffic users; and
- West Link – new local distributer single carriageway between Holm Roundabout and A82 at General Booth Road.

3 Option Generation

A series of road based options were developed to address the problems identified in Section 2.1 and the objectives outlined in Section 2.2, with input from Transport Scotland and THC. The options developed are described below in the following paragraphs.

3.1 Longman Improvements

The existing Longman Roundabout lacks sufficient capacity and a number of modifications to the current roundabout layout have been made in order to optimise the performance of the junction. The signalisation of the junction in February 2013 has improved the overall operation of the junction, reducing the queue length on the A9 approaches to a maximum of 600m. Although this is a significant improvement, the queue length is still extensive. Planned developments to the east of Inverness, combined with general traffic growth, will increase traffic levels in the area, increasing the pressure on the junction.

One of the key issues at Longman Roundabout are the conflicting traffic movements, which are the dominant traffic flows passing through the junction. Further improvements to or modest enlargement of the existing at-grade arrangement would not provide sufficient increased capacity to cater for future demand as the conflict between the major traffic movements would still remain. Full grade separation of the junction will increase capacity, reduce the conflict between the dominant traffic movements and remove the A9 through traffic from passing through the junction.

Alleviating the congestion at Longman Roundabout will improve journey times for public transport. Grade separating Longman Roundabout will also improve safety and crossing opportunities for pedestrian and cyclists alike, encouraging active travel.

Four grade separated layout options were developed for consideration:

1. **Longman Option 1** (drawing B1557601/CST/002) - A two-bridge roundabout grade separated junction. The existing roundabout would be enlarged to an oval shape at existing ground level with approaches from the A82 and Stadium Road altered. Slip roads would be constructed to the side of the existing A9 dual carriageway and the A9 raised on embankment over the new roundabout as shown in Figure 3-1.

2. **Longman Option 2** (drawing B1557601/CST/003) - A free flow grade separated junction connection between the A9 and the A82 only (with no connection to Stadium Road). The A9 dual carriageway would remain at existing ground level through the junction and an overbridge would carry the A82 over the A9 for traffic to or from the A9 southbound carriageway.

   The southbound merge and diverge slip roads would form a loop to eliminate the key traffic conflict (A9 southbound to A82 westbound and A82 eastbound to A9 southbound) as shown in Figure 3-2.

3. **Longman Option 3** (drawing B1557601/CST/004) - A grade separated junction arrangement with full traffic movements between the A9, A82 and

Stadium Road. The A9 dual carriageway would remain at existing ground level through the junction and an overbridge would form a direct connection between the A82 and Stadium Road. Turning movements at the junctions with the A9 slip roads would be controlled by traffic signals. The southbound merge and diverge slip roads would form a loop to eliminate the key traffic conflict (A9 southbound to A82 westbound and A82 eastbound to A9 southbound) as shown in Figure 3-3.

4. **Longman Option 4** (drawing B1557601/CST/005) - A grade separated junction arrangement with dumbbell roundabouts. The southbound merge and diverge slip roads would form a loop to eliminate the key traffic conflict (A9 southbound to A82 westbound and A82 eastbound to A9 southbound).

For each of the options the A9 between Raigmore Junction and Longman Junction would be widened to three lanes in each direction providing a lane gain / lane drop arrangement between the ends of the slip roads as shown in Figure 3-4. Note that these interventions are options at this stage and will be subject to further refinement as the appraisal and design process progresses.

Figure 3-1 - Longman Option 1

Figure 3-2 - Longman Option 2

Figure 3-3 - Longman Option 3

Figure 3-4 - Longman Option 4

3.2 Link Road between Stevenson Road and Culloden Road

In order to address the problem of limited opportunities to cross the A9 Corridor, the road network in the study area was examined to identify possible options for providing an additional link road across the A9. A potential new link between Stevenson Road and the B9006 Culloden Road has been identified. This would provide an alternative route for local traffic travelling via Sir Walter Scott Drive to cross the A9 and access Culloden and Smithton, and avoid the currently congested Inshes Roundabout and Inshes overbridge. The additional crossing of the A9 will also increase crossing opportunities for pedestrian and cyclists alike, encouraging active travel.

Three variations of this option were identified:

1. **Stevenson Road to Culloden Road Link Option 1** (drawing B1557601/CST/006) - A single carriageway local distributor road which connects to the eastern leg of an existing roundabout on Stevenson Road to the south of Inshes and runs east and north east, crossing the A9 dual carriageway on an overbridge to a junction with Culloden Road where the B9177 currently connects with Culloden Road as shown in Figure 3-5.

2. **Stevenson Road to Culloden Road Link Option 2** (drawing B1557601/CST/007) - A single carriageway road with slip road connections to the A9 providing an A9 northbound diverge slip road and an A9 southbound merge slip road as shown in Figure 3-6.

3. **Stevenson Road to Culloden Road Link Option 3** (drawing B1557601/CST/008) - A single carriageway road with slip road connections to the A9 providing all slip road movements between the A9 and the new side road connection as shown in Figure 3-7.

Note that these interventions are options at this stage and will be subject to further refinement as the appraisal and design process progresses.

Figure 3-5 - Stevenson Road to Culloden Road Link Option 1

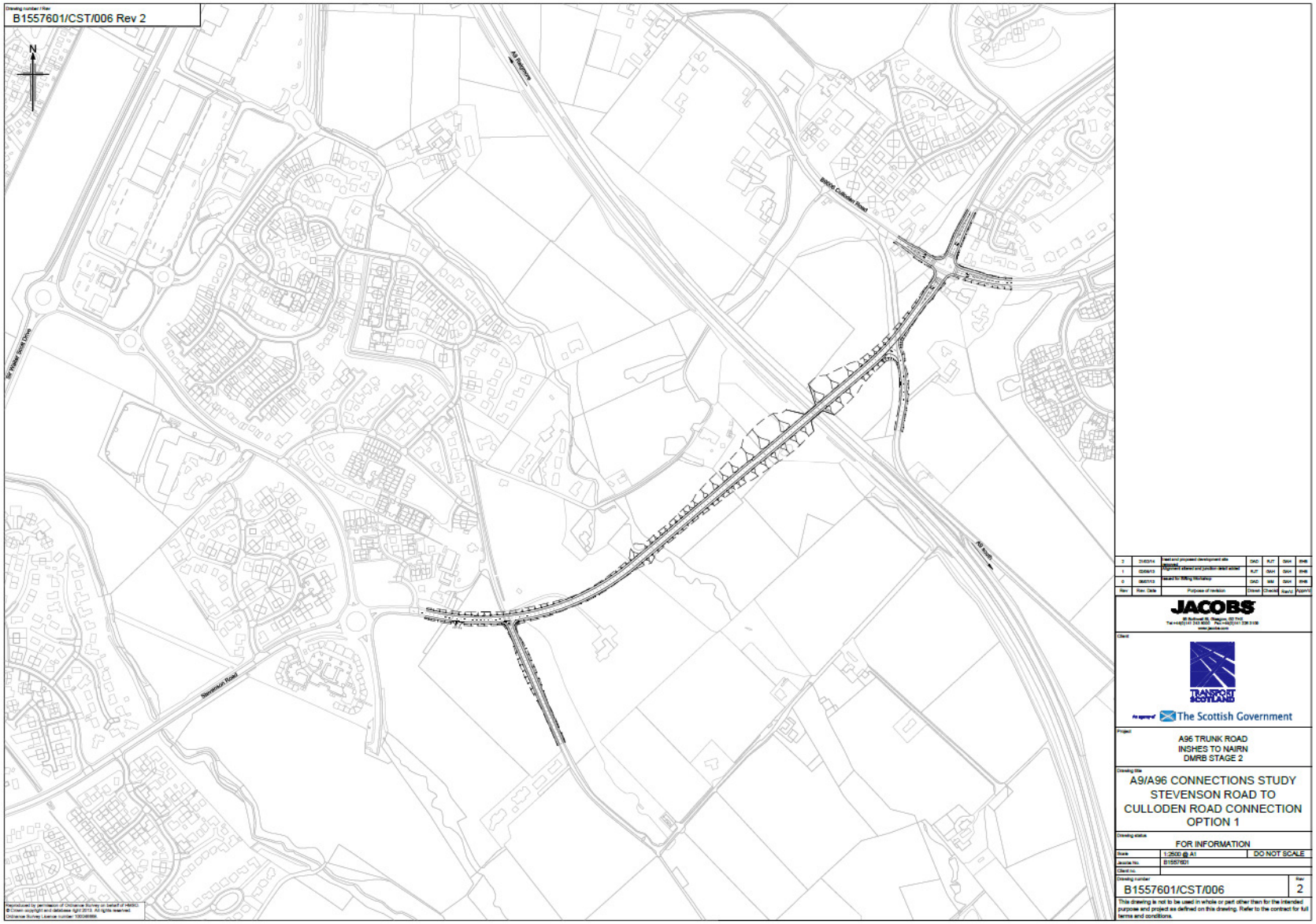


Figure 3-6 - Stevenson Road to Culloden Road Link Option 2

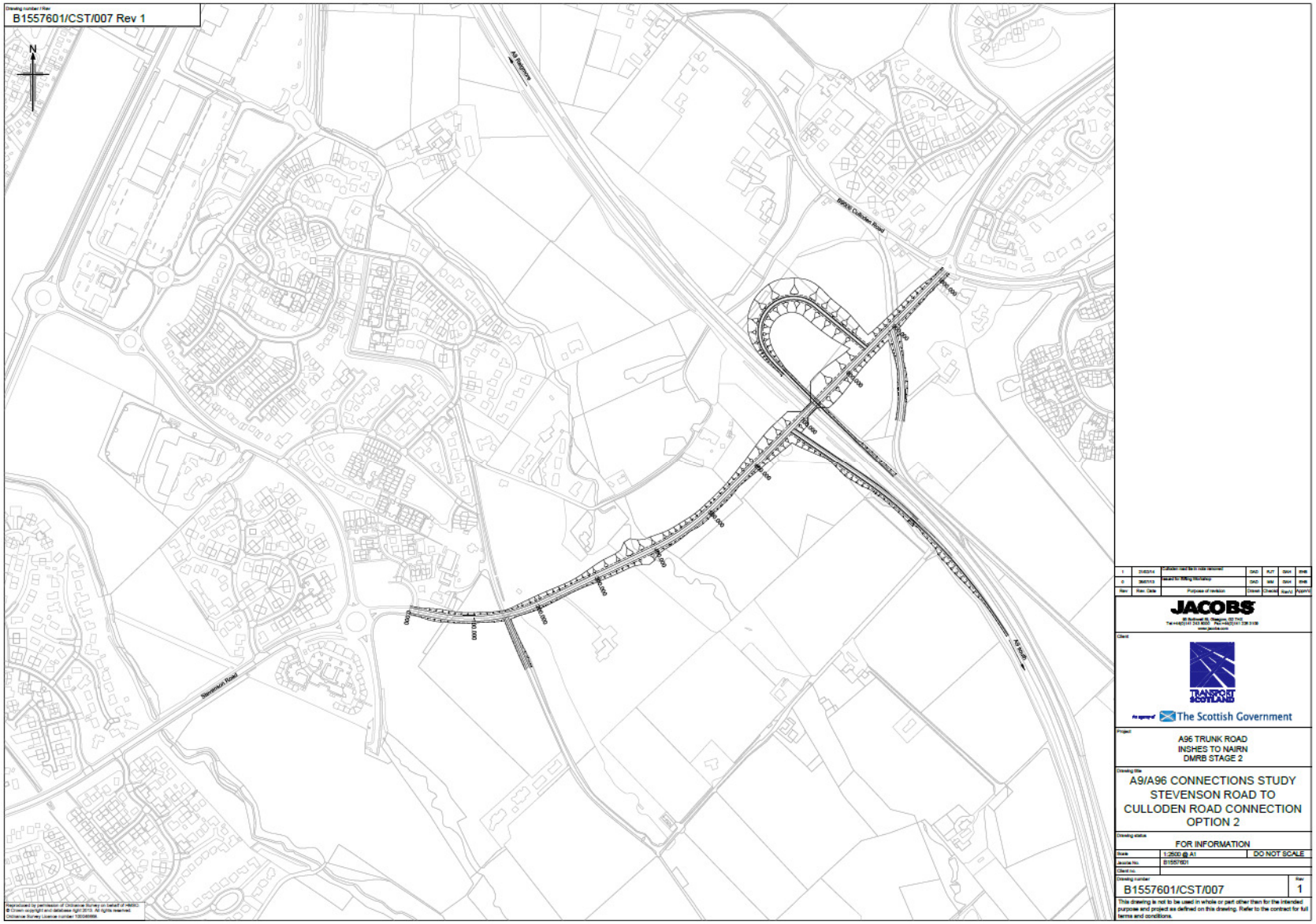
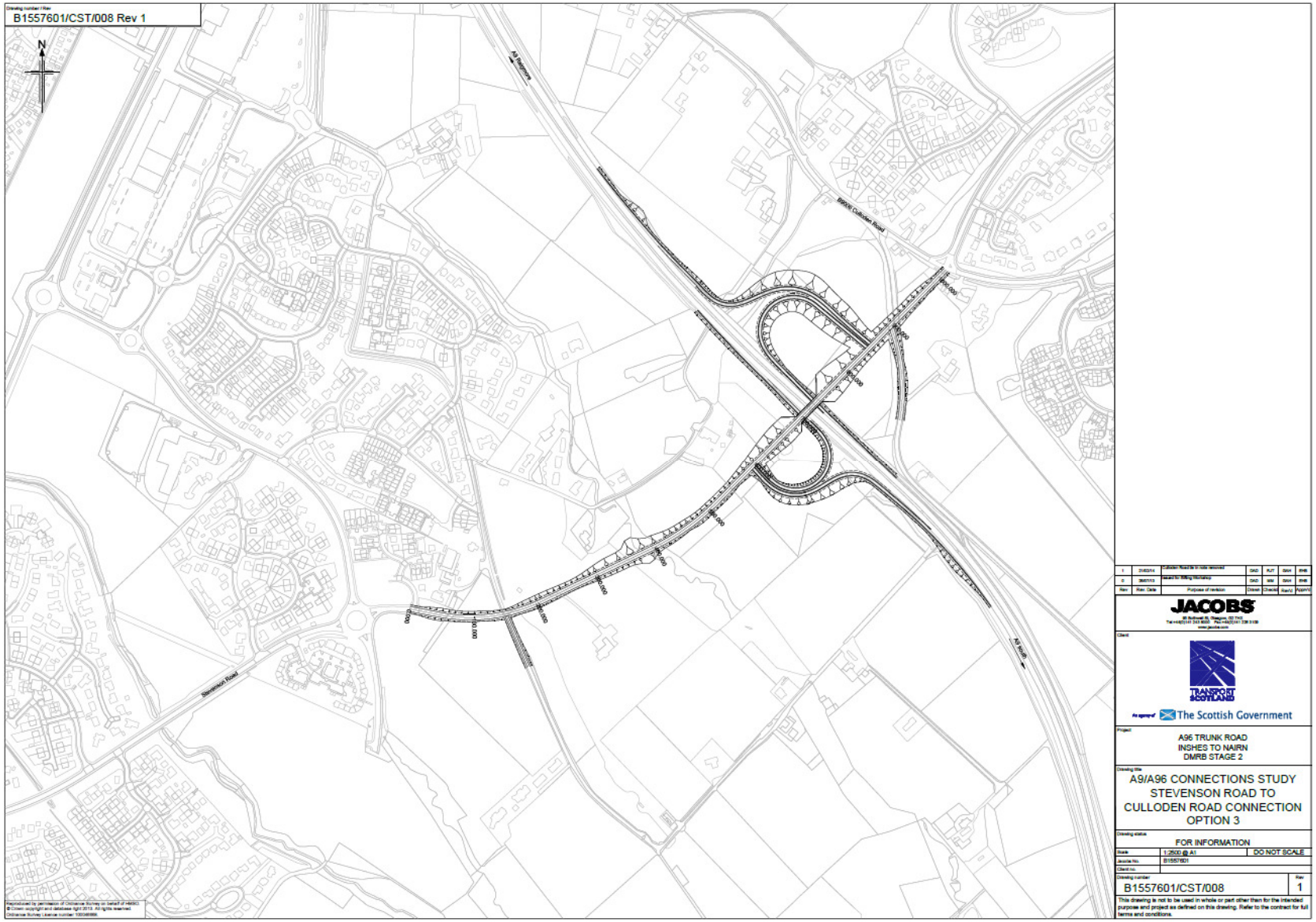


Figure 3-7- Stevenson Road to Culloden Road Link Option 3



3.3 Inshes - Smithton Link Road

A number of alternative link road options were developed for appraisal following feedback from the exhibitions in February 2012 where the Trunk Link Road option was presented.

Inshes to Smithton Options 1 to 4 will provide access for public transport to the development areas to the east of Inverness. The single carriageway local distributor road it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness.

The Trunk Link Road option is a dual carriageway, national speed limit trunk road that will have no intermediate junction to provide access to the development area to the east. The route will be elevated on a steep embankment, and as a result the option does not provide the same opportunities for active travel and public transport.

1. **Inshes to Smithton Trunk Link Road** (drawing B1557601/CST/025) – STPR recommended Intervention 18 that consisted of a dual carriageway between a new grade separated junction at Inshes and the southern roundabout forming the proposed A96 Smithton junction. The new junction at Inshes includes link road connections to Culloden Road. The existing Inshes junction slip roads would be closed under this proposal. This option was presented at a public exhibition in February 2012 as shown in Figure 3-8.

2. **Inshes to Smithton Link Road Option 1** (drawing B1557601/CST/009) - A single carriageway local distributor road which would connect the junction of Culloden Road and Caulfield Road to the proposed A96 Smithton junction as shown in Figure 3-9.

3. **Inshes to Smithton Link Road Option 2** (drawing B1557601/CST/010) - A single carriageway local distributor road which would connect the junction of Culloden Road and Caulfield Road to Barn Church Road as shown in Figure 3-10.

4. **Inshes to Smithton Link Road Option 3** (drawing B1557601/CST/014) - A single carriageway local distributor road connecting a new grade separated junction with the A9 at Inshes, and the southern roundabout at the proposed grade separated junction on the A96 at Smithton. The new junction at Inshes has a connection to the Tesco access roundabout and the new link road follows the same local road alignment to Smithton as Option 1, as shown in Figure 3-11.

5. **Inshes to Smithton Link Road Option 4** (drawing B1557601/CST/015) - This option is a development of Option 3. It comprises a single carriageway local distributor road connecting from the Tesco access roundabout at Inshes, across the A9 and Culloden Road to a new roundabout on Caulfield Road North then following the same local road alignment to Smithton as Option 1. In addition it provides replacement A9 southbound slip roads at Inshes junction which connect to a new roundabout on this new link road immediately east of the A9 as shown in Figure 3-12.

Note that these interventions are options at this stage and will be subject to further refinement as the appraisal and design process progresses.

Figure 3-8 - Inshes to Smithton Trunk Link Road

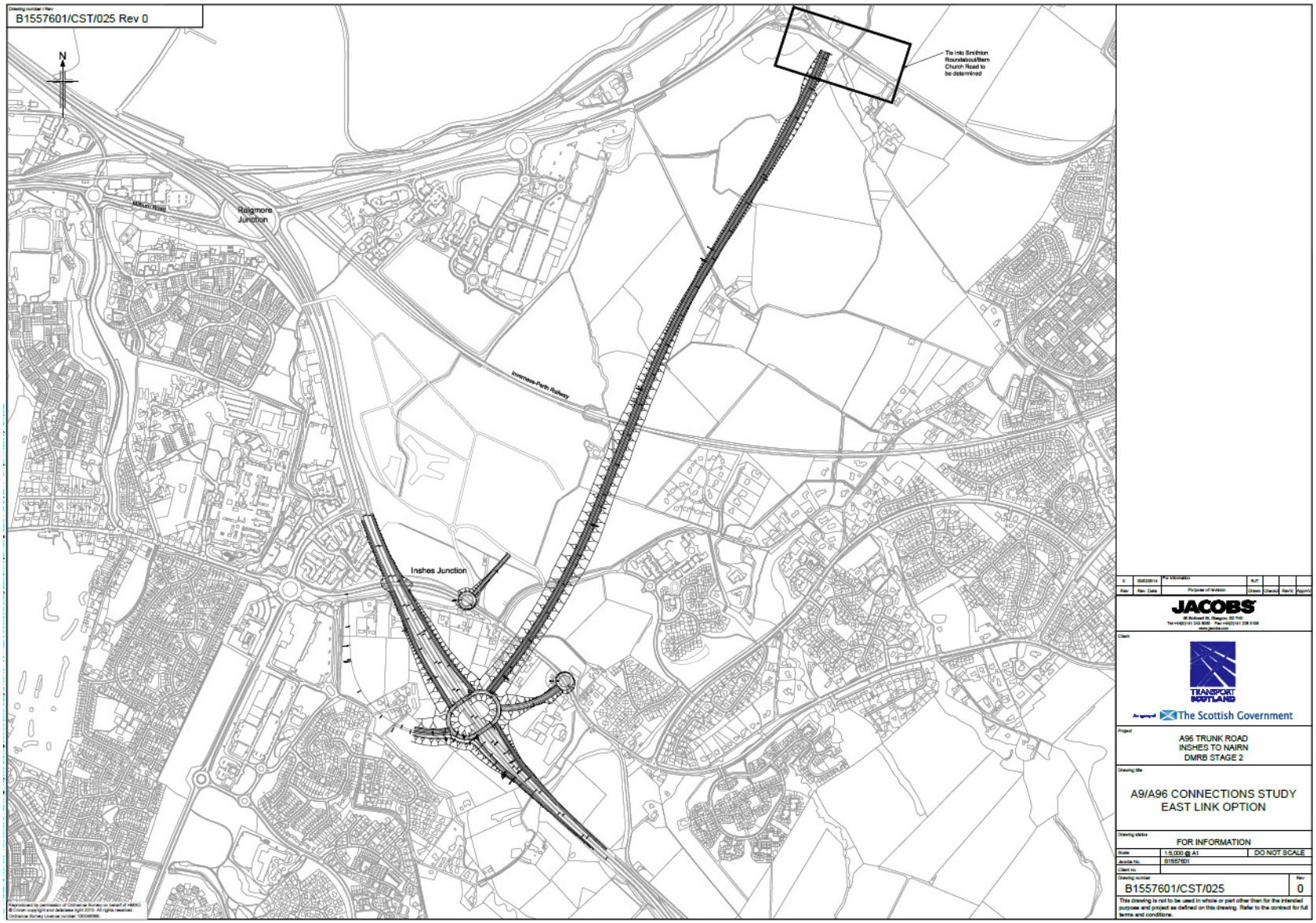


Figure 3-9 - Inshes to Smithton Link Road Option 1

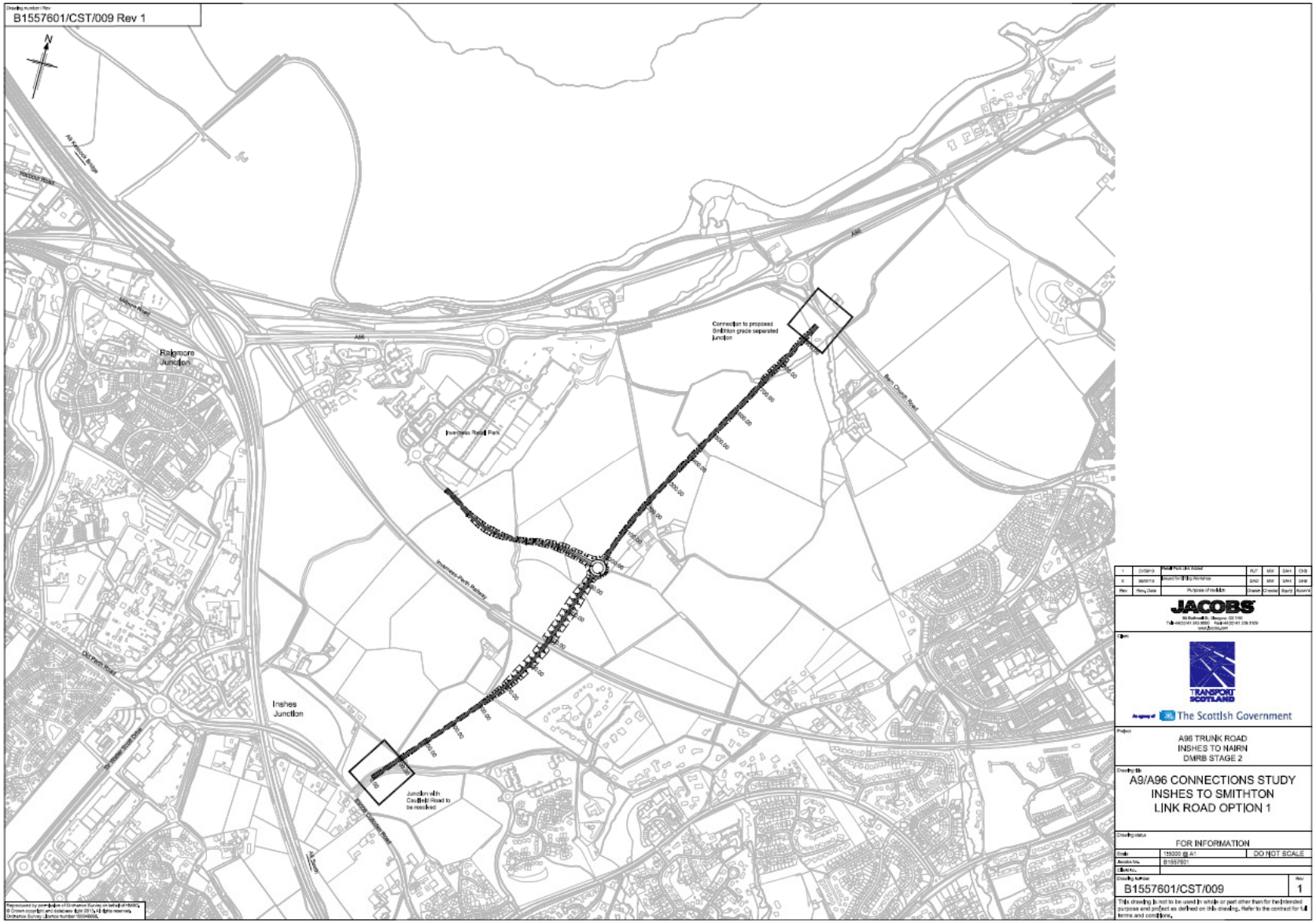


Figure 3-10 - Inshes to Smithton Link Road Option 2

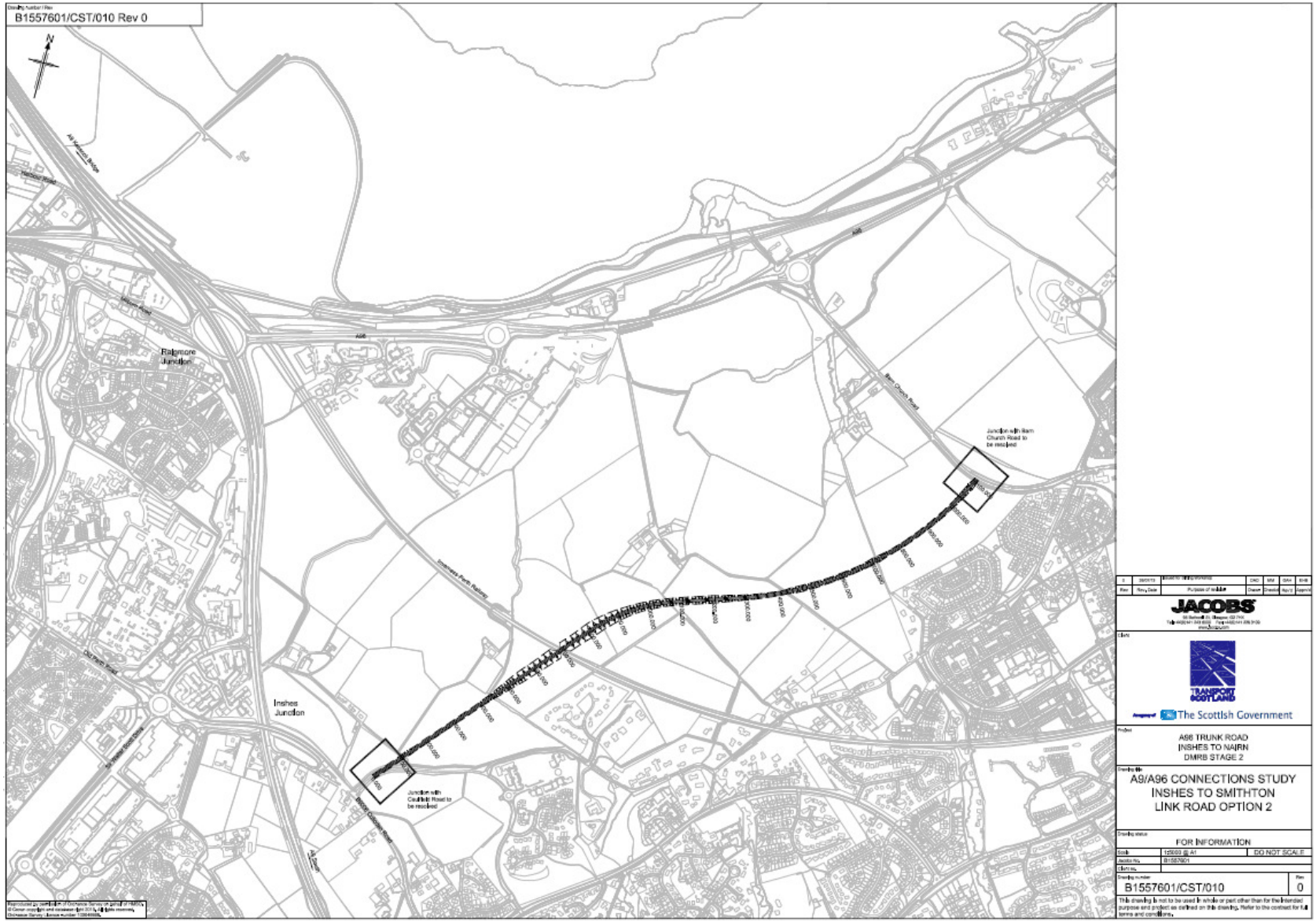
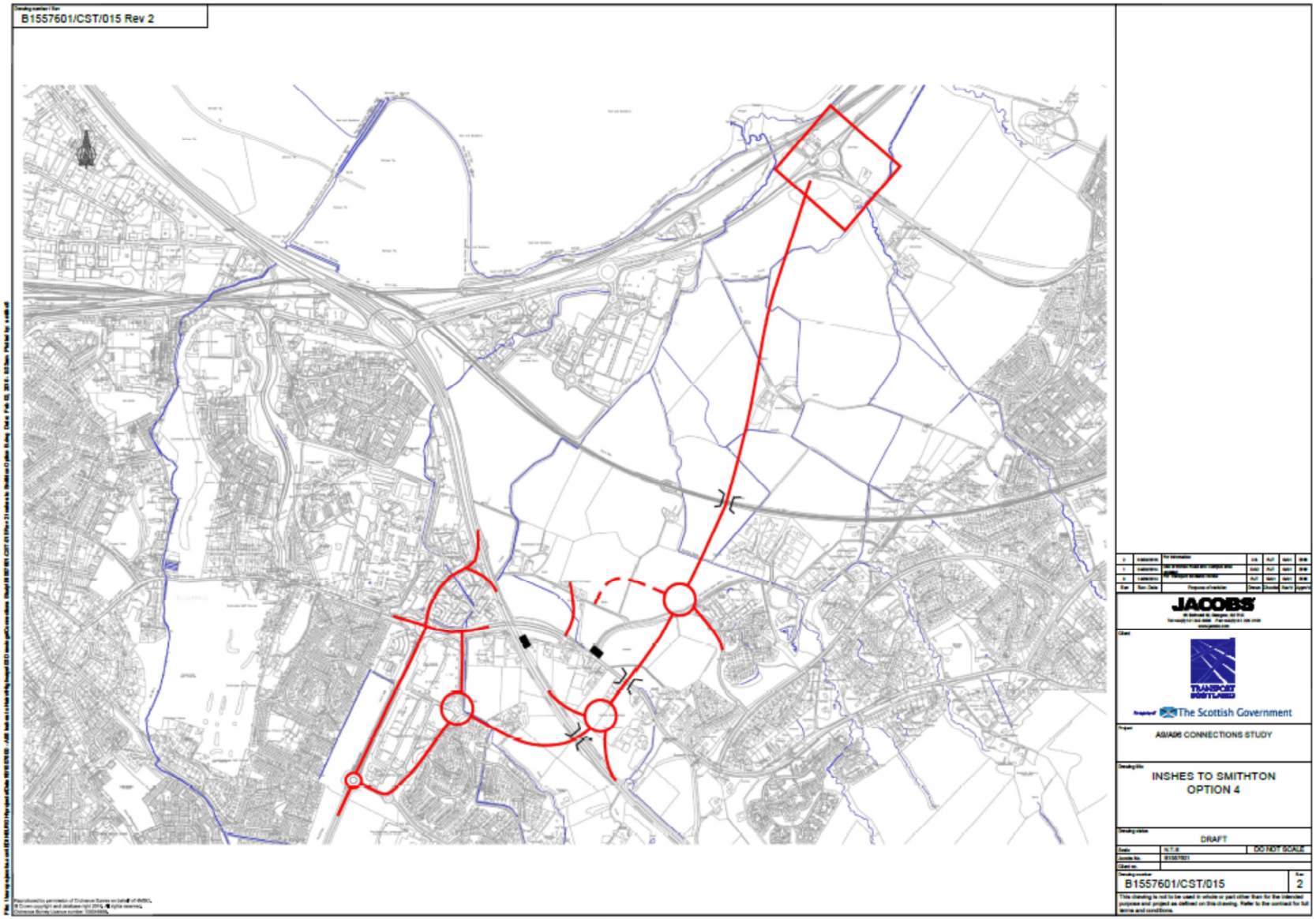


Figure 3-11 - Inshes to Smithton Link Road Option 3

Figure 3-12 - Inshes to Smithton Link Road Option 4



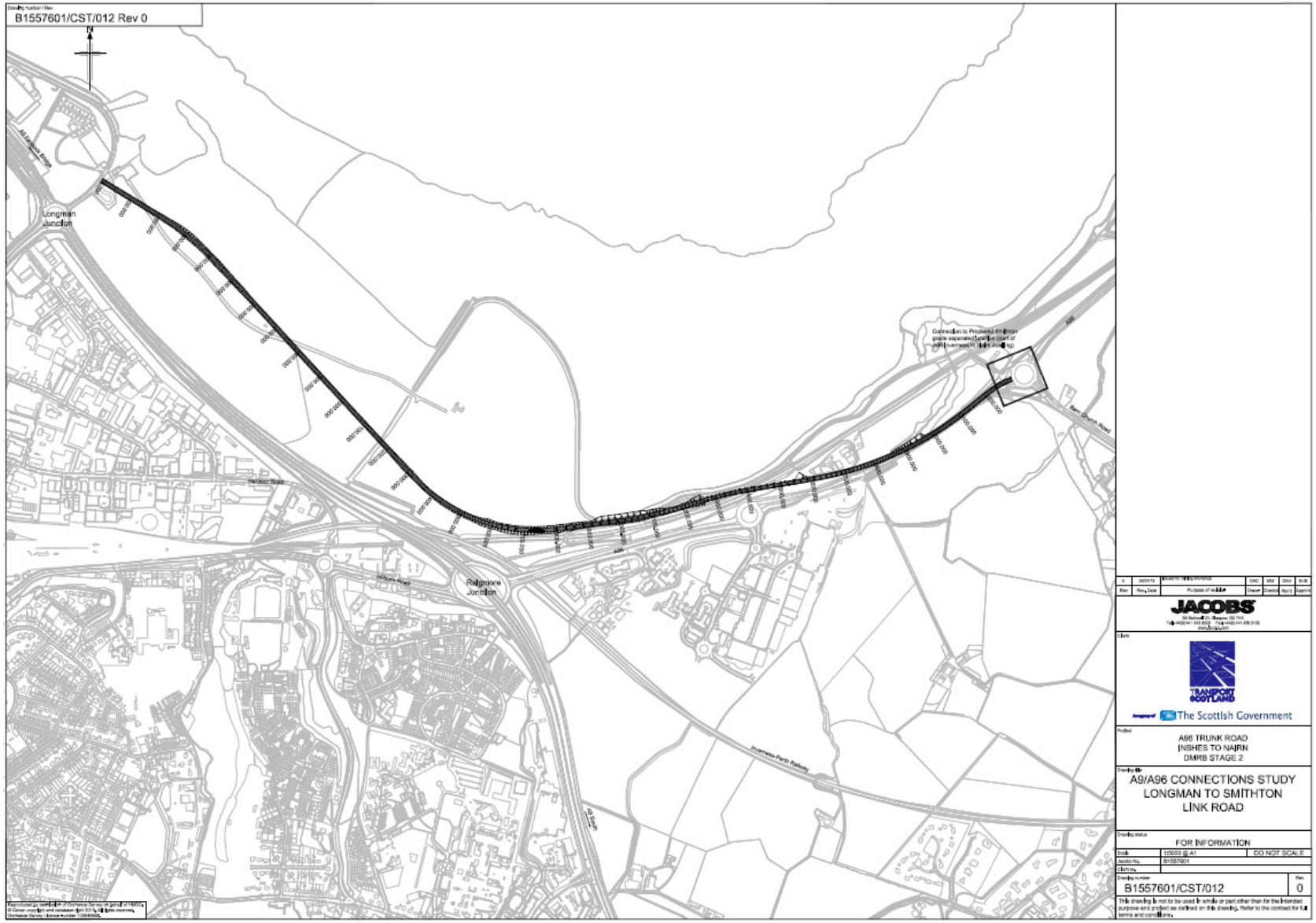
3.4 Longman to Smithton Link Road

Due to the level of local traffic using the A9 and A96 trunk roads for local journeys, a local road connection was considered between Longman Roundabout on the A9 and Smithton roundabout on the A96. This would provide an alternative route for local traffic between these junctions, as shown in Figure 3-13 (drawing B1557601/CST/012). Note that this intervention is an option at this stage and will be subject to further refinement as the appraisal and design process progresses.

The Longman to Smithton Link Road is a local road connection from Stadium Road immediately east of the Longman Roundabout, to the existing roundabout at Smithton forming the current junction between the A96 and Barn Church Road. As part of the A96 Inverness to Nairn (including Nairn Bypass) dualling scheme this roundabout forms the northern dumbbell of the new Smithton grade separated junction with the new dual carriageway following an alignment to the south of the existing A96.

The Longman to Smithton Link Road runs south east from Stadium Road through the former Longman landfill site. At the Inverness to Aberdeen railway the route turns east running parallel to the railway before crossing the railway immediately north of the existing A96 Seafield Roundabout. Heading east from the railway the route takes the alignment of the existing A96 connecting to the Smithton Roundabout. This option would require the A96 dualling to be completed first.

Figure 3-13 - Longman to Smithton Link Road



3.5 Raigmore Segregated Left Turn Lane

To improve the operation of Raigmore Interchange and separate the dominant north to east movement the option for a segregated left turn lane at Raigmore Interchange from the A9 southbound to the A96 eastbound was developed, as shown in Figure 3-14 (drawing B1557601/CST/011). Note that this intervention is an option at this stage and will be subject to further refinement as the appraisal and design process progresses.

Figure 3-14 - Raigmore Segregated Left Turn Lane

4 Appraisal Methodology

4.1 Introduction

The options generated and described in Section 3 were subject to a proportionate level of appraisal following the principles contained in the Scottish Transport Appraisal Guidance (STAG). The appraisal outcomes have been reported within Appraisal Summary Tables (ASTs) that are based on the standard STAG Part 1 appraisal tables. These summarise the performance of the options against the following:

- Study Specific Transport Planning Objectives;
- STAG Criteria including:
    - Environment;
    - Safety;
    - Economy;
    - Integration; and
    - Accessibility and Social Inclusion.
- Feasibility, Affordability and Public Acceptability.

The first stage of the process was the appraisal of the individual intervention options, described in Section 3, at an appropriate level to provide sufficient information to differentiate between the options for option sifting. This process sought to make as much use as possible of the previous work completed for the A96 Inshes to Nairn DMRB Stage 2 Report, in particular the environmental information. Further details of the appraisal of the individual options are presented in Section 5.

4.2 Transport Modelling

The Highland Council's Moray Firth Transport Model (MFTM) provided the main appraisal tool in establishing the future pressures on the transport network in terms of location and magnitude, and how they are forecast to change over time compared to the current situation. The MFTM was also used to establish the impact of each option variant on the network in the future years, to compare the performance of the options against the Do Minimum scenario, and assess each option against the project specific transport planning objectives.

It should be noted that currently the MFTM includes a modelled AM peak and PM peak period only and as such there is no representation of inter peak conditions in either the base or future modelled years.

Transport Scotland and THC agreed to include the grade separation of Smithton Roundabout in all options. This roundabout provides the connection between Inshes to Smithton Link Road and the A96/Barn Church Road. As the Grade Separation of Smithton is part of a separate scheme, the constructions costs of the junction have not been included. The level of delay experienced at the current Smithton junction in the MFTM model is minimal. Including the upgrade in the options and not in the Do Minimum scenario is therefore not considered to over-estimate the benefits from the options.

The MFTM has been used to provide quantitative inputs to the ASTs for each option to assess that option's performance against the project objectives, and the safety

and economy STAG criteria. The model outputs that have been used in the appraisal process include:

- Flows on key links;
- Journey times on key routes;
- Select link (origin-destination) analyses; and
- TUBA economic assessment data (model demand, time and distance skim matrices).

4.3 Analysis of Individual Options

As noted in Section 3, there were 14 individual options developed for appraisal including two options developed by THC for input to the appraisal process.

MFTM specific models were developed for each of the 14 options developed, including the two options provided by THC, using the alternative Low and High growth scenarios for the future years of 2016 and 2031. The High growth scenarios were modelled to assess the likely operational performance of each option under a higher level of forecast growth as a worst case scenario. Similarly, the Low growth scenarios were modelled to provide input to the economic assessment of each option again to reflect the worst case scenario in economic terms.

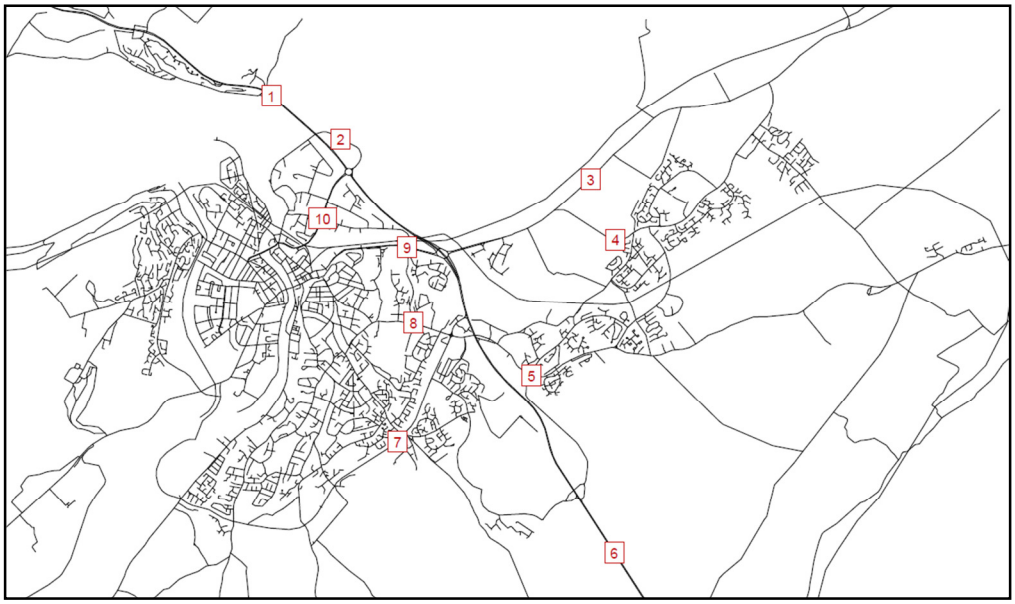
The impact of each option was assessed through extraction of data from the MFTM model assignments with respect to changes in traffic flows on key routes within the study area, and journey times for key movements, compared to the Do Minimum scenario. Flow comparisons were assessed at the key locations, shown in Figure 4-1 below, to identify changes in traffic flows on the A9 and A96 trunk roads, and key local roads including Culloden Road, Millburn Road, Old Perth Road and Harbour Road.

Figure 4-1 - A9/A96 Connections - link locations selected for traffic assessment

The journey time information was extracted from the MFTM models between the route start and end points identified in Figure 4-2. These points were selected to represent key roads in the area.

To identify and assess the potential changes in the mix of longer distance and local traffic, a series of select link analyses were undertaken in the MFTM to identify the origins and destinations of traffic and the level of trips between local and longer distance model zones.

Figure 4-2 - A9/A96 Connections - Journey Routes Start and End Points



The Department of Transport's TUBA economic assessment software was used to measure the potential economic return or value for money that each option could provide, when assessed with the estimated investment costs of each option. TUBA 1.9 was used to undertake the cost benefit analysis for each option under the Low growth demand scenario as this provides the worst case scenario in economic terms due to the lowest level of traffic growth and hence potential benefits. The TUBA cost benefit analysis produced an indicative Benefit to Cost Ratio (BCR) for each option.

4.4 Presentation of Results

The performance of each option was appraised using a seven point scale, that considered the relative size and scale of impacts on the transport planning objectives and the STAG criteria of Environment, Safety, Economy, Integration, and Accessibility and Social Inclusion. The scoring scale comprised ranking the performance or impact as: Major Benefit, Moderate Benefit, Minor Benefit, No Benefit or Impact, Minor Negative Impact, Moderate Negative Impact or Major Negative Impact. An appraisal of the feasibility, affordability and likely public acceptability of options was also undertaken.

The assessment of each option against the Environment STAG criterion made best use of relevant existing information that was available from the ongoing A96 Inshes to Nairn DMRB Stage 2 project. It should be noted that in accordance with the adoption of a proportionate appraisal process, no quantitative assessment of the

environmental impacts that are based on traffic data (for example air quality and noise) was undertaken.

The environmental appraisal considered the impact of each option for the following sub-disciplines:

- Global and Local Air Quality;
- Cultural Heritage;
- Noise & Vibration;
- Habitats and Biodiversity;
- Agriculture and Soils;
- Landscape & Visual Amenity;
- Water, Drainage and Flood Defence;
- Water Quality, and
- Geology.

Each of the options was also appraised against the 4 remaining STAG criteria:

- Safety;
- Economy;
- Integration; and
- Accessibility and Social Inclusion.

The output from the appraisal process was collated in an Appraisal Summary Table (AST) that presented the score for each option against the defined objectives and STAG criteria and commentary on the option's performance or impact. The AST also included an initial recommendation as to whether the option should be taken forward for further assessment or sifted out, along with the rationale behind the recommendation.

5 Initial Appraisal

5.1 Introduction

This section summarises the key appraisal outcomes for each of the developed options. Each option was assessed following the STAG guidelines. The options were assessed against the scheme objectives and the STAG criteria. The Appraisal Summary Tables (ASTs) are presented in Appendix B3.

5.2 Longman Junction Improvement

The four proposals developed for Longman junction that were assessed are as follows:

1. **Longman Option 1** - A two-bridge roundabout grade separated junction, as shown in Figure 3-1.
2. **Longman Option 2** - A free flow grade separated junction connection between the A9 and the A82 only (with no connection to Stadium Road) as shown in Figure 3-2.
3. **Longman Option 3** - A grade separated junction arrangement with full traffic movements between the A9, A82 and Stadium Road as shown in Figure 3-3. Turning movements at the junctions with the A9 slip roads would be traffic signal controlled.
4. **Longman Option 4** - A grade separated junction arrangement with dumbbell roundabouts as shown in Figure 3-4**.**

Due to the proximity of the Raigmore Interchange and Longman junction, under these options the A9 between Raigmore Interchange and Longman junction would be widened to three lanes in each direction providing a lane gain / lane drop arrangement between the ends of the slip roads.

5.2.1 Longman Option 1 Appraisal Summary

The key appraisal outcomes, as presented in pages 14 to 17 in Appendix B2 and summarised in the AST Appendix B3.1, for this option were:

- Positive contribution to the objectives of improving the effectiveness of the road network hierarchy [Appendix B3.1 L2.1], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.1 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.1 L5.1].
- Slight positive contributions for journey times and opportunities to travel by public transport between Aberdeen and Inverness [Appendix B3.1 L1], reducing the conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.1 L2.2] and improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.1 L5.2].
- No impact on improving connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east including Inverness Airport [Appendix B3.1 L3].
- Increased journey times for movements from the A9 North to the A82 and Stadium Road (Page 17 Appendix B2) in the AM Peak.

- Reduction in traffic on local routes at Harbour Road and Millburn Road (Pages 15 and 16 Appendix B2).
- No significant impact on the land use allocation as the southbound merge does not encroach on the proposed development area to the east of Longman.
- Improves access to the development area to the east of Longman Junction.
- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to proximity to Moray Firth SAC, and Inner Moray Firth SPA, Longman/Castle Stuart Bays SSS.
- Potential for release of contaminants to water bodies and groundwater as a result of construction in the former Longman Landfill site.

Based on the appraisal outcomes detailed in the AST Appendix B3.1, the option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

However, there are disbenefits to users travelling from the A9 North to Inverness in terms of journey time increases and the option also has a high capital cost estimate. This option would require full signalisation to accommodate forecast traffic levels.

It was therefore recommended that this option be taken forward to detailed appraisal.

5.2.2 Longman Option 2 Appraisal Summary

The key appraisal outcomes, as presented in pages 18 to 21 in Appendix B2 and summarised in AST Appendix B3.2, for this option were:

- Positive contribution to the objectives of improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.2 L4], and improve the operational performance of the trunk road network and junctions on the A9 [Appendix B3.2 L5.1].
- Slight positive contributions for journey time savings for longer distance and local traffic movements except to/from Stadium Road [Appendix B3.2 L1] and improving the effectiveness of the road network hierarchy [Appendix B3.2 L2.1].
- Negative contribution to improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.2 L5.2].
- No impact on the conflict for longer distance and local traffic for planned development areas to the east [Appendix B3.2 L2.2] or on improving connectivity particularly by public transport and active travel, between Inverness City Centre and the growth area to the east including Inverness Airport [Appendix B3.2 L3].
- Loss of direct access to Stadium Road and resultant journey time increases due to re-routing via A82 (Page 21 Appendix B2).
- Reduction in traffic on local routes at Harbour Road and Millburn Road (Pages 19 and 20 Appendix B2).
- The southbound merge would require land take from the landfill site, impacting on the land use allocations to the east of Longman Junction.
- Negative impact on access to the development site to the east of Longman.
- Restricts access to Stadium Road and the development area to the east of Longman.

- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to proximity to Moray Firth SAC, and Inner Moray Firth SPA, Longman/Castle Stuart Bays SSSI.
- Potential for release of contaminants to water bodies and groundwater as a result of construction in the former Longman Landfill site.

Based on the appraisal outcomes detailed in the AST Appendix B3.2, this option was not taken forward to detailed appraisal as it negatively impacts on access to Stadium Road from the trunk road network, and may contribute to decreased operational performance of the A82 and local road network in the industrial estate area as a result of the re-routing impacts.

5.2.3 Longman Option 3 Appraisal Summary

The key appraisal outcomes, as presented in pages 22 to 25 in Appendix B2 and summarised in AST Appendix B3.3, for this option were:

- Positive contribution to the objectives of improving the effectiveness of the road network hierarchy [Appendix B3.3 L2.1], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.3 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.3 L5.1].
- Slight positive contributions for journey times journey time savings for longer distance and local traffic movements [Appendix B3.3 L1], reduces the conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.3 L2.2] and improve the operational performance of the secondary network and junctions that may then improve the operation of the trunk road network [Appendix B3.3 L5.2].
- No impact on improving connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east including Inverness Airport [Appendix B3.3 L3].
- Reduction in traffic on local routes of Harbour Road and Millburn Road (Pages 23 and 24 Appendix B2).
- The southbound merge and diverge would require land take from the land fill site, impacting on the land use allocations to the east of Longman Junction.
- Improves access to the development area to the east of Longman Junction.
- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to proximity to Moray Firth SAC, and Inner Moray Firth SPA, Longman/Castle Stuart Bays SSSI.
- Potential for release of contaminants to water bodies and groundwater as a result of construction in the former Longman Landfill site.
- The road layout is more complex and less conventional than Option 1.
- Larger relative footprint compared to Option 1, potentially affecting development area and utility apparatus.

Based on the appraisal outcomes detailed in the AST Appendix B3.3, the option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9. There are journey time savings for longer distance and local traffic movements, and the option would provide a positive economic assessment result.

The current proposed layout of this option may have to be altered due to the location of a high pressure gas pipe, however this was considered preferable to Option 2 and

worth further consideration. As with Option 1, Option 3 would require full signalisation to accommodate forecast traffic levels.

It was therefore recommended that this option be taken forward to detailed appraisal.

5.2.4 Longman Option 4 Appraisal Summary

The key appraisal outcomes, as presented in pages 26 to 29 in Appendix B2 and summarised in AST Appendix B3.4, for this option were:

- Positive contribution to the objectives of improving the effectiveness of the road network hierarchy [Appendix B3.4 L2.1], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.4 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.4 L5.1].
- Slight positive contributions for journey time savings for longer distance and local traffic movements. [Appendix B3.4 L1], reduces the conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.4 L2.2] and improve the operational performance of the secondary network and junctions that may then improve the operation of the trunk road network [Appendix B3.4 L5.2].
- No impact on improving connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east including Inverness Airport [Appendix B3.4 L3].
- Reduction in traffic on local routes of Harbour Road and Millburn Road (Pages 27 and 28 Appendix B2).
- The southbound merge and diverge would require land take from the landfill site, impacting on the land use allocations to the east of Longman Junction.
- Improves access to the development area to the east of Longman Junction.
- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to proximity to Moray Firth SAC, and Inner Moray Firth SPA, Longman/Castle Stuart Bays SSSI.
- Potential for release of contaminants to water bodies and groundwater as a result of construction in the former Longman Landfill site.
- Overall land take for the option is greater than the other options for Longman Junction.

Based on the appraisal outcomes detailed in the AST Appendix B3.4, the option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

However, there are minor disbenefits to users travelling from the A9 North to Inverness in terms of journey time increases, and the option overall provides a lower level of journey time savings and economic benefits compared to Option 3. The option layout is also more complex than the other options, occupies a larger footprint and does not offer any greater operational benefits compared to other options.

It was therefore recommended that this option not be taken forward to detailed appraisal.

5.2.5 Indicative Economic Appraisal Summary

In relation to the indicative economic appraisal, the results for each option are summarised in Table 5-1 below. The results show that the higher estimated cost associated with Longman Option 1 results in the lowest Benefit to Cost Ratio (BCR), although the travel time benefits are lower due to the assessment being undertaken without full signalisation. Option 2 and Option 3 both have BCRs that indicate the options would provide value for money, with similar BCRs above the 1.0 threshold. Option 4 has a cost estimate broadly similar to Options 2 and 3 but the BCR result shows that the level of benefits would not be sufficient to provide value for money.

5.2.6 Longman Option Sifting Summary

Table 5-1 also summarises the transport planning objectives that each option meets, and the appraisal outcome on whether to progress the option to the next stage of appraisal.

Table 5-1 Longman Option Sifting Summary

Objective/Option	Longman 1	Longman 2	Longman 3	Longman 4
L1 To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓	✓	✓	✓
L2.1 To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of trunk road junctions.	✓✓	✓	✓✓	✓✓
L2.2 Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓	✓	✓	✓
L3 To improve connectivity, particularly by public transport and active travel between Inverness City Centre and the growth area to the east including Inverness Airport.	o	o	o	o
L4 To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions.	✓✓	✓✓	✓✓	✓✓
L5.1 To improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout.	✓✓	✓✓	✓✓	✓✓
L5.2 To improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network.	✓	o	✓	✓
Indicative BCR	0.5	1.5	1.6	0.7
Progress to detailed appraisal	Yes	No	Yes	No

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit O Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

5.3 Link Road between Stevenson Road and Culloden Road

The three proposals developed for a new link road between Stevenson Road and Culloden Road that were assessed are as follows:

1. **Stevenson Road to Culloden Road Link Option 1** - A single carriageway local distributor road which connects to the eastern leg of an existing roundabout on Stevenson Road, to the south of Inshes and runs east and north east, crossing the A9 dual carriageway via an overbridge to a junction with Culloden Road where the B9177 currently connects with Culloden Road, as shown in Figure 3-5.
2. **Stevenson Road to Culloden Road Link Option 2** - The same local link road as option 1 with slip road connections to the A9 providing an A9 northbound diverge slip road and an A9 southbound merge slip road, as shown in Figure 3-6.
3. **Stevenson Road to Culloden Road Link Option 3** - The same local link road as option 1 with slip road connections to the A9 providing all slip road movements between the A9 and the new side road connection, as shown in Figure 3-7.

5.3.1 Stevenson Road to Culloden Road Link Option 1 Appraisal Summary

The key appraisal outcomes, as presented in pages 30 to 33 in Appendix B2 and summarised in AST Appendix B3.5, for this option were:

- Positive contribution to the objectives of reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.5 L2.2], improving connectivity between Inverness and the growth area to the east [Appendix B3.5 L3], and improving the operational performance of the secondary network and junctions [Appendix B3.5 L5.2].
- Slight positive contributions for journey time savings for longer distance and local traffic movements [Appendix B3.5 L1], improving the effectiveness of the road network hierarchy [Appendix B3.5 L2.1], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.5 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.5 L5.1].
- The introduction of the new link road over the A9 potentially reduces the journey time between Inverness South and communities to the east of the A9 (Page 33 Appendix B2).
- Reduction in traffic on Culloden Road, through Inshes junction and Sir Walter Scott Drive (Pages 31 to 32 Appendix B2).
- The new link road improves access to the B9177 and A9 via the Milton of Leys junction, as it provides access to the B9177 from Inverness South.
- Option connects areas which have been identified as future expansion areas at Inshes and Milton of Leys to Culloden.
- Provides positive economic benefits.
- Impacts on the setting of listed buildings located within close proximity to the route and impacts in relation to landscape character and visual amenity due to the loss of and severance of woodland, the introduction of road infrastructure and a large scale embankment at the crossing of the A9.

Based on the appraisal outcomes detailed in the AST Appendix B3.5, the option performs well against all of the study objectives and against most of the appraisal criteria. The additional crossing of the A9 is also considered to be a benefit to

connectivity. Further investigation of the Culloden Road and Stevenson Road junction layout is required due to the location of properties. The junction layout may be altered to a staggered junction to avoid the properties that are located within the current footprint of the proposed junction.

It was therefore recommended that this option be taken forward to detailed appraisal.

5.3.2 Stevenson Road to Culloden Road Link Option 2 Appraisal Summary

The key appraisal outcomes, as presented in pages 34 to 37 in Appendix B2 and summarised in AST Appendix B3.6, for this option were:

- Positive contribution to the objectives of improving the effectiveness of the road network hierarchy [Appendix B3.6 L2.1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.6 L2.2], improving connectivity between Inverness and the growth area to the east [Appendix B3.6 L3], and improving the operational performance of the secondary network and junctions [Appendix B3.6 L5.2].
- Slight positive contributions for journey time savings across the A9 between Inverness South and communities to the east of the A9 [Appendix B3.6 L1], improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.6 L5.1].
- No impact on the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.6 L4].
- Reduction in traffic on Culloden Road, through Inshes junction and Sir Walter Scott Drive (Pages 35 and 36 Appendix B2).
- Improved distribution of movements to and from the A9 South between Inshes, Stevenson Road and Milton of Leys junctions. Additional crossing of the A9 reduces traffic on Culloden Road overbridge and relieves some of the congestion at Inshes junction, improving the operation of the local and trunk road networks (Pages 35 and 36 Appendix B2).
- Option connects areas which have been identified as future expansion areas at Inshes and Milton of Leys to Culloden.
- Provides positive economic benefits.
- Impacts on the setting of listed buildings located within close proximity to the route and impacts in relation to landscape character and visual amenity due to the loss of and severance of woodland, the introduction of road infrastructure and a large scale embankment at the crossing of the A9.

Based on the appraisal outcomes detailed in the AST Appendix B3.6, this option performs well against all the study objectives and against most of the appraisal criteria. Some moderate impacts are noted under the Environment criteria.

This option contributes to a degree of distribution of traffic between the A9 junctions, however Option 3 provides a better reduction in traffic volumes around Inshes Roundabout including the approaches from Sir Walter Scott Drive and Culloden Road.

Due to the proximity of this proposed junction to the Inshes Junction and reduced visibility due to the bend on the A9, a junction with the A9 at this location is unlikely to be acceptable in terms of design standards.

As the operational benefits of this option are not significantly greater than Option 1, this option was not recommended to be taken forward to detailed appraisal.

5.3.3 Stevenson Road to Culloden Road Link Option 3 Appraisal Summary

The key appraisal outcomes, as presented in pages 38 to 41 in Appendix B2 and summarised in AST Appendix B3.7, for this option were:

- Positive contribution to the objectives of reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.7 L2.2], improving connectivity between Inverness and the growth area to the east [Appendix B3.7 L3], and improving the operational performance of the secondary network and junctions [Appendix B3.7 L5.2].
- Slight positive contributions for journey time savings across the A9 between Inverness South and communities to the east of the A9 [Appendix B3.7 L1], improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.7 L5.1].
- No impact on the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.7 L4].
- Reduction in traffic on Culloden Road, through Inshes junction and Sir Walter Scott Drive (Pages 39 and 40 Appendix B2).
- Improved distribution of movements to and from the A9 South between Inshes, Stevenson Road and Milton of Leys junctions. Additional crossing of the A9 reduces traffic on Culloden Road overbridge and relieves some of the congestion at Inshes junction, improving the operation of the local and trunk road network (Pages 39 and 40 Appendix B2).
- Option connects areas which have been identified as future expansion areas at Inshes and Milton of Leys to Culloden.
- Provides positive economic benefits.
- Impacts on the setting of listed buildings located within close proximity to the route and impacts in relation to landscape character and visual amenity due to the loss of and severance of woodland, the introduction of road infrastructure and a large scale embankment at the crossing of the A9.

Based on the appraisal outcomes detailed in the AST Appendix B3.7, this option performs well against all the study objectives and against most of the appraisal criteria. Some moderate impacts are noted under the Environment criteria.

This option enhances accessibility since it forms a full grade separated junction with the A9 and contributes to additional reduction to traffic volumes around Inshes Roundabout including the approaches from Sir Walter Scott Drive and Culloden Road.

Due to the proximity of this proposed junction to the Inshes Junction and reduced visibility due to the bend on the A9, a junction with the A9 at this location is unlikely to be acceptable in terms of design standards.

As the operational benefits of this option are not significantly greater than Option 1, this option was not recommended to be taken forward to detailed appraisal.

5.3.4 Indicative Economic Appraisal Summary

In relation to the indicative economic appraisal, the results for each option are summarised in Table 5-2 below. The table shows that all three options would provide value for money in terms of the likely investment costs with BCRs all greater

than 1.0. The increasing cost estimates associated with providing limited or full access slip road connections to the A9 result in a corresponding reduction in the BCRs.

5.3.5 Stevenson Road to Culloden Road Link Option Sifting Summary

Table 5-2 also summarises the transport objectives that each option meets, and the appraisal decision outcome on whether to progress the option to the next stage of appraisal.

Table 5-2 Stevenson Road to Culloden Road Link Option Sifting Summary

Objective/Option	Stevenson Road to Culloden Road 1	Stevenson Road to Culloden Road 2	Stevenson Road to Culloden Road 3
L1 To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓	✓	✓
L2.1 To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of trunk road junctions.	✓	✓✓	✓✓
L2.2 Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓✓	✓✓	✓✓
L3 To improve connectivity, particularly by public transport and active travel between Inverness City Centre and the growth area to the east including Inverness Airport.	✓✓	✓✓	✓✓
L4 To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions.	✓	o	o
L5.1 To improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout.	✓	✓	✓
L5.2 To improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network.	✓✓	✓✓	✓✓
Indicative BCR	2.3	2.1	1.6
Progress to detailed appraisal	Yes	No	No

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit O Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

5.4 Inshes to Smithton Link Road

Five proposals were developed for a new link road between Culloden Road and Barn Church Road that were assessed are as follows:

1. **Inshes to Smithton Trunk Link Road** - A dual carriageway between a new grade separated junction at Inshes and the southern roundabout forming the proposed A96 Smithton junction, as shown in Figure 3-8. The new junction at Inshes includes link road connections to Culloden Road. The existing Inshes junction slip roads would be closed under this proposal. This option was presented at a public exhibition in February 2012.

2. **Inshes to Smithton Link Road Option 1** - A single carriageway local distributor road which would connect the junction of Culloden Road and Caulfield Road to the proposed A96 Smithton junction, as shown in Figure 3-9.
3. **Inshes to Smithton Link Road Option 2**- A single carriageway local distributor road which would connect the junction of Culloden Road and Caulfield Road to Barn Church Road, as shown in Figure 3-10.
4. **Inshes to Smithton Link Road Option 3** - A single carriageway local distributor road connecting a new grade separated junction with the A9 at Inshes, and the southern roundabout at the proposed grade separated junction on the A96 at Smithton. The new junction at Inshes has a connection to the Tesco access roundabout and the new link road follows the same local road alignment to Smithton as Option 1, as shown in Figure 3-11.
5. **Inshes to Smithton Link Road Option 4** - A new single carriageway local distributor road, as shown in Figure 3-12. It is similar in alignment to the original Inshes to Smithton trunk link road proposal but with an alternative road layout around Inshes. This option retains the existing northbound A9 slip roads at Inshes with a modified road layout to the east side of the Inshes Retail Park. A new single carriageway link road is proposed over the A9 to a roundabout immediately east of the A9 which would connect to new southbound merge and diverge slip roads, resulting in closure of the existing southbound slip roads at Inshes. From this new roundabout a single carriageway link road heads north east to the proposed A96 junction at Smithton with a new roundabout on Caulfield Road North providing access to Castlehill Road and access to the UHI Campus. A key element of this option is the proposed closure of the junction between Culloden Road and Caulfield Road North.

Note that the Inshes to Smithton Link Road Option 3 and Option 4 were developed at a later date than the other options.

5.4.1 Inshes to Smithton Trunk Link Road Appraisal Summary

This proposal was presented at a public exhibition in February 2012, but was not taken forward at that time due negative feedback from the public. As this is the original proposal presented to the public, further work is required on the assessment of alternative options before any recommendation will be made on this option.

The key appraisal outcomes for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.8 L1],
- Provides a new strategic link between the A9 and the A96 [Appendix B3.8 L2.1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.8 L2.2], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.8 L5.1].
- Slight positive contribution to improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.8 L4], improving connectivity between Inverness and the growth area to the east [Appendix B3.8 L3], and improving the operational performance of the secondary network and junctions [Appendix B3.8 L5.2].

- Journey time savings for movements between the A96 East and Inverness South, and savings between the A96 East and Inverness Centre.
- Reduction in traffic on the A96, through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound, and around the Smithton and Culloden area.
- Partial impact on the Ashton Farm Scheduled Monument, and severance of Core Path and National Cycle Route potentially introducing a conflict with the Highland Wide Local Development Plans relating to Public Access, however mitigation would limit or remove these impacts.
- The route bisects land that has been allocated for development and does not provide access to development areas to the east of Inverness as this route is a trunk road.

Based on the appraisal outcomes detailed in the AST Appendix B3.8, this option performs well against the transport planning objectives and the appraisal criteria, providing journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also reducing traffic levels through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound and around the Smithton and Culloden areas.

There are some major negative impacts associated with this option under the environmental criteria and against Economy, Integration and Social Inclusion.

As the previously published option, it formed the comparator for the alternative Inshes to Smithton options and was therefore taken forward to detailed appraisal.

5.4.2 Inshes to Smithton Link Road Option 1 Appraisal Summary

The key appraisal outcomes, as presented in pages 42 to 45 in Appendix B2 and summarised in AST Appendix B3.9,for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.9 L1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.9 L2.2], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.9 L5.1].
- Slight positive contribution to improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.9 L2.1], and improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.9 L4].
- No impact on the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.9 L3], and improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.9 L5.2].
- Journey time savings for movements between the A96 East and Inverness South, and savings between the A96 East and Inverness Centre (Page 45 Appendix B2).
- Reduction in traffic on the A96, through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound, and Tower Road (Pages 43 and 44 Appendix B2).

- The route bisects land that has been allocated for development, however it would facilitate access to the developments as well as remove some of the additional traffic from the A96.
- Provides positive economic benefits.
- Partial impact on the Ashton Farm Scheduled Monument, and severance of Core Path and National Cycle Route potentially introducing a conflict with the Highland Wide Local Development Plans relating to Public Access, however mitigation would limit or remove those impacts.

Based on the appraisal outcomes detailed in the AST Appendix B3.9, this option performs well against the transport planning objectives and the appraisal criteria, and integrates well with the Highland Council development plan aspiration. Some aspects of this option require further investigation in relation to the tie in at Caulfield Road and minimising the impacts on the scheduled monument.

It was therefore recommended that this option be taken forward to detailed appraisal.

5.4.3 Inshes to Smithton Link Road Option 2 Appraisal Summary

The key appraisal outcomes, as presented in pages 46 to 49 in Appendix B2 and summarised in AST Appendix B3.10, for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.10 L1], improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.10 L2.1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.10 L2.2], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.10 L5.1].
- Slight positive contribution to the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.10 L3], and improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.10 L4].
- No impact on improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.10 L5.2].
- Journey time savings for movements between the east and Inverness South, and savings between the A96 East and Inverness Centre (Page 49 Appendix B2).
- Reduction in traffic on the A96, through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound, and Tower Road (Pages 47 and 48 Appendix B2).
- The route bisects land that has been allocated for development, however it would facilitate access to the developments as well as remove some of the additional traffic from the A96.
- Provides positive economic benefits.
- Partial impact on the Ashton Farm Scheduled Monument, and severance of Core Path and National Cycle Route potentially introducing a conflict with the Highland Wide Local Development Plans relating to Public Access, however mitigation would limit or remove those impacts.

Based on the appraisal outcomes detailed in the AST Appendix B3.10, whilst this option performs well against the transport planning objectives and the appraisal criteria, the Inshes to Smithton Link Road Option 1 is preferred as it provides a direct connection to the proposed A96 junction at Smithton.

Therefore this option was not recommended to be taken forward to detailed appraisal.

5.4.4 Inshes to Smithton Link Road Option 3 Appraisal Summary

The key appraisal outcomes, as presented in pages 58 to 61 in Appendix B2 and summarised in AST Appendix B3.11, for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.11 L1], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.11 L5.1].
- Slight positive contribution to improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.11 L2.1], the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.11 L3], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.11 L4] and improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.11 L5.2].
- Journey time savings for movements between the east and Inverness South, and savings between the A96 East and Inverness Centre (Page 61 Appendix B2).
- Reduction in traffic on the A96, through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound, and Tower Road (Pages 59 and 60 Appendix B2).
- The route bisects land that has been allocated for development, however it would facilitate access to the developments as well as remove some of the additional traffic from the A96.
- Unlikely to provide positive economic benefits.
- Partial impact on the Ashton Farm Scheduled Monument, and severance of Core Path and National Cycle Route potentially introducing a conflict with the Highland Wide Local Development Plans relating to Public Access, however mitigation would limit or remove those impacts.

Based on the appraisal outcomes detailed in the AST Appendix B3.11, whilst this option performs reasonably well against the transport planning objectives and the appraisal criteria, the Inshes to Smithton Link Road Option 4 is preferred as it provides a connection to the local road network to the east of the A9.

Therefore this option was not recommended to be taken forward to detailed appraisal.

5.4.5 Inshes to Smithton Link Road Option 4 Appraisal Summary

The key appraisal outcomes, as presented in pages 62 to 65 in Appendix B2 and summarised in AST Appendix B3.12, for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.12 L1], improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.12 L2.1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.12 L2.2], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.12 L5.1].
- Slight positive contribution to the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.12 L3], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.12 L4] and improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.12 L5.2].
- Journey time savings for movements between the east and Inverness South, and savings between the A96 East and Inverness Centre (Page 65 Appendix B2).
- Reduction in traffic on the A96, through Raigmore Interchange, on the A9 between Raigmore and Inshes southbound, and Tower Road (Pages 63 and 64 Appendix B2).
- The route bisects land that has been allocated for development, however it would facilitate access to the developments as well as remove some of the additional traffic from the A96.
- Likely to provide positive economic benefits.
- Partial impact on the Ashton Farm Scheduled Monument, and severance of Core Path and National Cycle Route potentially introducing a conflict with the Highland Wide Local Development Plans relating to Public Access, however mitigation would limit or remove those impacts.

Based on the appraisal outcomes detailed in the AST Appendix B3.12, this option performs well against the transport planning objectives and the appraisal criteria, and integrates well with the Highland Council development plan aspiration. Some aspects of this option require further investigation in relation to the connecting junction at Caulfield Road North and minimising the impacts on the scheduled monument.

It was therefore recommended that this option be taken forward to detailed appraisal.

5.4.6 Indicative Economic Appraisal

In relation to the indicative economic appraisal, the results for each option are summarised in Table 5-3 below. The table shows that Option 1 would likely provide value for money in terms of the likely investment costs, with a BCR of 1.1. The Trunk Road Link and Option 2 both have a higher cost estimate than Option 1, and the level of benefits indicate that neither option would provide value for money. At the time of the initial appraisal, costs were not available for Option 3 and 4, therefore an economic assessment has not been undertaken.

5.4.7 Inshes to Smithton Link Road Option Sifting Summary

Table 5-3 also summarises the transport planning objectives that each option meets, and the appraisal decision outcome on whether to progress the option to the next stage of appraisal..

Table 5-3 Inshes to Smithton Link Road Option Sifting Summary

Objective/Option	Inshes to Smithton Trunk Link Road	Inshes to Smithton Option 1	Inshes to Smithton Option 2	Inshes to Smithton Option 3	Inshes to Smithton Option 4
L1 To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓✓	✓✓	✓✓	✓✓	✓✓
L2.1 To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of trunk road junctions.	✓✓	✓	✓✓	✓	✓✓
L2.2 Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓✓	✓✓	✓✓	o	✓✓
L3 To improve connectivity, particularly by public transport and active travel between Inverness City Centre and the growth area to the east including Inverness Airport.	×	o	✓	✓	✓
L4 To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions.	✓	✓	✓	✓	✓
L5.1 To improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout.	✓✓	✓✓	✓✓	✓✓	✓✓
L5.2 To improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network.	✓	o	o	✓	✓
Indicative BCR	0.5	1.1	0.9	At the time of the initial appraisal, cost information was not available and a BCR has not been calculated.	

Progress to detailed appraisal	Yes	Yes	No	No	Yes

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit O Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

5.5 Longman to Smithton Link Road

The Longman to Smithton link road is a local road connection from Stadium Road, immediately east of the Longman Roundabout to the Smithton Roundabout which forms the junction between the A96 and Barn Church Road, as shown in Figure 3-13.

The key appraisal outcomes, as presented in pages 54 to 57 in Appendix B2 and summarised in AST Appendix B3.13 for this option were:

- Slight positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.13 L1], improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.13 L2.1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.13 L2.2], to the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.13 L3], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.13 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.13 L5.1].
- No impact on improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.13 L5.2].
- Journey time savings for movements from the A82 and A9 North to the A96 (Page 57 Appendix B2).
- Reduction in traffic on the A9 southbound between Longman and Smithton, Harbour Road and Millburn Road (Pages 55 and 56 Appendix B2).
- This option provides some integration with growth areas to the east of Inverness as it provides an alternative route from Inverness City Centre.
- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to close proximity to Moray Firth SAC, Inner Moray Firth SPA, and Longman and Castle Stuart Bays SSSI.
- Potential for release of contaminants to water bodies and groundwater as a result of construction in the former Longman Landfill site.

Based on the appraisal outcomes detailed in the AST Appendix B3.13, whilst this option performs well against some of the transport planning objectives there are significant technical challenges and environmental impacts caused by the choice of route through the former Longman landfill site and in proximity to areas of environmental designation. The Raigmore Segregated Left Turn Lane Option offers similar benefits with lower environmental impact.

This option was therefore not recommended to be taken forward to detailed appraisal.

5.5.1 Indicative Economic Appraisal

In relation to the indicative economic appraisal, the results for each option are summarised in Table 5-4. The table shows that the estimated cost of this option outweighs the benefits achieved, and it is not likely to provide a value for money.

5.5.2 Longman to Smithton Link Option Summary

Table 5-4 also summarises the transport planning objectives that each option meets, and the appraisal decision outcome on whether to progress the option to the next stage of appraisal.

Table 5-4 Longman to Smithton Link Option Summary

Objective/Option	Longman to Smithton Link
L1 To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓
L2.1 To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of trunk road junctions.	✓
L2.2 Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓
L3 To improve connectivity, particularly by public transport and active travel between Inverness City Centre and the growth area to the east including Inverness Airport.	✓
L4 To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions.	✓
L5.1 To improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout.	✓
L5.2 To improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network.	o
Indicative BCR	0.7
Progress to detailed appraisal	No

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit o Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

5.6 Raigmore Segregated Left Turn Lane

This option provides a segregated left turn lane at Raigmore Interchange from the A9 southbound to the A96 eastbound, as shown in Figure 3.14

5.6.1 Raigmore Segregated Left Turn Lane Appraisal Summary

The key appraisal outcomes, as presented in pages 50 to 53 in Appendix B2 and summarised in AST Appendix B3.14 for this option were:

- Positive contribution to the objectives of improving journey times and increased opportunities to travel between Inverness and Aberdeen [Appendix B3.14 L1], reducing conflicts for longer distance and local traffic for planned development areas to the east [Appendix B3.14 L2.2], improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions [Appendix B3.14 L4], and improving the operational performance of the trunk road network and junctions on the A9 [Appendix B3.14 L5.1],

- No impact on improving the road hierarchy in addressing the conflict between longer distance and local traffic [Appendix B3.14 L2.1], the connectivity, particularly by public transport and active travel, between Inverness City Centre and the growth area to the east [Appendix B3.14 L3], and improving the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network [Appendix B3.14 L5.2].
- Journey time saving for movements from the A9 North of Raigmore to the A96 (Page 53 Appendix B2).
- Reduction in traffic on Harbour Road and Millburn Road (Page 51 and 52 Appendix B2).
- This option provides relief at Raigmore Interchange, allowing capacity for increased traffic to the developments to the east (Pages 51 and 52 Appendix B2).
- Provides positive economic benefits.
- Potential biodiversity/habitat impacts due to proximity to Moray Firth SAC, and Inner Moray Firth SPA, Longman and Castle Stuart Bays SSSI.

Based on the appraisal outcomes detailed in the AST Appendix B3.14, this option performs well against the transport planning objectives and appraisal criteria and as a result the concept of a segregated left turn lane was initially recommended for selection for further consideration. However there were concerns about whether such an arrangement would comply with the DMRB and could be developed to address all safety considerations. This option also requires significant engineering structures.

On further consideration, this option was not recommended to be taken forward to detailed appraisal.

5.6.2 Indicative Economic Appraisal

In relation to the indicative economic appraisal, the results for each option are summarised in Table 5.5. The table shows that the provision of a segregated left turn at Raigmore is likely to provide value for money.

5.6.3 Raigmore Segregated Left turn Option Summary

Table 5.5 summarises the transport planning objectives that each option meets, and the appraisal decision outcome on whether to progress the option to the next stage of appraisal.

Table 5-5 Longman to Raigmore Link Option Summary

Objective/Option	Raigmore Segregated Left turn
L1 To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓
L2.1 To improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through the rationalisation of local movements use of Trunk road junctions.	o
L2.2 Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓
L3 To improve connectivity, particularly by public transport and active travel between Inverness City Centre and the growth area to the east including Inverness Airport.	o
L4 To improve the safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions.	✓
L5.1 To improve the operational performance of the Trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; south of Inshes and the Smithton Roundabout.	✓
L5.2 To improve the operational performance of the secondary network and junctions where this may improve the operation of the Trunk road network.	o
Indicative BCR	1.2
Progress to detailed appraisal	No

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit o Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

5.7 Initial Appraisal Summary

Following the initial appraisal of the individual options, which is summarised in the ASTs presented in Appendix B3, the following options were taken forward for detailed appraisal:

- Longman Junction Option 1;
- Longman Junction Options 3;
- Stevenson Road to Culloden Road Option 1;
- Inshes to Smithton Trunk Road Link (the current proposal);
- Inshes to Smithton Link Road Option 1; and
- Inshes to Smithton Link Road Option 4.

Following further consideration of Inshes to Smithton Link Road Option 4, it was agreed that a modified version of this option would also be taken forward to detailed appraisal. This option is identical to Inshes to Smithton Link Road Option 4, with the exception of the new A9 southbound merge and diverge slip roads that have been excluded. The roundabout on the link road was therefore no longer required and was also excluded. This option is denoted as Inshes to Smithton Option 4a and retains the existing A9 southbound slip roads at Inshes.

5.8 Option Packaging

Following the appraisal of the options, it was evident that no single options would be able to meet all the objectives and hence address all the problems identified. Table 5-6 summarises the performance of each individual option against the objectives.

Table 5-6 - Mapping of Objectives to Options

Planning objective/ option	Longman Option 1	Longman Option 3	Stevenson Road to Culloden Road Option 1	Inshes to Smithton Trunk Road Link	Inshes to Smithton Link Road Option 1	Inshes to Smithton Link Road Options 4	Inshes to Smithton Link Road Options 4a
L1	✓	✓	✓	✓✓	✓✓	✓✓	Sub-variant of Option 4.
L2.1	✓✓	✓✓	✓	✓✓	✓	✓✓	
L2.2	✓	✓	✓✓	✓✓	✓✓	✓✓	
L3	o	o	✓✓	×	o	✓	
L4	✓✓	✓✓	✓	✓	✓	✓	
L5.1	✓✓	✓✓	✓	✓✓	✓✓	✓✓	
L5.2	✓	✓	✓✓	✓	o	✓	

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit o Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

In order to achieve the objectives, selected individual options were therefore amalgamated into combined 'packages' for further assessment.

It was concluded that each combined package of options should include an improvement of Longman Junction, a new connection between Inshes and Smithton and a new crossing over the A9. It was also agreed that the new connection between Inshes and Smithton should include a connection to the retail park and the potential for a connection to Barn Church Road.

The four main combinations of options that were assessed are:

- Longman Option 1 (or Longman Option 3) + Inshes to Smithton trunk road link;
- Longman Option 1 (or Longman Option 3) + Inshes to Smithton Option 1 + Stevenson Road Option 1;
- Longman Option 1 (or Longman Option 3) + Inshes to Smithton Option 4a;
- Longman Option 1 (or Longman Option 3) + Inshes to Smithton Option 4; and

An additional link has also been included in all options, with the exception of the Inshes to Smithton Trunk Road option. This link connects to the Inverness Retail Park via an intermediate junction on the Inshes to Smithton Link Road. This link has been included as it provides an additional access to the retail park, relieving pressure on the A96.

6 Detailed Appraisal

6.1 Introduction

The appraisal of the four combined options was undertaken using the MFTM to determine the operational performance and the likely impacts on the trunk road network and junctions, and key local road routes. Various metrics were extracted from the models to assess the ability of each option to meet the transport planning objectives, and their performance against the transport related STAG criteria.

To measure the performance of the combined options against objectives 2.1 and 2.2, which relate to a reduction in the level of conflict between local and longer distance traffic, analysis was undertaken to identify and examine the likely impacts that the combined options have on local traffic movements, and on longer distance traffic movements. This consisted of identifying movements between zones where the trips were considered as being local trips, and then undertaking select link analyses in the MFTM at relevant links on the approaches to the trunk road junctions.

The assessment of each combined option against the STAG Environment criteria was based on the information from the individual option ASTs, and at this stage does not represent the cumulative impacts of the combined options.

6.2 Combined Options

The following combined options were assessed:

1. Combined Option A – comprising the Inshes to Smithton Trunk Road Link plus Longman Option 1, as shown in Figure 6-1.
2. Combined Option B – comprising Inshes to Smithton Link Road Option 1 plus Stevenson Road to Culloden Road Link Option 1 plus Longman Option 1, as shown in Figure 6-2.
3. Combined Option C – comprising Inshes to Smithton Option 4a plus Longman Option 1, as shown in Figure 6-3.
4. Combined Option D – comprising Inshes to Smithton Option 4 plus Longman Option 1, as shown in Figure 6-4.

Note that in accordance with the option sifting process Longman Option 3 was also taken forward for further appraisal. However, as the results of the traffic modelling assessment for Longman Option 3 were shown to be very similar to Longman Option 1 it has not been presented as a separate appraisal and specific ASTs have not been prepared. The appraisal process has confirmed that the principle of improving Longman junction to a grade separated layout provides significant performance benefits, and it is appropriate that the precise junction form will be developed during the next stage of assessment work.

Figure 6-1 - Option A layout Inshes to Smithton Trunk Road Link plus Longman Option 1

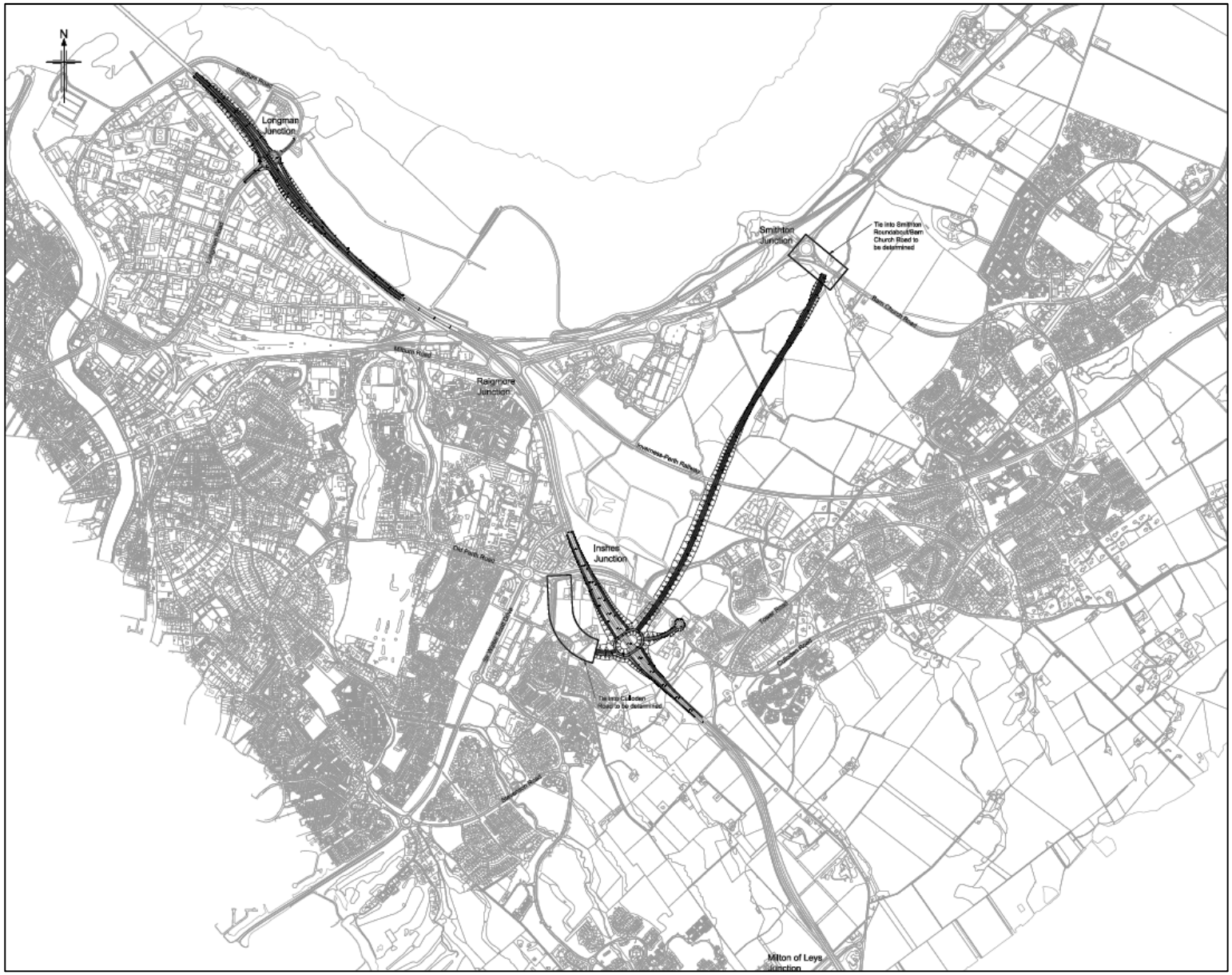


Figure 6-2 - Option B layout Inshes to Smithton Link Road Option 1 plus Stevenson Road to Culloden Road Link Option 1 plus Longman Option 1

Figure 6-3 - Option C layout Inshes to Smithton Option 4a plus Longman Option 1

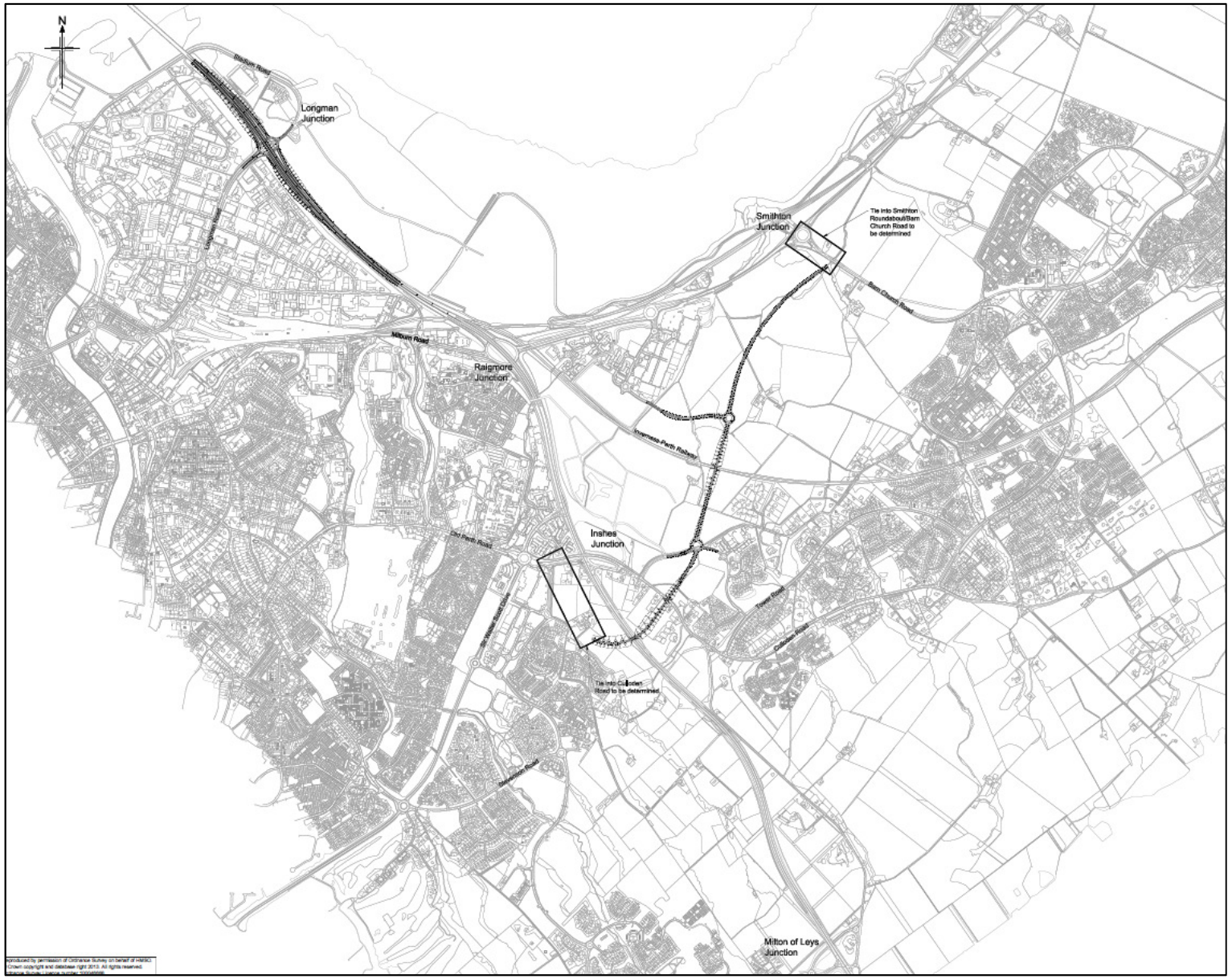


Figure 6-4 - Option D layout Inshes to Smithton Option 4 plus Longman Option 1

6.3 Modelling Assessment of the Combined Options

The following common modelling refinements were applied in the MFTM for all four of the Combined Options:

- Full signalisation of the Longman Option 1 grade separated roundabout;
- Signal adjustments at key junctions including the Culloden Road/A9 southbound diverge signalised junction;
- Wider network refinements to update junction delay calculations at key junctions to use the Intersection Capacity Analysis function;
- The assumption that a form of grade separated junction is in place at Smithton (the A96/Barn Church Road junction), and
- Refinement of the junction coding at the Smithton grade separated junction to better reflect the operation of the eastbound merge on to the A96. This was impacting traffic movements on the East Trunk Road Link in Combined Option A.

Further investigation of and refinements to the combined option model scenarios were undertaken to finalise the transport modelling aspects of the appraisal process. The relevant quantitative metrics for the four combined options were extracted and assessed, and provided input to the final set of ASTs. The full AST for each Combined Option is contained in Appendix C1, C2, C3 and C4.

Sections 6.4.1 to 6.4.4 summarise the outcomes from the modelling of the combined options.

6.3.1 Combined Option A

The operational performance of Combined Option A has been assessed with respect to journey times and traffic flows extracted from the transport model, with the outcomes of the appraisal contained in the AST included at Appendix C1.

Journey time information has been extracted from MFTM between the following key locations:

1. A9 Kessock Bridge;
2. Stadium Road;
3. A96 East of Smithton;
4. Barn Church Road;
5. Culloden Road east of the B9177;
6. A9 South of the Milton of Leys Junction;
7. Sir Walter Scott Drive South of Stevenson Road;
8. Old Perth Road;
9. Millburn Road; and
10. Harbour Road.

The locations of these locations are shown in Figure 6-5.

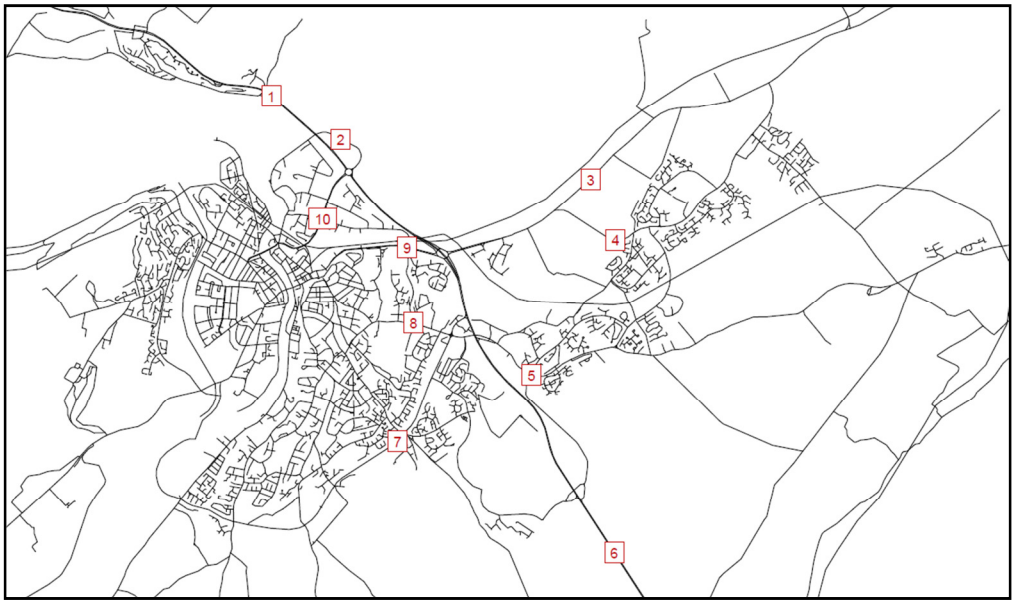


Figure 6-5 Journey Time Locations

A selection of journey time results are included in Table 6-1, with the most significant journey time changes as a result of Combined Option A discussed below.

The upgrade at Longman Roundabout improves journey times in the area. The journey times between the A96 East of Smithton and the A82 via Longman Junction are reduced by 46% in the AM peak and 28% in the PM peak. In the opposite direction there are more modest savings, with the AM peak journey time remaining the same as the Do Minimum and a 6% reduction occurring in the PM peak.

The improvements at Longman roundabout also provide significant journey time savings for traffic travelling to and from the Kessock Bridge in the both peaks, with reductions in journey times for the A96, Culloden Road, the A9 South of Milton of Leys and the Southern Distributor Road movements (Table 6-1).

The inclusion of the Inshes to Smithton link road within this option removes the South to East and East to South movement from Raigmore Interchange and in doing so improves the performance of Raigmore Interchange. Journey times between the A96 East of Smithton and the Milburn Road / Harbour Road junction are reduced by 47% in the AM peak and by 17% in the PM peak. In the opposite direction, journey times are reduced by 3% in the AM peak and remain the same in the PM peak.

Similarly, the inclusion of the Inshes to Smithton Trunk Link Road also has a significant impact on the journey time between the A96 East of Smithton and the Culloden Road and Inshes areas in both directions and both peaks, reducing the journey times by between 40% and 65%. There is a similar level of journey time saving in the opposite direction.

The inclusion of a gyratory at the Inshes Junction with the A9 alleviates delay for traffic from the Culloden and Inshes area joining the strategic network. Journey times between Culloden Road and the Kessock Bridge reduced by 50% in the AM Peak and 39% in the PM Peak (Table 6-1), and journey times between the Southern Distributor Road (SDR) and the Kessock Bridge reduce by 40% in the AM Peak and 13% in the PM Peak (Table 6-1). The journey time savings from this area are a result of the combined improvements at both Inshes and Longman Junctions.

A more detailed set of journey time analysis results are found on pages 24 and 25 of Appendix C1 (Combined Option A AST).

Table 6-1 2031 Journey Time Changes (Seconds) for Option A

From Point	To Point	Do min		Opt A		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	Stadium Road	398	181	192	177	-206	-4	-52%	-2%
A9 Kessock Bridge	A96 East of Smithton	523	343	302	294	-221	-49	-42%	-14%
A9 Kessock Bridge	Barn Church Road	559	391	353	363	-207	-28	-37%	-7%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	292	281	-304	-138	-51%	-33%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	365	366	-247	-31	-40%	-8%
A9 Kessock Bridge	Sir Walter Scott Drive South of Stevenson Road	702	721	437	488	-265	-233	-38%	-32%
A9 Kessock Bridge	Old Perth Rd	663	663	468	460	-195	-203	-29%	-31%
A9 Kessock Bridge	Milburn Rd	582	344	368	305	-214	-39	-37%	-11%
A9 Kessock Bridge	A82	429	201	213	193	-216	-7	-50%	-4%
Stadium Road	A9 Kessock Bridge	453	409	248	243	-205	-166	-45%	-40%
Stadium Road	A96 East of Smithton	299	343	353	349	54	6	18%	2%
Stadium Road	Barn Church Road	335	390	404	418	68	27	20%	7%
Stadium Road	Culloden Road east of B9177	372	418	344	336	-28	-82	-8%	-20%
Stadium Road	A9 South of Milton of Leys	388	397	416	421	28	24	7%	6%
Stadium Road	Sir Walter Scott Drive South of Stevenson Road	478	721	488	542	10	-178	2%	-25%
Stadium Road	Old Perth Rd	439	662	519	515	81	-147	18%	-22%
Stadium Road	Milburn Rd	358	344	419	360	61	17	17%	5%
Stadium Road	A82	220	265	266	264	46	-1	21%	0%
A96 East of Smithton	A9 Kessock Bridge	761	492	347	297	-413	-195	-54%	-40%

From Point	To Point	Do min		Opt A		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A96 East of Smithton	Stadium Road	848	535	449	375	-399	-160	-47%	-30%
A96 East of Smithton	Barn Church Road	81	95	72	87	-9	-8	-11%	-9%
A96 East of Smithton	Culloden Road east of B9177	502	366	173	171	-328	-195	-65%	-53%
A96 East of Smithton	A9 South of Milton of Leys	518	344	295	305	-223	-38	-43%	-11%
A96 East of Smithton	Sir Walter Scott Drive South of Stevenson Road	607	668	317	377	-290	-290	-48%	-44%
A96 East of Smithton	Old Perth Rd	568	609	360	350	-209	-260	-37%	-43%
A96 East of Smithton	Milburn Rd	396	175	208	146	-187	-29	-47%	-17%
A96 East of Smithton	A82	696	432	374	312	-322	-120	-46%	-28%
Barn Church Road	A9 Kessock Bridge	809	530	476	366	-333	-163	-41%	-31%
Barn Church Road	Stadium Road	896	572	578	444	-318	-128	-35%	-22%
Barn Church Road	A96 East of Smithton	92	85	128	83	35	-2	38%	-2%
Barn Church Road	Culloden Road east of B9177	549	403	247	199	-303	-205	-55%	-51%
Barn Church Road	A9 South of Milton of Leys	566	382	368	333	-198	-48	-35%	-13%
Barn Church Road	Sir Walter Scott Drive South of Stevenson Road	655	706	391	405	-264	-300	-40%	-43%
Barn Church Road	Old Perth Rd	616	647	433	377	-183	-270	-30%	-42%
Barn Church Road	Milburn Rd	444	213	337	215	-107	2	-24%	1%
Barn Church Road	A82	725	451	483	362	-242	-90	-33%	-20%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	346	336	-352	-219	-50%	-39%
Culloden Road east	Stadium Road	785	598	448	414	-337	-184	-43%	-31%

From Point	To Point	Do min		Opt A		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
of B9177									
Culloden Road east of B9177	A96 East of Smithton	548	529	279	257	-269	-272	-49%	-51%
Culloden Road east of B9177	Barn Church Road	584	577	297	288	-287	-288	-49%	-50%
Culloden Road east of B9177	A9 South of Milton of Leys	190	190	189	190	0	0	0%	0%
Culloden Road east of B9177	Sir Walter Scott Drive South of Stevenson Road	319	319	319	319	0	0	0%	0%
Culloden Road east of B9177	Old Perth Rd	304	256	240	234	-64	-23	-21%	-9%
Culloden Road east of B9177	Milburn Rd	425	351	287	255	-138	-96	-33%	-27%
Culloden Road east of B9177	A82	633	495	373	351	-260	-144	-41%	-29%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	350	355	-220	-129	-39%	-27%
A9 South of Milton of Leys	Stadium Road	657	527	451	434	-205	-94	-31%	-18%
A9 South of Milton of Leys	A96 East of Smithton	420	458	327	338	-93	-121	-22%	-26%
A9 South of Milton of Leys	Barn Church Road	457	506	345	369	-111	-137	-24%	-27%
A9 South of Milton of Leys	Culloden Road east of B9177	236	264	230	245	-6	-19	-2%	-7%
A9 South of Milton of Leys	Sir Walter Scott Drive South of Stevenson Road	357	385	343	389	-14	4	-4%	1%
A9 South of Milton of Leys	Old Perth Rd	314	338	385	363	70	25	22%	7%
A9 South of Milton of Leys	Milburn Rd	297	281	291	275	-7	-6	-2%	-2%
A9 South of Milton of Leys	A82	505	425	376	370	-129	-54	-25%	-13%
Sir Walter Scott	A9 Kessock Bridge	718	542	432	471	-286	-71	-40%	-13%

From Point	To Point	Do min		Opt A		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Drive South of Stevenson Road									
Sir Walter Scott Drive South of Stevenson Road	Stadium Road	871	591	543	556	-328	-35	-38%	-6%
Sir Walter Scott Drive South of Stevenson Road	A96 East of Smithton	576	522	374	398	-203	-124	-35%	-24%
Sir Walter Scott Drive South of Stevenson Road	Barn Church Road	613	570	374	430	-239	-140	-39%	-25%
Sir Walter Scott Drive South of Stevenson Road	Culloden Road east of B9177	346	308	302	299	-44	-9	-13%	-3%
Sir Walter Scott Drive South of Stevenson Road	A9 South of Milton of Leys	458	441	423	458	-34	17	-8%	4%
Sir Walter Scott Drive South of Stevenson Road	Milburn Rd	391	345	381	394	-10	50	-2%	14%
Sir Walter Scott Drive South of Stevenson Road	A82	592	489	467	493	-124	4	-21%	1%
Old Perth Rd	A9 Kessock Bridge	582	497	304	331	-279	-166	-48%	-33%
Old Perth Rd	Stadium Road	670	539	406	409	-264	-131	-39%	-24%
Old Perth Rd	A96 East of Smithton	433	470	380	467	-52	-4	-12%	-1%
Old Perth Rd	Barn Church Road	469	518	399	499	-71	-19	-15%	-4%
Old Perth Rd	A9 South of Milton of Leys	429	495	489	523	60	28	14%	6%
Old Perth Rd	Culloden Road east of B9177	249	291	257	299	8	8	3%	3%
Old Perth Rd	Sir Walter Scott Drive South of Stevenson Road	210	291	212	276	1	-15	1%	-5%
Old Perth Rd	A82	296	306	285	280	-11	-26	-4%	-8%

From Point	To Point	Do min		Opt A		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Milburn Rd	A9 Kessock Bridge	421	329	201	221	-221	-108	-52%	-33%
Milburn Rd	Stadium Road	509	371	303	299	-206	-73	-41%	-20%
Milburn Rd	A96 East of Smithton	179	190	174	190	-5	1	-3%	0%
Milburn Rd	Barn Church Road	216	238	225	259	9	22	4%	9%
Milburn Rd	Culloden Road east of B9177	344	381	288	299	-55	-82	-16%	-22%
Milburn Rd	A9 South of Milton of Leys	360	359	361	384	1	24	0%	7%
Milburn Rd	Sir Walter Scott Drive South of Stevenson Road	449	683	433	505	-17	-178	-4%	-26%
A82	A9 Kessock Bridge	299	208	155	181	-144	-28	-48%	-13%
A82	Stadium Road	393	251	211	208	-182	-43	-46%	-17%
A82	A96 East of Smithton	366	387	366	365	0	-22	0%	-6%
A82	Barn Church Road	402	435	416	434	14	-1	3%	0%
A82	Culloden Road east of B9177	584	489	346	353	-238	-137	-41%	-28%
A82	A9 South of Milton of Leys	600	468	419	438	-181	-30	-30%	-6%
A82	Sir Walter Scott Drive South of Stevenson Road	689	792	553	645	-136	-147	-20%	-19%
A82	Old Perth Rd	650	733	522	532	-129	-202	-20%	-28%

The introduction of the Inshes to Smithton Link Road attracts approximately 1,500 vehicles (two-way) in both peaks as shown in Figures 6-6 and 6-7. This results in a reduction in traffic on the A96 to the east of Raigmore Interchange, and on the A9 between Raigmore Interchange and Inshes Junction. The provision of the new junction at Inshes provides an additional crossing over the A9. This reduces the traffic on the Culloden Road overbridge by approximately 40% in the AM Peak and 80% in the PM Peak.

The improvements at Longman have improved the operation of the junction, which has increased the traffic flows on the surrounding links in both peaks as seen in Figures 6-6 and 6-7.

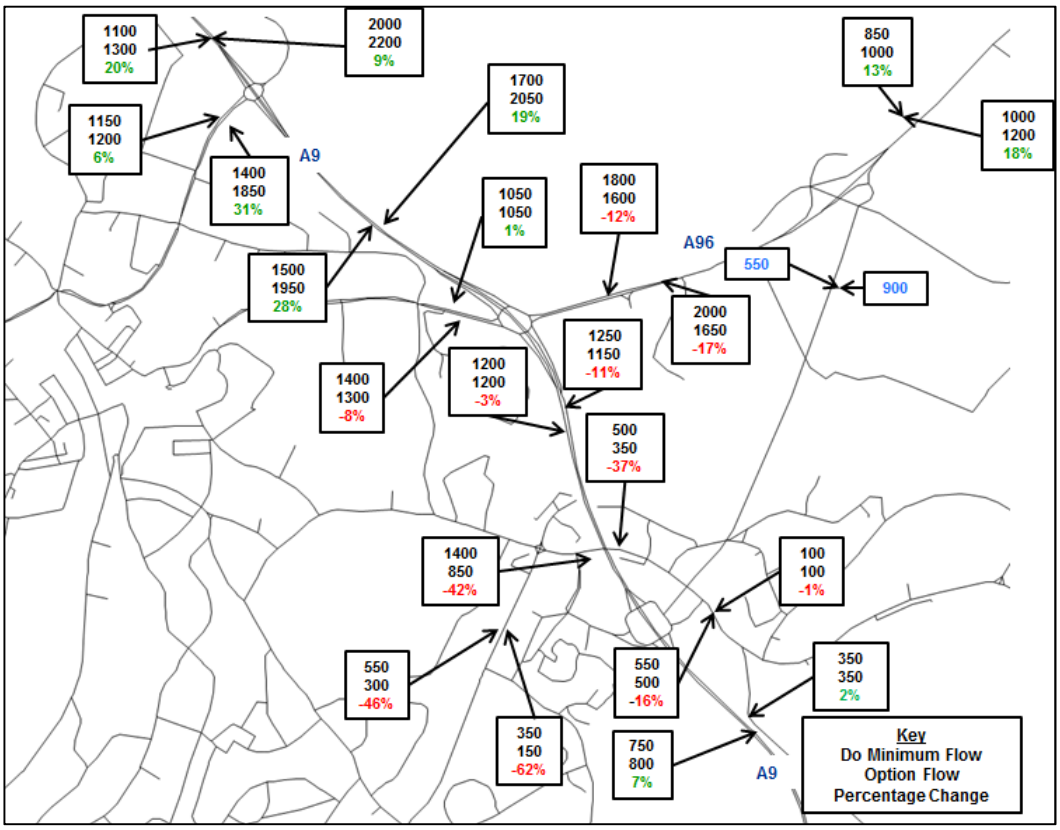


Figure 6-6 Option A 2031 AM Peak Flow Difference

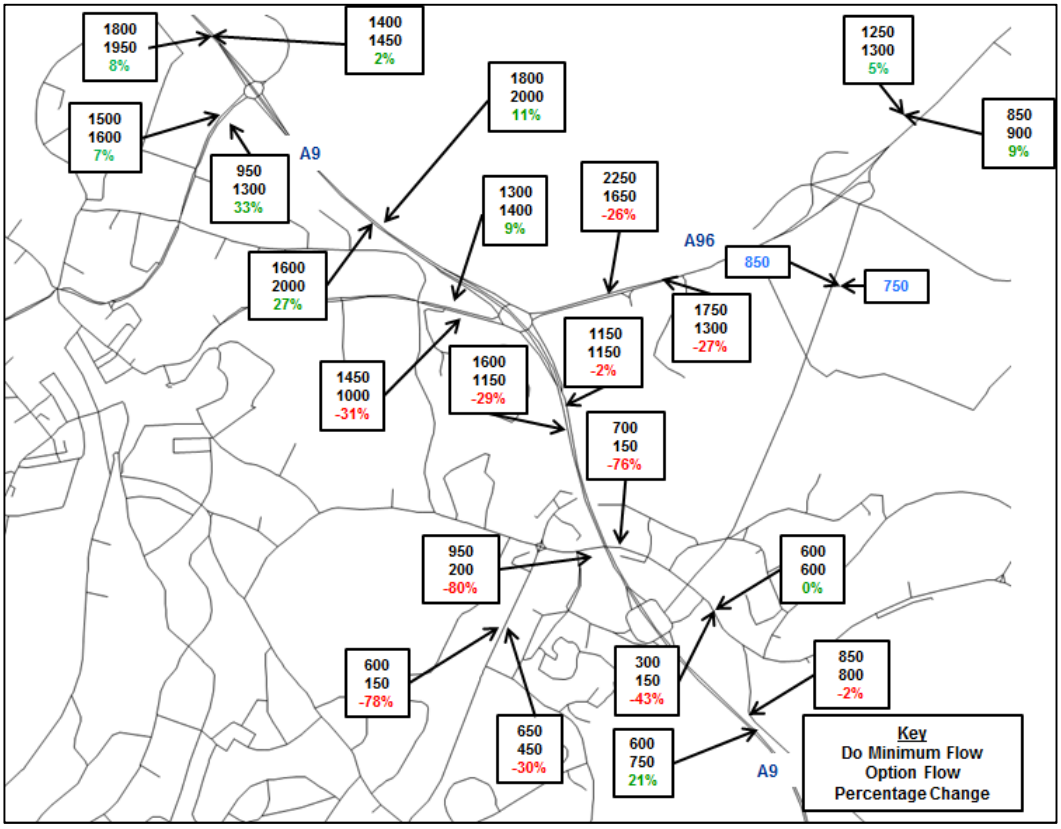
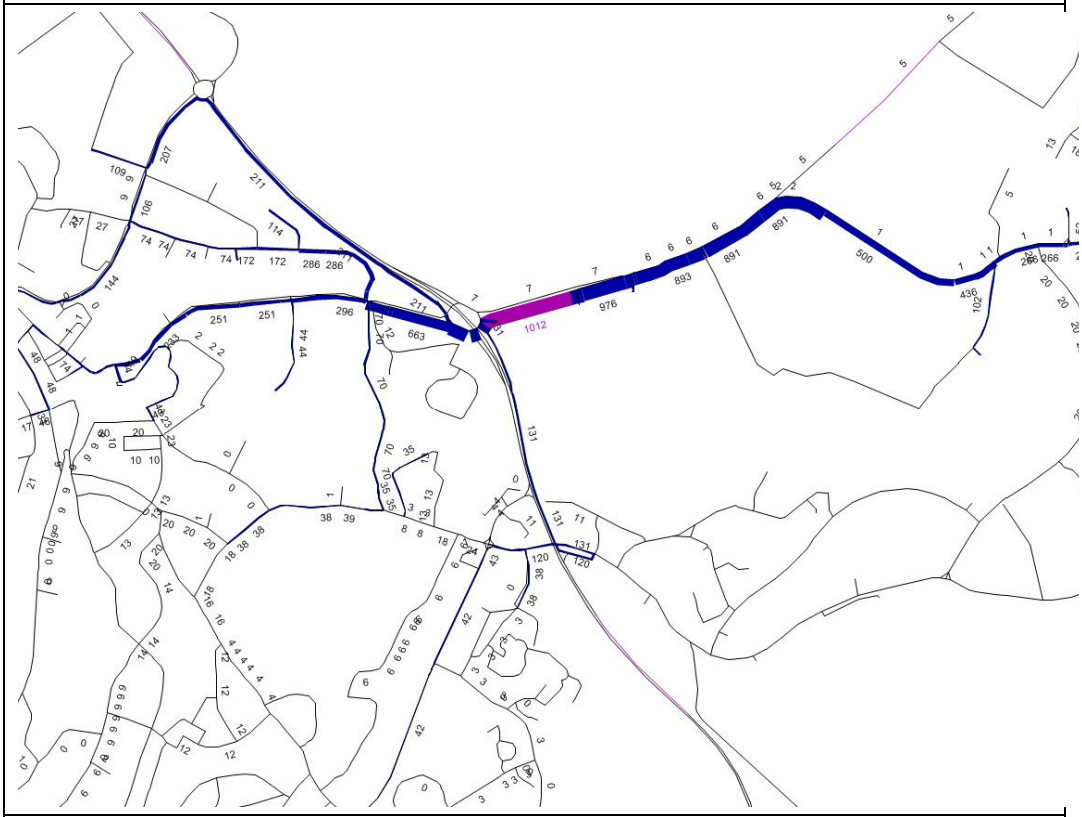


Figure 6-7 Option A 2031 PM Peak Flow Difference

The provision of the Inshes to Smithton link road reduces the conflict between local and strategic traffic at Raigmore Interchange. Whilst local and strategic trips will both use the link road, the number of local trips passing through Raigmore Interchange will reduce by approximately 25% westbound in the AM Peak and 30% eastbound in the PM Peak. This is illustrated through the select link analysis results shown in Figures 6-8 and 6-9.

The improvements at Longman Junction have resulted in an increase in local traffic using it to travel via the A82 in the westbound direction in the AM peak (50%), and in the eastbound direction in the PM peak (33%). Whilst local traffic levels using Longman Junction increase, overall the level of conflict between local and longer distance traffic is reduced as there is a reduction in the number of conflict points as a result of grade separating the A9 straight-through movements.

Do Min 2031 AM peak – Select Link Analysis A96 Westbound



Opt A 2031 AM Peak – Select Link Analysis A96 Westbound

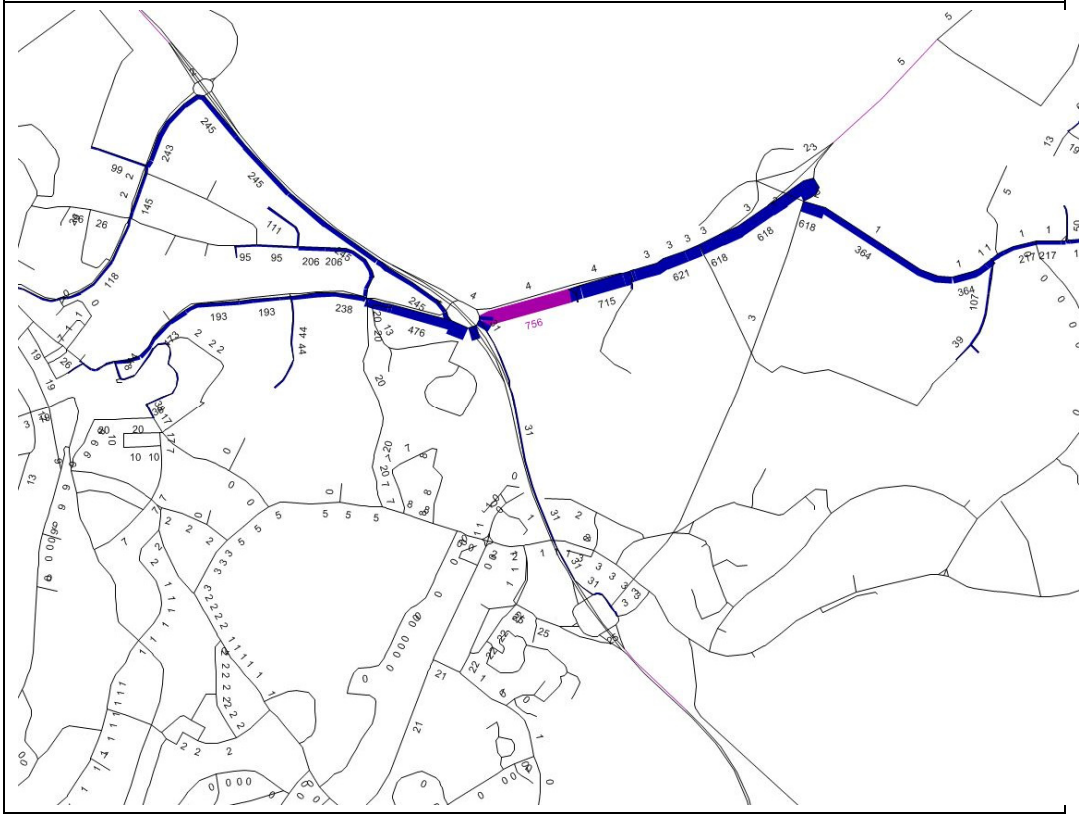
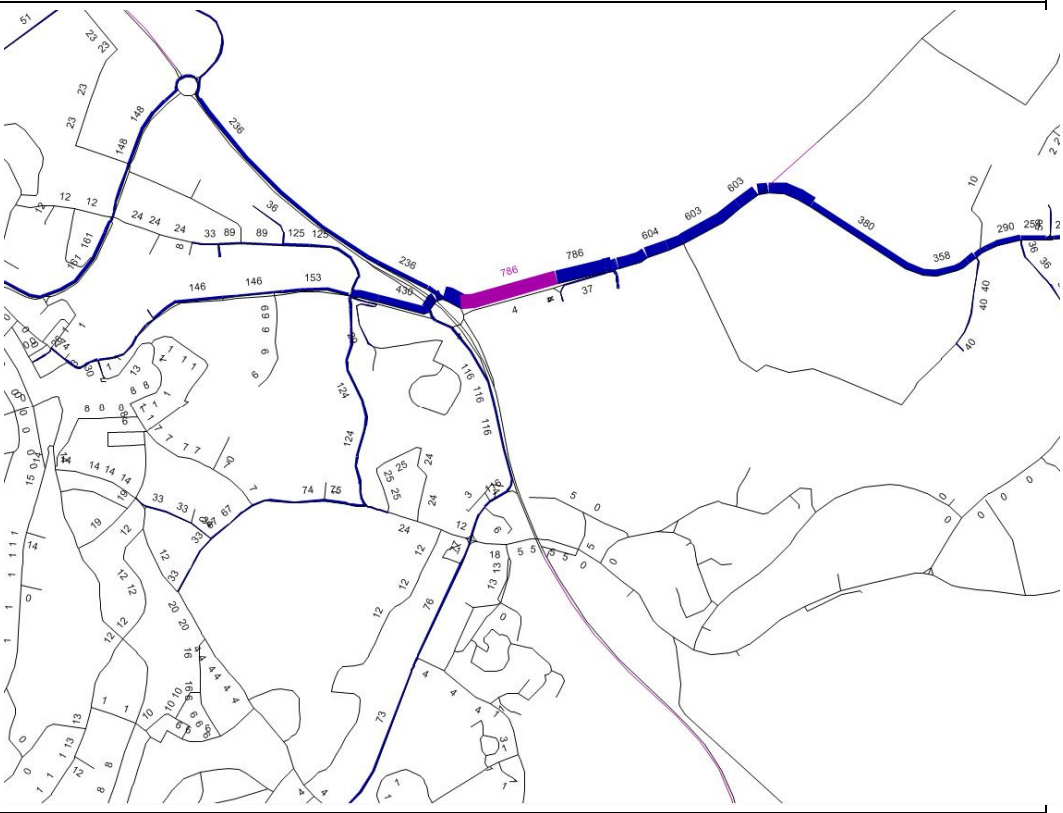


Figure 6-8 Select Link Analysis at Raigmore Interchange in the AM Peak

Do Min 2031 PM Peak – Select Link Analysis A96 Eastbound



Opt A 2031 PM Peak – Select Link Analysis A96 Eastbound

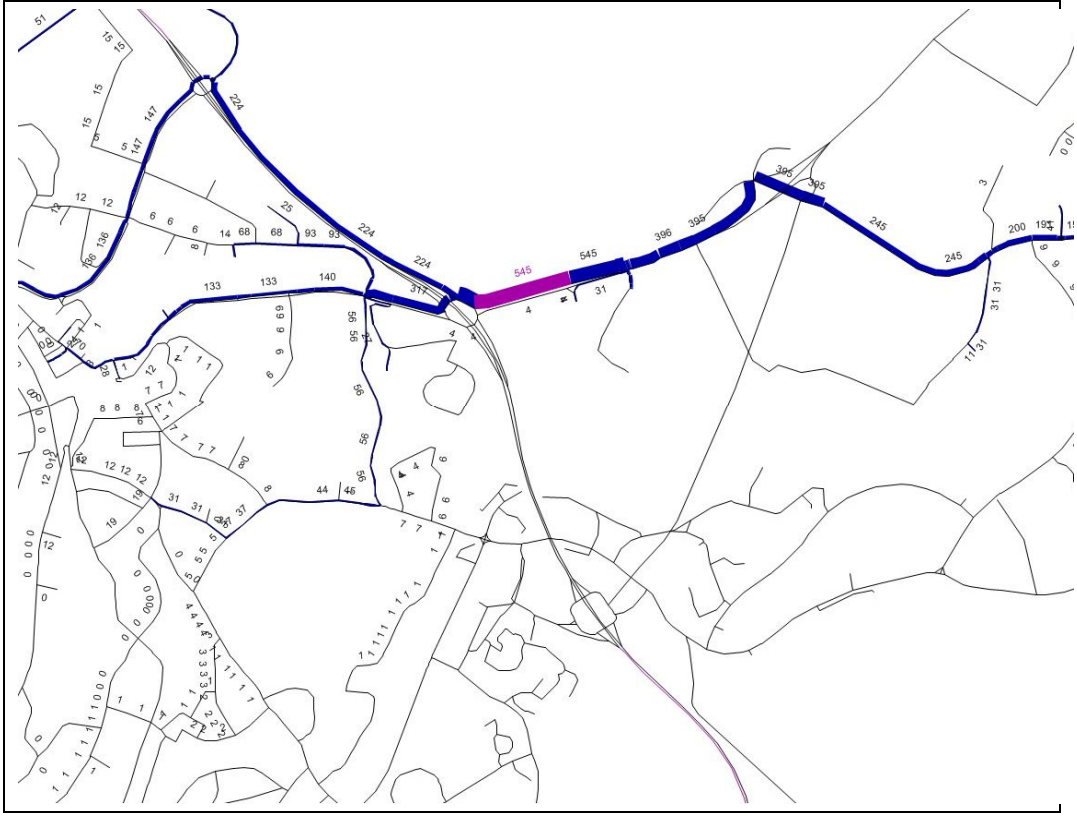


Figure 6-9 Select Link Analysis at Raigmore Interchange in the PM Peak

The indicative economic appraisal (TUBA only) shows that the option provides a low level of economic benefits in relation to the investment required, with a Benefit to Cost Ratio (BCR) of approximately 0.8[1].

Table 6-2 contains a summary of the appraisal of Combined Option A against the transport planning objectives, and the key appraisal impacts of the option against the STAG criteria.

Table 6-2 Combined Option A - Appraisal Summary

Criterion	Combined Option A
Objective L1 – Improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness. (Appendix C1 Page 4)	**Moderate Benefit** This option reduces the south to east and east to south movement through Raigmore Interchange, improving the operation of the junction, resulting in journey time savings approaching Inverness. Whilst this option does not directly increase the opportunities to travel by public transport, it will provide improvement in journey times for bus services accessing Inverness via the A96.
Objective L2.1 – Improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through rationalisation of local movements' use of trunk road junctions (Appendix C1 Page 4)	**Moderate Benefit** The road network hierarchy is improved through the provision of grade separation at Longman, the development of a new grade separated junction at Inshes and the new link road between Smithton and Caulfield Road North.
Objective L2.2 – Reduce conflicts for longer distance and local traffic for planned development areas to the east. (Appendix C1 Page 5)	**Minor Benefit** The link road provides a dedicated link for traffic travelling between the A9 and the A96, whilst removing a degree of local traffic from Raigmore Interchange.
Objective L3 – Improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport. (Appendix C1 Page 5)	**Minor Negative Impact** There are no junctions along the Trunk Link Road to allow public transport to serve the communities in between. It is difficult to accommodate active travel in this option due to the link road being a dual carriageway trunk road.
Objective L4 – Improve safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions. (Appendix C1 Page 5)	**Moderate Benefit** Both Longman and Inshes Junctions will be built to modern safety standards. Grade Separating Longman will remove the A9 through traffic from the junction. Longman Junction will be controlled by traffic signals, reducing the conflict between movements.
Objective L5.1 – Improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; South of Inshes and the Smithton Roundabout.	**Moderate Benefit** The operation of Inshes Junction will be improved as it is being upgraded to a grade separated gyratory. The grade separation of Longman junction will separate long distance A9 traffic from

[1] The TUBA appraisal software requires a single cost as input so for the purposes of the economic appraisal a capital cost estimate of £119.2m has been used.

(Appendix C1 Page 6)	local movements. The operation of Raigmore Interchange will improve as the link road reduces the level of traffic passing through it.
Objective L5.2 – Improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network. (Appendix C1 Page 6)	**Minor Benefit** This option shows a reduction in traffic on the local roads, suggesting a transfer of traffic away from the B9006 Tower Road onto the new link road, and a transfer of traffic from Harbour Road and Milburn Road onto the A82 Longman Road.
STAG Environment (Appendix C1 Pages 8 - 13)	**Habitats and Biodiversity – Moderate to Major Impact** Construction of Longman Junction and the Inshes to Smithton link road could impact on the Moray Firth (SAC), Inner Moray Firth (SPA) and Longman and Castle Stuart Bays SSSI through disruption to foraging patterns and flightlines of qualifying species. Disruption of the former landfill could release potential contaminants. **Landscape and Visual - Major Negative Impact** The construction of the link road leads to an impact in relation to landscape character due to the introduction of road and traffic (on embankment and bridge over the railway) into an open, relatively flat landscape. The National Cycle Way and Core Path are also severed. Construction of the A9 Inshes junction is likely to significantly impact on the visual amenity of residents to the north of Inshes. **Global and Local Air Quality/Noise and Vibration – Major Negative Impact** The link road alignment goes through an area of mainly agricultural land, with a junction constructed to the north of Inshes.
STAG Safety (Appendix C1 Page 13)	**Moderate Benefit** Grade separation of Longman Junction will remove some of the conflict at the junction and make it safer for Non-Motorised Users. There are traffic reductions on the A96 approach to Raigmore and the local road network around Inshes which will lead to improved safety.
STAG Economy (Appendix C1 Pages 13 and 14)	**Minor Negative Impact** Significant benefits are derived from traffic travelling between the A96 and South Inverness, traffic travelling along the A9 and traffic travelling between the Kessock Bridge and A96. BCR of approximately 0.8[1]
STAG Integration(Appendix C1 Page 15)	**Minor Negative Impact** Improved operation of the trunk road junctions should result in a benefit to bus journey times. This option is less well integrated with the Highland Council's proposed developments at east Inverness, as there is no provision for direct access to be taken off the trunk road link itself.
STAG Accessibility & Social Inclusion (Appendix C1 Page 16)	**Moderate Negative Impact** Inshes to Smithton Link Road passes through

	undeveloped land and severs a Core Path and National Cycle Route.

The option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

The improvements at Longman Junction provide journey time savings for all movements through the junction. The inclusion of the Inshes to Smithton Trunk Link Road, and gyratory junction at Inshes, results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound and around the Smithton and Culloden areas.

There are however, major negative impacts associated with this option under the environment criteria of Habitats and Biodiversity, Landscape and Visual, and Air Quality, Noise and Vibration. The option also results in moderate negative impacts for Accessibility and Social Inclusion.

It is therefore not recommended that this option be taken forward for design development.

6.3.2 Combined Option B

The operational performance of Combined Option B has been assessed with respect to journey times and traffic flows extracted from the transport model, with the outcomes of the appraisal contained in the AST included at Appendix C2.

Journey time information has been extracted from MFTM between the following key locations:

1. A9 Kessock Bridge;
2. Stadium Road;
3. A96 East of Smithton;
4. Barn Church Road;
5. Culloden Road east of the B9177;
6. A9 South of the Milton of Leys Junction;
7. Sir Walter Scott Drive South of Stevenson Road;
8. Old Perth Road;
9. Millburn Road; and
10. Harbour Road.

The locations of these points are shown in Figure 6-10.

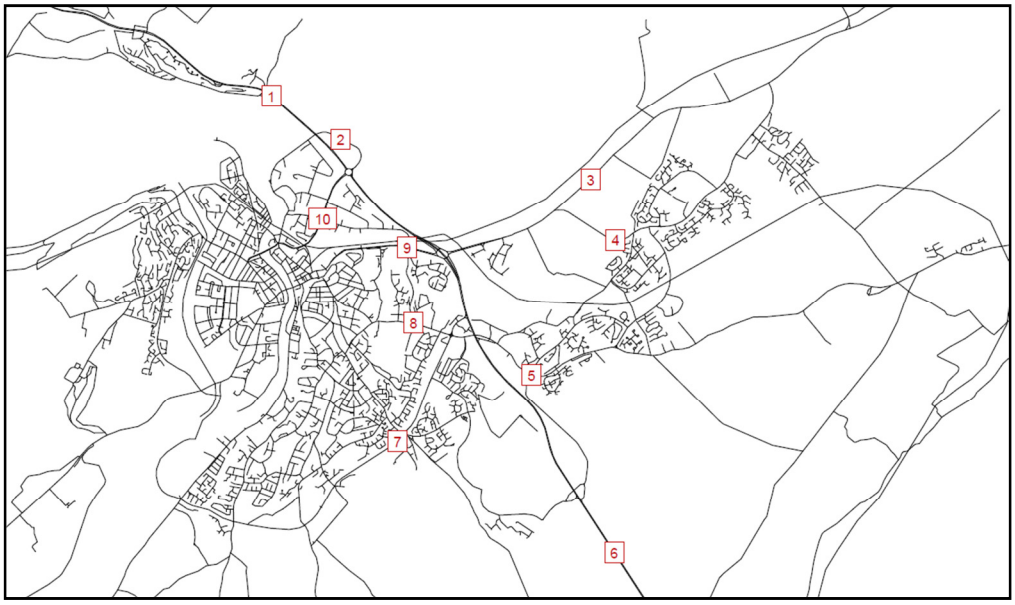


Figure 6-10 Journey Time Locations

A selection of journey time results are included in Table 6-3, with the most significant journey time changes as a result of Combined Option B discussed below.

The upgrade at Longman Roundabout improves journey times in the area. The journey times between the A96 East of Smithton and the A82 via Longman Junction are reduced by 38% in the AM peak and 25% in the PM peak. In the opposite direction there are more modest savings, with the AM peak journey time reducing by approximately 7% and the PM Peak journey time reducing by 11%.

The improvements at Longman roundabout also provide significant journey time savings for traffic travelling to and from the Kessock Bridge in the both peaks, with reductions in journey times for the A96, Culloden Road, the A9 South of Milton of Leys and the Southern Distributor Road movements (Table 6-3).

The inclusion of the Inshes to Smithton link road within this option removes the South to East and East to South movement from Raigmore Interchange and in doing so improves the performance of Raigmore Interchange. Journey times between the A96 East of Smithton and the Milburn Road / Harbour Road junction are reduced by 33% in the AM peak and by 15% in the PM peak. In the opposite direction, journey times are reduced by 8% in the AM peak and by 10% in the PM peak.

Similarly, the inclusion of the Inshes to Smithton Link Road also has a significant impact on the journey time between the A96 East of Smithton and the Culloden Road and Inshes areas in both directions and both peaks, reducing the journey times by between 30% and 50%. There is a similar level of journey time saving in the opposite direction.
The provision of an additional crossing of the A9 at Stevenson Road has reduced the journey time between Culloden Road and the Southern Distributor Road, and between the Southern Distributor Road and the A9 Milton of Leys Junction. The Stevenson Road Link provides an alternative access to the A9 for vehicles travelling south from the Southern Distributor Road. Vehicles would previously join the A9 at Inshes Junction, however they can now access the B9177 via the Stevenson Road link and join the A9 at the Milton of Leys Junction.

A more detailed set of journey time analysis results are found on pages 28 and 29 of Appendix C2 (Combined Option B AST).

Table 6-3 2031 Journey Time Changes (Seconds) for Option B

From Point	To Point	Do min		Opt B		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	Stadium Road	398	181	203	178	-196	-3	-49%	-2%
A9 Kessock Bridge	A96 East of Smithton	523	343	290	285	-232	-58	-44%	-17%
A9 Kessock Bridge	Barn Church Road	559	391	340	345	-220	-46	-39%	-12%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	319	331	-277	-87	-46%	-21%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	373	367	-239	-30	-39%	-8%
A9 Kessock Bridge	Sir Walter Scott Drive South of Stevenson Road	702	721	486	445	-216	-276	-31%	-38%
A9 Kessock Bridge	Old Perth Rd	663	663	456	395	-207	-267	-31%	-40%
A9 Kessock Bridge	Milburn Rd	582	344	389	295	-193	-49	-33%	-14%
A9 Kessock Bridge	A82	429	201	230	190	-199	-11	-46%	-5%
Stadium Road	A9 Kessock Bridge	453	409	230	244	-223	-165	-49%	-40%
Stadium Road	A96 East of Smithton	299	343	334	332	35	-10	12%	-3%
Stadium Road	Barn Church Road	335	390	383	392	48	2	14%	0%
Stadium Road	Culloden Road east of B9177	372	418	363	379	-10	-40	-3%	-9%
Stadium Road	A9 South of Milton of Leys	388	397	416	414	28	17	7%	4%
Stadium Road	Sir Walter Scott Drive South of Stevenson Road	478	721	529	492	51	-228	11%	-32%
Stadium Road	Old Perth Rd	439	662	499	443	60	-220	14%	-33%
Stadium Road	Milburn Rd	358	344	432	342	75	-2	21%	0%
Stadium Road	A82	220	265	264	272	44	7	20%	3%
A96 East of Smithton	A9 Kessock Bridge	761	492	416	321	-345	-171	-45%	-35%

From Point	To Point	Do min		Opt B		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A96 East of Smithton	Stadium Road	848	535	511	321	-337	-214	-40%	-40%
A96 East of Smithton	Barn Church Road	81	95	70	81	-10	-14	-13%	-15%
A96 East of Smithton	Culloden Road east of B9177	502	366	235	237	-267	-129	-53%	-35%
A96 East of Smithton	A9 South of Milton of Leys	518	344	350	322	-168	-22	-32%	-6%
A96 East of Smithton	Sir Walter Scott Drive South of Stevenson Road	607	668	437	438	-170	-230	-28%	-34%
A96 East of Smithton	Old Perth Rd	568	609	433	420	-135	-189	-24%	-31%
A96 East of Smithton	Milburn Rd	396	175	264	150	-132	-26	-33%	-15%
A96 East of Smithton	A82	696	432	434	326	-262	-106	-38%	-25%
Barn Church Road	A9 Kessock Bridge	809	530	506	389	-303	-141	-37%	-27%
Barn Church Road	Stadium Road	896	572	601	463	-295	-109	-33%	-19%
Barn Church Road	A96 East of Smithton	92	85	87	80	-5	-5	-5%	-6%
Barn Church Road	Culloden Road east of B9177	549	403	232	234	-317	-169	-58%	-42%
Barn Church Road	A9 South of Milton of Leys	566	382	421	422	-145	41	-26%	11%
Barn Church Road	Sir Walter Scott Drive South of Stevenson Road	655	706	541	467	-114	-238	-17%	-34%
Barn Church Road	Old Perth Rd	616	647	511	418	-105	-230	-17%	-35%
Barn Church Road	Milburn Rd	444	213	354	218	-89	5	-20%	2%
Barn Church Road	A82	725	451	505	375	-221	-77	-30%	-17%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	488	444	-209	-111	-30%	-20%
Culloden Road east	Stadium Road	785	598	584	519	-201	-79	-26%	-13%

From Point	To Point	Do min		Opt B		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
of B9177									
Culloden Road east of B9177	A96 East of Smithton	548	529	221	257	-327	-271	-60%	-51%
Culloden Road east of B9177	Barn Church Road	584	577	210	253	-374	-324	-64%	-56%
Culloden Road east of B9177	A9 South of Milton of Leys	190	190	181	182	-9	-7	-5%	-4%
Culloden Road east of B9177	Sir Walter Scott Drive South of Stevenson Road	319	319	319	319	0	0	0%	0%
Culloden Road east of B9177	Old Perth Rd	304	256	300	284	-5	28	-2%	11%
Culloden Road east of B9177	Milburn Rd	425	351	420	355	-6	4	-1%	1%
Culloden Road east of B9177	A82	633	495	507	449	-126	-46	-20%	-9%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	357	365	-213	-120	-37%	-25%
A9 South of Milton of Leys	Stadium Road	657	527	452	439	-205	-88	-31%	-17%
A9 South of Milton of Leys	A96 East of Smithton	420	458	404	412	-16	-47	-4%	-10%
A9 South of Milton of Leys	Barn Church Road	457	506	475	509	18	3	4%	1%
A9 South of Milton of Leys	Culloden Road east of B9177	236	264	232	228	-4	-36	-2%	-14%
A9 South of Milton of Leys	Sir Walter Scott Drive South of Stevenson Road	357	385	353	383	-4	-2	-1%	0%
A9 South of Milton of Leys	Old Perth Rd	314	338	314	340	0	1	0%	0%
A9 South of Milton of Leys	Milburn Rd	297	281	288	276	-9	-5	-3%	-2%
A9 South of Milton of Leys	A82	505	425	376	370	-130	-55	-26%	-13%
Sir Walter Scott	A9 Kessock Bridge	718	542	460	403	-258	-139	-36%	-26%

From Point	To Point	Do min		Opt B		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Drive South of Stevenson Road									
Sir Walter Scott Drive South of Stevenson Road	Stadium Road	871	591	564	485	-306	-106	-35%	-18%
Sir Walter Scott Drive South of Stevenson Road	A96 East of Smithton	576	522	444	450	-133	-72	-23%	-14%
Sir Walter Scott Drive South of Stevenson Road	Barn Church Road	613	570	432	468	-180	-102	-29%	-18%
Sir Walter Scott Drive South of Stevenson Road	Culloden Road east of B9177	346	308	189	194	-156	-113	-45%	-37%
Sir Walter Scott Drive South of Stevenson Road	A9 South of Milton of Leys	458	441	366	372	-92	-69	-20%	-16%
Sir Walter Scott Drive South of Stevenson Road	Milburn Rd	391	345	387	322	-4	-23	-1%	-7%
Sir Walter Scott Drive South of Stevenson Road	A82	592	489	488	416	-104	-73	-18%	-15%
Old Perth Rd	A9 Kessock Bridge	582	497	358	360	-224	-137	-39%	-28%
Old Perth Rd	Stadium Road	670	539	453	434	-216	-105	-32%	-19%
Old Perth Rd	A96 East of Smithton	433	470	405	407	-27	-64	-6%	-14%
Old Perth Rd	Barn Church Road	469	518	366	415	-104	-103	-22%	-20%
Old Perth Rd	A9 South of Milton of Leys	429	495	434	457	5	-38	1%	-8%
Old Perth Rd	Culloden Road east of B9177	249	291	242	285	-7	-6	-3%	-2%
Old Perth Rd	Sir Walter Scott Drive South of Stevenson Road	210	291	208	267	-2	-24	-1%	-8%
Old Perth Rd	A82	296	306	279	283	-17	-23	-6%	-8%

From Point	To Point	Do min		Opt B		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Milburn Rd	A9 Kessock Bridge	421	329	200	206	-221	-123	-52%	-37%
Milburn Rd	Stadium Road	509	371	296	280	-213	-91	-42%	-25%
Milburn Rd	A96 East of Smithton	179	190	165	171	-14	-19	-8%	-10%
Milburn Rd	Barn Church Road	216	238	214	230	-2	-7	-1%	-3%
Milburn Rd	Culloden Road east of B9177	344	381	296	318	-48	-63	-14%	-17%
Milburn Rd	A9 South of Milton of Leys	360	359	350	353	-11	-6	-3%	-2%
Milburn Rd	Sir Walter Scott Drive South of Stevenson Road	449	683	462	431	13	-252	3%	-37%
A82	A9 Kessock Bridge	299	208	157	174	-142	-34	-48%	-16%
A82	Stadium Road	393	251	215	202	-179	-50	-45%	-20%
A82	A96 East of Smithton	366	387	342	344	-24	-44	-7%	-11%
A82	Barn Church Road	402	435	391	404	-12	-31	-3%	-7%
A82	Culloden Road east of B9177	584	489	370	390	-214	-99	-37%	-20%
A82	A9 South of Milton of Leys	600	468	424	425	-176	-42	-29%	-9%
A82	Sir Walter Scott Drive South of Stevenson Road	689	792	537	504	-153	-288	-22%	-36%
A82	Old Perth Rd	650	733	507	454	-144	-279	-22%	-38%

The introduction of the Inshes to Smithton Link Road attracts approximately 1,100 vehicles (two-way) in both peaks as shown in Figures 6-11 and 6-12. This results in a reduction in traffic on the A96 to the east of Raigmore Interchange, and on the A9 between Raigmore Interchange and Inshes Junction.

The inclusion of the Stevenson Road to Culloden Road link provides an additional crossing over the A9. This link attracts approximately 550 trips (two-way) in both peaks, however the traffic on the Culloden Road overbridge increase in both directions in both peaks (Figures 6-11 and 6-12). This is a result of the Inshes to Smithton Link Road and the Stevenson Road link road not being a continuous link. The discontinuous nature of these links and the distance of the additional A9 crossing from Inshes encourages traffic onto Culloden Road, and results in an increase in traffic flow at this already congested area of the network.

The improvements at Longman have improved the operation of the junction, which results in increased the traffic flows on the surrounding links in both peaks as seen in Figures 6-11 and 6-12.

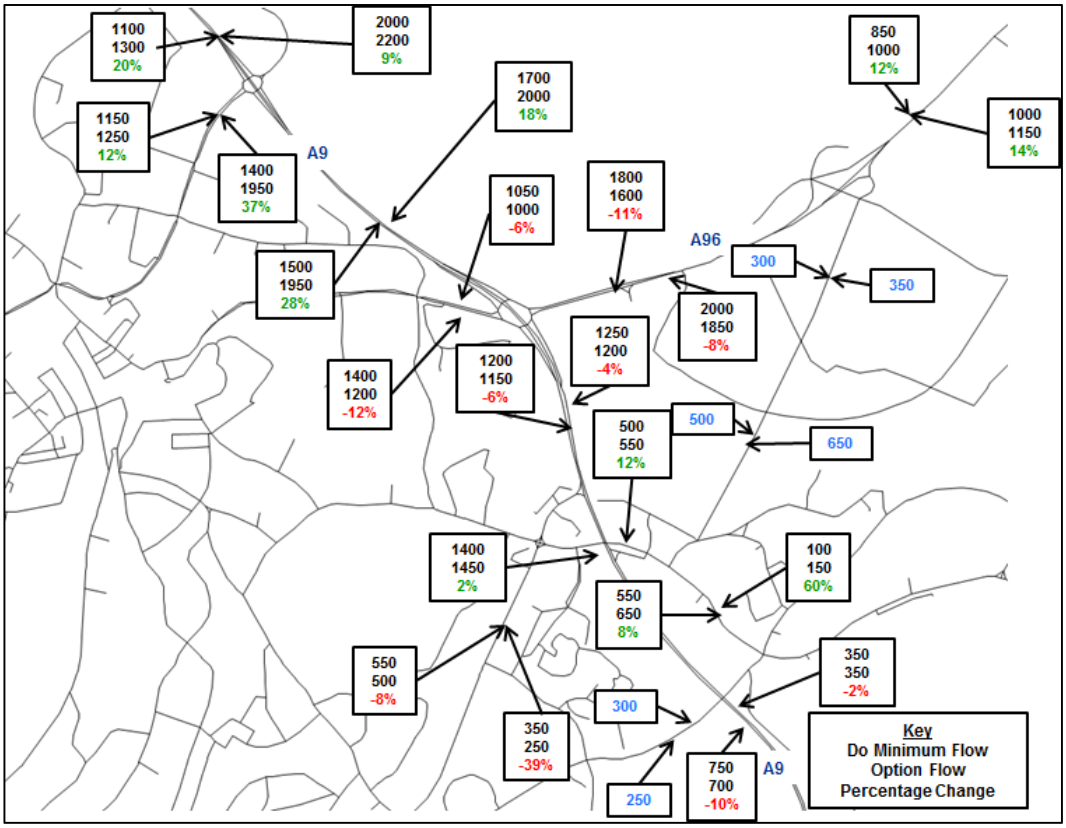


Figure 6-11 Option B 2031 AM Peak Flow Difference

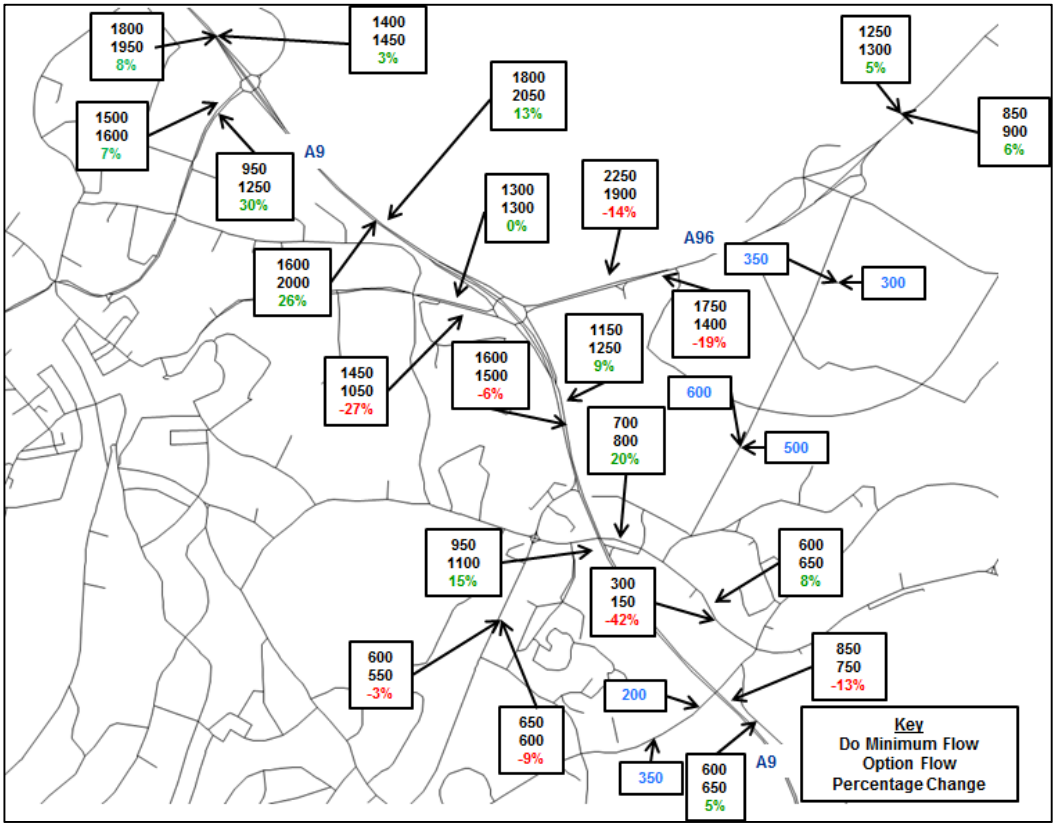
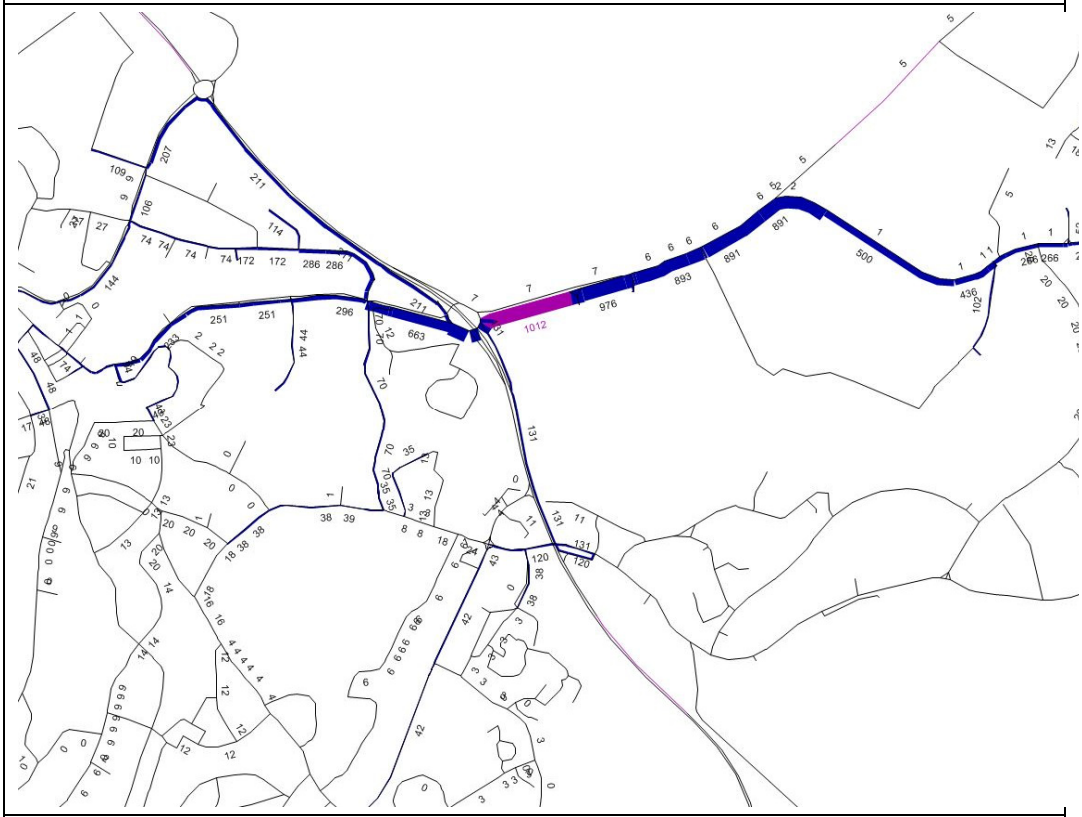


Figure 6-12 Option B 2031 PM Peak Flow Difference

The provision of the Inshes to Smithton link road reduces the conflict between local and strategic traffic at Raigmore Interchange. Whilst local and strategic trips will both use the link road, the number of local trips passing through Raigmore Interchange will reduce by approximately 16% westbound in the AM Peak and 15% eastbound in the PM Peak. This is illustrated through the select link analysis results shown in Figures 6-13 and 6-14.

The improvements at Longman Junction have resulted in an increase in local traffic using it to travel via the A82 in the westbound direction in the AM peak (55%), and in eastbound direction in the PM peak (39%). Whilst local traffic levels using Longman Junction increase, overall the level of conflict between local and longer distance traffic is reduced as there is a reduction in the number of conflict points as a result of grade separating the A9 straight-through movements.

Do Min 2031 AM peak – Select Link Analysis A96 Westbound



Opt B 2031 AM Peak – Select Link Analysis A96 Westbound

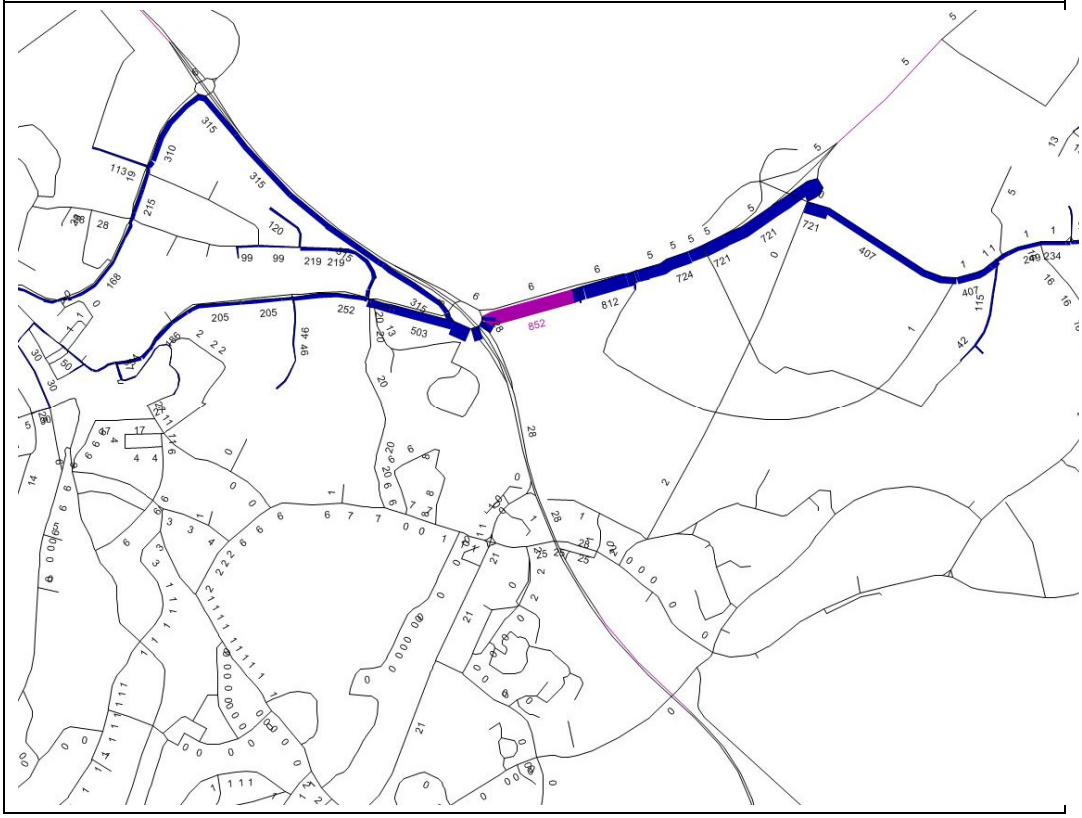
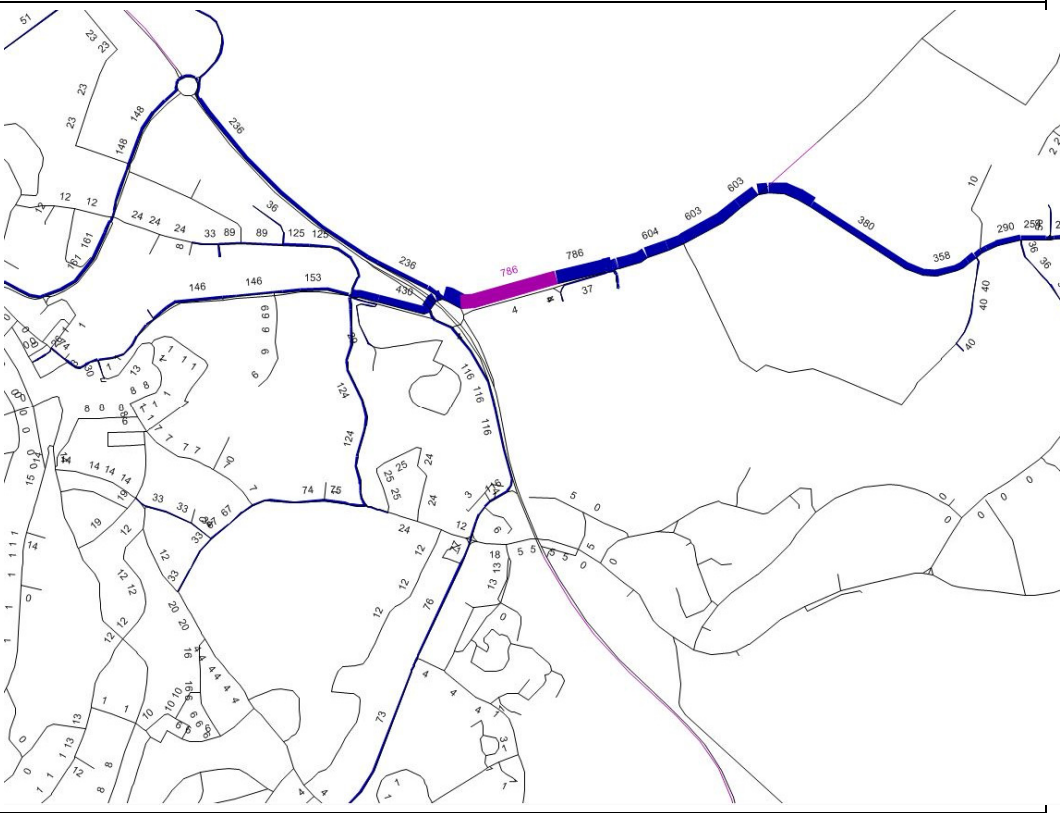


Figure 6-13 Select Link Analysis at Raigmore Interchange in the AM Peak

Do Min 2031 PM Peak – Select Link Analysis A96 Eastbound



Opt B 2031 PM Peak – Select Link Analysis A96 Eastbound

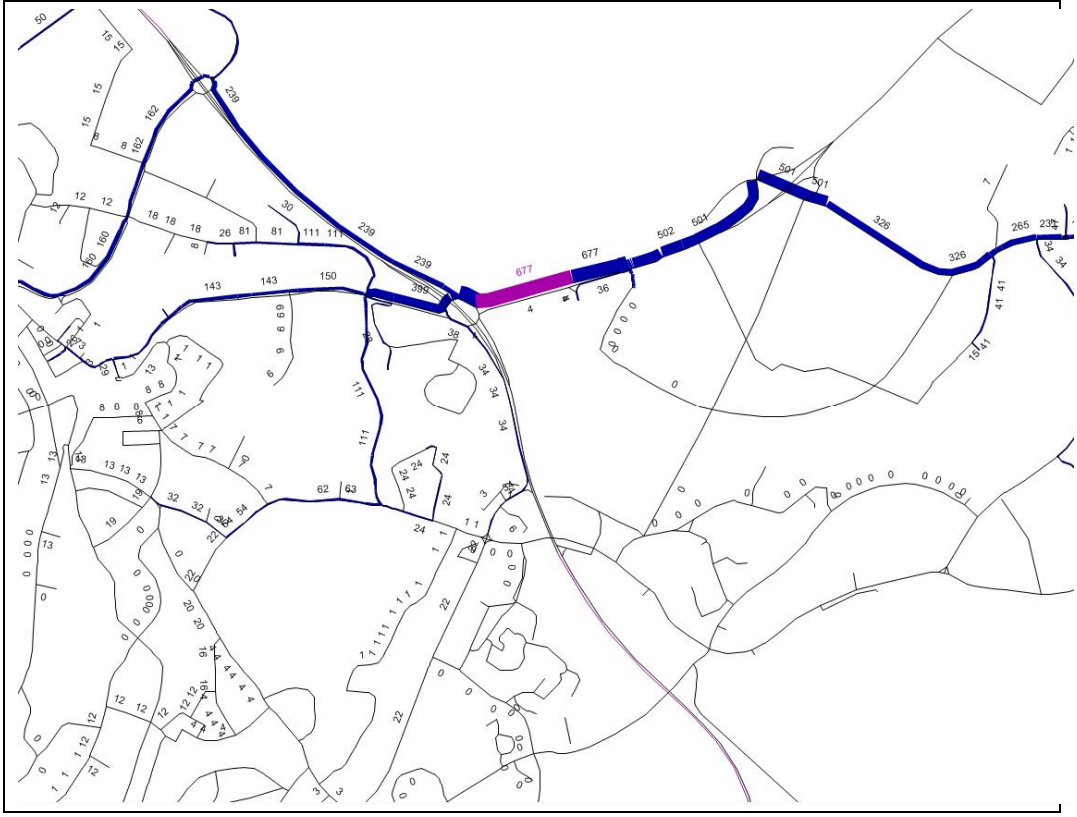


Figure 6-14 Select Link Analysis at Raigmore Interchange in the PM Peak

The indicative economic appraisal (TUBA only) shows that the option would provide moderate economic benefits in relation to the investment with required a Benefit to Cost Ratio (BCR) of approximately 1.7[2].

The option also provides additional access into the retail park, via a new link connecting to the Inshes to Smithton link, and would provide further opportunities for connections to access Inverness East development area. This is likely to encourage wider economic growth in the area.

Table 6-4 contains a summary of the appraisal of Combined Option B against the transport planning objectives, and the key appraisal impacts of the option against the STAG criteria.

Table 6-4 Combined Option B – Appraisal Summary

Criterion	Combined Option B
Objective L1 – Improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness. (Appendix C2 Page 4)	**Minor Benefit** This option removes the south to east and east to south movement from Raigmore Interchange, improving the operation of the junction, resulting in some journey time savings approaching Inverness. The journey time savings are not as great as in the other options. Whilst this option does not directly increase the opportunities to travel by public transport, it will provide improvement in journey times for bus services accessing Inverness via the A96.
Objective L2.1 – Improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through rationalisation of local movements' use of trunk road junctions (Appendix C2 Page 4)	**No Benefit or Impact** The road network hierarchy is improved through the provision of grade separation at Longman, the new link road between Smithton and Caulfield Road North, and the new link crossing the A9 connecting Stevenson Road to Culloden Road. This will provide additional access to the Inverness east area. The cumulative level of local traffic passing through the trunk road junctions at Longman, Raigmore and Inshes results in a marginal net increase. The location of the additional crossing of the A9 is not as attractive to traffic as Option C as it is not close enough to Inshes roundabout.
Objective L2.2 – Reduce conflicts for longer distance and local traffic for planned development areas to the east. (Appendix C2 Page 5)	**No Benefit or Impact** This option addresses the conflict between longer distance and local traffic at some locations, however it also introduces conflict at the new Inshes junction which negates any benefits.

[2] The TUBA appraisal software requires a single cost as input so for the purposes of the economic appraisal a capital cost estimate of £49.8m has been used.

Objective L3 – Improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport. (Appendix C2 Page 5)	**Minor Benefit** The Inshes to Smithton Link Road and the Stevenson Road to Culloden Road link road will provide new opportunities for public transport and active travel links.
Objective L4 – Improve safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions. (Appendix C2 Page 6)	**Minor Benefit** Longman will be built to modern safety standards. Grade Separation will remove the A9 through traffic from the junction. Longman Junction will be controlled by traffic signals, reducing the conflict between movements. These benefits may however be partly offset by an increase in overall traffic levels on the Culloden Road overbridge.
Objective L5.1 – Improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; South of Inshes and the Smithton Roundabout. (Appendix C2 Page 6)	**Minor Benefit** The grade separation of Longman junction will separate long distance A9 traffic from local movements. The operation of Raigmore Interchange will improve as the Inshes to Smithton link road reduces the level of traffic passing through it. This option will contribute towards improving the operational performance of the A9 Inshes Junction by providing a new crossing over the A9 for local movements travelling east to west and west to east across the A9, however the impact is not of the same magnitude as the other options.
Objective L5.2 – Improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network. (Appendix C2 Page 7)	**Minor Benefit** This option provides an alternative route for local traffic travelling between Smithton and Culloden, and Inshes and the areas to the south of Inverness through the provision of the Stevenson Road Link. This leads to an improvement in the operational performance of the local road network through the reductions in traffic on Culloden Road (east of Tower Road), Tower Road, Harbour Road, Milburn Road and Sir Walter Scott Drive, and reduces traffic levels passing through the local Inshes roundabout junction.
STAG Environment (Appendix C2 Pages 8 - 15)	**Habitats and Biodiversity – Moderate to Major Impact** Construction of Longman Junction and the Inshes to Smithton link road could impact on the Moray Firth (SAC), Inner Moray Firth (SPA) and Longman and Castle Stuart Bays SSSI through disruption to foraging patterns and flightlines of qualifying species. Disruption of the former landfill could release potential contaminants. **Cultural Heritage – Major Negative Impact** Stevenson Road to Culloden Road link road will have a significant impact on the setting of Category A (Tower House), B (Inshes House) and C Listed buildings (Helens Lodge). This option is considered to have a high potential for the presence of unknown archaeological remains, which are likely to be removed during construction. It is unlikely that mitigation will reduce the potential impact on the

	setting of the Category A, B and C Listed buildings. Inshes to Smithton link road will result in the partial removal of the Aston Farm Cottages Ring Ditch and Pit Circles Scheduled Monument and impacts are also seen on the setting of the unaffected area of this monument to the west of the alignment. There is also high potential for impact on unknown archaeological remains in this area. Scheduled Monument Consent would be required for the direct impacts on the Scheduled Monument and where preservation in situ is not viable, preservation by record is likely to reduce the impact. It is unlikely that mitigation will significantly reduce the potential impact on the setting of the scheduled monument.
STAG Safety (Appendix C2 Page 16)	**Minor Benefit** A reduction of traffic on the secondary road network around Smithton, Culloden and Inshes should have a positive impact on the accidents in the area. It would also reduce traffic levels and congestion in and around Raigmore Interchange and improve accident rates there. The new grade separated junction at Longman would improve the safety of the junction. This option may increase traffic levels on selected roads adjacent to Inshes Primary school, which may have a negative impact on safety.
STAG Economy (Appendix C2 Pages 17)	**Moderate Benefit** Main benefits are for trips between the A96 area and the south of Inverness traffic along the A9 and traffic travelling between Kessock Bridge and the A96 The option provides additional access into Inverness Retail Park BCR of approximately 1.7
STAG Integration(Appendix C2 Page 17)	**Moderate Benefit** The new secondary road links provide additional opportunities for new bus services and active travel links to encourage non-motorised transport and interchange. The new link road between Smithton and Caulfield Road would facilitate access to the Inverness east development area as well as remove some of the additional traffic from the A96. The new road would also provide a connection to the Inverness Retail and Business Park, and would facilitate future connections to the Inverness east development area.
STAG Accessibility & Social Inclusion (Appendix C2 Page 20)	**Minor Benefit** Inshes to Smithton Link Road passes mainly through land which is currently undeveloped, and so minimal impacts during construction are likely. The route option is likely to improve journey times and therefore connectivity between Inshes, Cradlehall and Smithton. A Core Path and National Cycle route are severed, however as this route is a

	local route, it should be easier to cross than Option A. Stevenson Road Link provides another crossing over the A9 and the potential impacts on the National Cycle Route and Core Path could be reduced through realignment or provision of infrastructure to allow these paths to cross the route option.

This option performs well against the transport planning objectives and the appraisal criteria and integrates well with the Highland Council development plan aspiration. The option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

The improvements at Longman Junction provide journey time savings for all movements through the junction. The inclusion of the Inshes to Smithton Link Road results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

Traffic flows on Culloden Road Overbridge and Culloden Road to the East of the Inshes to Smithton Link Road connection increase in this option. This is a result of the Inshes to Smithton Link Road and the Stevenson Road link road not being a continuous link. The discontinuous nature of these links and the distance of the additional A9 crossing from Inshes encourages traffic onto Culloden Road, and results in an increase in traffic flow at this already congested area of the network.

As the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness. The option is therefore deemed to provide a minor benefit to accessibility and social inclusion and provide moderate benefits to the economy and integration.

The option has the lowest combined journey time savings on key routes, and the lowest reduction in traffic flows on the trunk roads (A96 and A9) compared to the other options. There are some moderate negative impacts associated with this option under the environmental criteria, as the option results in an adverse impact on listed buildings from new crossing of A9.

It is therefore not recommended that this option be taken forward for design development.

6.3.3 Combined Option C

The operational performance of Combined Option C has been assessed with respect to journey times and traffic flows extracted from the transport model, with the outcomes of the appraisal contained in the AST included at Appendix C3.

Journey time information has been extracted from MFTM between the following key locations:

1. A9 Kessock Bridge;
2. Stadium Road;
3. A96 East of Smithton;
4. Barn Church Road;
5. Culloden Road east of the B9177;
6. A9 South of the Milton of Leys Junction;
7. Sir Walter Scott Drive South of Stevenson Road;
8. Old Perth Road;
9. Millburn Road; and
10. Harbour Road.

The locations of these points are shown in Figure 6-15.

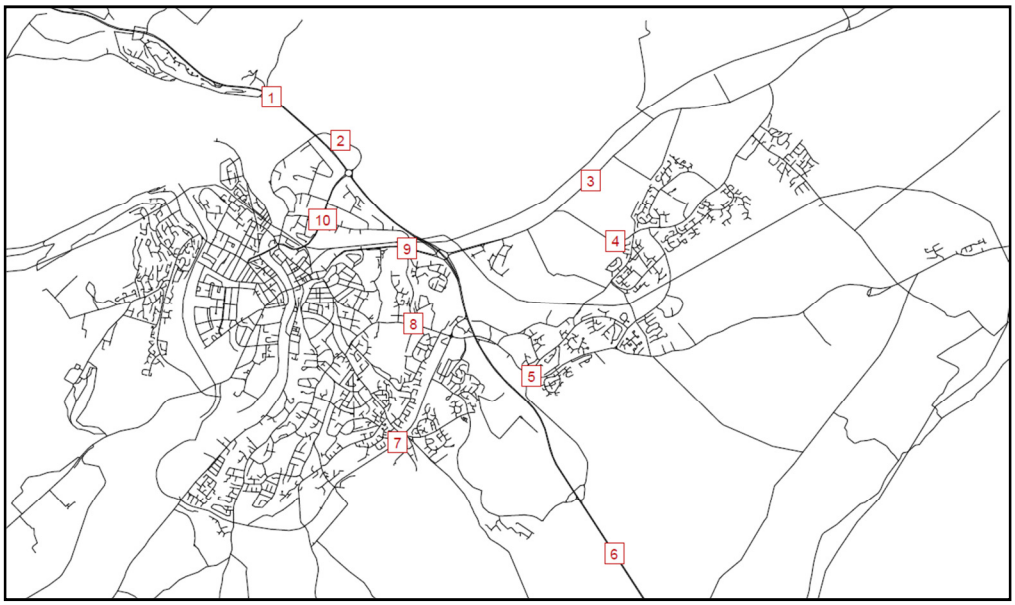


Figure 6-15 Journey Time Locations

A selection of journey time results are included in Table 6-5, with the most significant journey time changes as a result of Combined Option C discussed below.

The upgrade at Longman Roundabout improves journey times in the area. The journey times between the A96 East of Smithton and the A82 via Longman Junction are reduced by 42% in the AM peak and 26% in the PM peak. In the opposite direction there are more modest savings, with the AM peak journey time reducing by approximately 6% and the PM Peak journey time reducing by 12%.

The improvements at Longman roundabout also provide significant journey time savings for traffic travelling to and from the Kessock Bridge in the both peaks, with reductions in journey times for the A96, Culloden Road, the A9 South of Milton of Leys and the Southern Distributor Road movements (Table 6-5).

The inclusion of the Inshes to Smithton link road within this option removes the South to East and East to South movement from Raigmore Interchange and in doing so improves the performance of Raigmore Interchange. Journey times between the A96 East of Smithton and the Milburn Road / Harbour Road junction are reduced by 41% in the AM peak and by 16% in the PM peak. In the opposite direction, journey times are reduced by 8% in the AM peak 12% in the PM peak.

Similarly, the inclusion of the Inshes to Smithton Link Road also has a significant impact on the journey time between the A96 East of Smithton and the Culloden Road and Inshes areas in both directions and both peaks, reducing the journey times by between 40% and 60%. There is a similar level of journey time saving in the opposite direction.

The continuation of the Inshes to Smithton Link Road over the A9 reduces the journey time between Barn Church Road and the Southern Distributor Road by approximately 40% in both peaks. In the opposite direction the saving is approximately 40% in the AM peak and 30% in the PM Peak.

A more detailed set of journey time analysis results are found on pages 28 and 29 of Appendix C2 (Combined Option B AST).

Table 6-5 2031 Journey Time Changes (Seconds) for Option C

From Point	To Point	Do min		Opt C		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	Stadium Road	398	181	193	176	-205	-5	-52%	-3%
A9 Kessock Bridge	A96 East of Smithton	523	343	286	270	-237	-73	-45%	-21%
A9 Kessock Bridge	Barn Church Road	559	391	336	339	-223	-52	-40%	-13%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	311	315	-285	-103	-48%	-25%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	365	359	-248	-38	-40%	-9%
A9 Kessock Bridge	Sir Walter Scott Drive South of Stevenson Road	702	721	457	448	-244	-273	-35%	-38%
A9 Kessock Bridge	Old Perth Rd	663	663	428	388	-235	-275	-35%	-41%
A9 Kessock Bridge	Milburn Rd	582	344	371	280	-210	-64	-36%	-19%
A9 Kessock Bridge	A82	429	201	217	187	-212	-14	-49%	-7%
Stadium Road	A9 Kessock Bridge	453	409	251	242	-202	-167	-45%	-41%
Stadium Road	A96 East of Smithton	299	343	339	327	40	-16	13%	-5%
Stadium Road	Barn Church Road	335	390	390	396	54	5	16%	1%
Stadium Road	Culloden Road east of B9177	372	418	364	372	-8	-46	-2%	-11%
Stadium Road	A9 South of Milton of Leys	388	397	418	416	30	20	8%	5%
Stadium Road	Sir Walter Scott Drive South of Stevenson Road	478	721	511	505	33	-216	7%	-30%
Stadium Road	Old Perth Rd	439	662	481	445	42	-217	10%	-33%
Stadium Road	Milburn Rd	358	344	481	337	123	-7	34%	-2%
Stadium Road	A82	220	265	267	270	47	4	21%	2%
A96 East of Smithton	A9 Kessock Bridge	761	492	375	270	-386	-222	-51%	-45%

From Point	To Point	Do min		Opt C		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A96 East of Smithton	Stadium Road	848	535	476	386	-372	-148	-44%	-28%
A96 East of Smithton	Barn Church Road	81	95	72	86	-9	-9	-11%	-9%
A96 East of Smithton	Culloden Road east of B9177	502	366	194	201	-308	-165	-61%	-45%
A96 East of Smithton	A9 South of Milton of Leys	518	344	332	322	-185	-21	-36%	-6%
A96 East of Smithton	Sir Walter Scott Drive South of Stevenson Road	607	668	322	382	-285	-286	-47%	-43%
A96 East of Smithton	Old Perth Rd	568	609	395	351	-173	-258	-30%	-42%
A96 East of Smithton	Milburn Rd	396	175	232	148	-164	-27	-41%	-16%
A96 East of Smithton	A82	696	432	401	318	-295	-114	-42%	-26%
Barn Church Road	A9 Kessock Bridge	809	530	493	377	-315	-153	-39%	-29%
Barn Church Road	Stadium Road	896	572	595	456	-301	-116	-34%	-20%
Barn Church Road	A96 East of Smithton	92	85	116	83	24	-3	26%	-3%
Barn Church Road	Culloden Road east of B9177	549	403	256	228	-293	-175	-53%	-43%
Barn Church Road	A9 South of Milton of Leys	566	382	451	392	-115	11	-20%	3%
Barn Church Road	Sir Walter Scott Drive South of Stevenson Road	655	706	384	410	-271	-296	-41%	-42%
Barn Church Road	Old Perth Rd	616	647	462	434	-154	-213	-25%	-33%
Barn Church Road	Milburn Rd	444	213	351	218	-93	5	-21%	2%
Barn Church Road	A82	725	451	500	369	-225	-83	-31%	-18%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	430	428	-268	-126	-38%	-23%
Culloden Road east	Stadium Road	785	598	531	508	-254	-90	-32%	-15%

From Point	To Point	Do min		Opt C		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
of B9177									
Culloden Road east of B9177	A96 East of Smithton	548	529	207	210	-341	-319	-62%	-60%
Culloden Road east of B9177	Barn Church Road	584	577	225	241	-359	-335	-61%	-58%
Culloden Road east of B9177	A9 South of Milton of Leys	190	190	189	190	-1	0	0%	0%
Culloden Road east of B9177	Sir Walter Scott Drive South of Stevenson Road	319	319	319	319	0	0	0%	0%
Culloden Road east of B9177	Old Perth Rd	304	256	247	270	-58	14	-19%	5%
Culloden Road east of B9177	Milburn Rd	425	351	374	347	-51	-4	-12%	-1%
Culloden Road east of B9177	A82	633	495	456	439	-177	-56	-28%	-11%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	348	355	-222	-129	-39%	-27%
A9 South of Milton of Leys	Stadium Road	657	527	449	435	-208	-93	-32%	-18%
A9 South of Milton of Leys	A96 East of Smithton	420	458	403	404	-17	-55	-4%	-12%
A9 South of Milton of Leys	Barn Church Road	457	506	454	472	-3	-34	-1%	-7%
A9 South of Milton of Leys	Culloden Road east of B9177	236	264	232	234	-4	-30	-1%	-11%
A9 South of Milton of Leys	Sir Walter Scott Drive South of Stevenson Road	357	385	362	398	4	13	1%	3%
A9 South of Milton of Leys	Old Perth Rd	314	338	319	344	5	6	2%	2%
A9 South of Milton of Leys	Milburn Rd	297	281	288	274	-10	-7	-3%	-2%
A9 South of Milton of Leys	A82	505	425	374	366	-131	-58	-26%	-14%
Sir Walter Scott	A9 Kessock Bridge	718	542	456	398	-262	-144	-37%	-27%

From Point	To Point	Do min		Opt C		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Drive South of Stevenson Road									
Sir Walter Scott Drive South of Stevenson Road	Stadium Road	871	591	566	484	-305	-107	-35%	-18%
Sir Walter Scott Drive South of Stevenson Road	A96 East of Smithton	576	522	357	362	-219	-160	-38%	-31%
Sir Walter Scott Drive South of Stevenson Road	Barn Church Road	613	570	375	393	-238	-177	-39%	-31%
Sir Walter Scott Drive South of Stevenson Road	Culloden Road east of B9177	346	308	277	278	-68	-30	-20%	-10%
Sir Walter Scott Drive South of Stevenson Road	A9 South of Milton of Leys	458	441	428	420	-30	-22	-7%	-5%
Sir Walter Scott Drive South of Stevenson Road	Milburn Rd	391	345	383	324	-7	-21	-2%	-6%
Sir Walter Scott Drive South of Stevenson Road	A82	592	489	491	416	-101	-73	-17%	-15%
Old Perth Rd	A9 Kessock Bridge	582	497	353	357	-229	-139	-39%	-28%
Old Perth Rd	Stadium Road	670	539	455	436	-215	-103	-32%	-19%
Old Perth Rd	A96 East of Smithton	433	470	409	406	-24	-65	-6%	-14%
Old Perth Rd	Barn Church Road	469	518	401	462	-68	-57	-15%	-11%
Old Perth Rd	A9 South of Milton of Leys	429	495	418	444	-11	-50	-3%	-10%
Old Perth Rd	Culloden Road east of B9177	249	291	238	289	-11	-2	-4%	-1%
Old Perth Rd	Sir Walter Scott Drive South of Stevenson Road	210	291	212	269	2	-22	1%	-8%
Old Perth Rd	A82	296	306	278	277	-18	-29	-6%	-9%

From Point	To Point	Do min		Opt C		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Milburn Rd	A9 Kessock Bridge	421	329	192	197	-230	-132	-55%	-40%
Milburn Rd	Stadium Road	509	371	293	276	-216	-95	-42%	-26%
Milburn Rd	A96 East of Smithton	179	190	165	168	-15	-22	-8%	-12%
Milburn Rd	Barn Church Road	216	238	215	236	0	-1	0%	-1%
Milburn Rd	Culloden Road east of B9177	344	381	297	306	-47	-75	-14%	-20%
Milburn Rd	A9 South of Milton of Leys	360	359	350	352	-10	-7	-3%	-2%
Milburn Rd	Sir Walter Scott Drive South of Stevenson Road	449	683	443	440	-6	-243	-1%	-36%
A82	A9 Kessock Bridge	299	208	155	176	-144	-32	-48%	-15%
A82	Stadium Road	393	251	212	206	-182	-45	-46%	-18%
A82	A96 East of Smithton	366	387	342	341	-23	-46	-6%	-12%
A82	Barn Church Road	402	435	393	410	-9	-26	-2%	-6%
A82	Culloden Road east of B9177	584	489	368	386	-216	-103	-37%	-21%
A82	A9 South of Milton of Leys	600	468	422	430	-178	-37	-30%	-8%
A82	Sir Walter Scott Drive South of Stevenson Road	689	792	514	519	-175	-273	-25%	-34%
A82	Old Perth Rd	650	733	485	459	-166	-275	-25%	-37%

The introduction of the Inshes to Smithton Link Road attracts approximately 1,400 vehicles (two-way) in both peaks as shown in Figures 6-16 and 6-17. This results in a reduction in traffic on the A96 to the east of Raigmore Interchange, and on the A9 between Raigmore Interchange and Inshes Junction. The inclusion of an additional crossing of the A9 provides a modest reduction in traffic flows on the Culloden Road overbridge in the AM Peak. The traffic reduction in the PM Peak is more significant, with a reduction of approximately 29% in the eastbound direction as shown in Figures 6-16 and 6-17.

The improvements at Longman have improved the operation of the junction, which results in increased the traffic flows on the surrounding links in both peaks as seen in Figure 6-16 and 6-17.

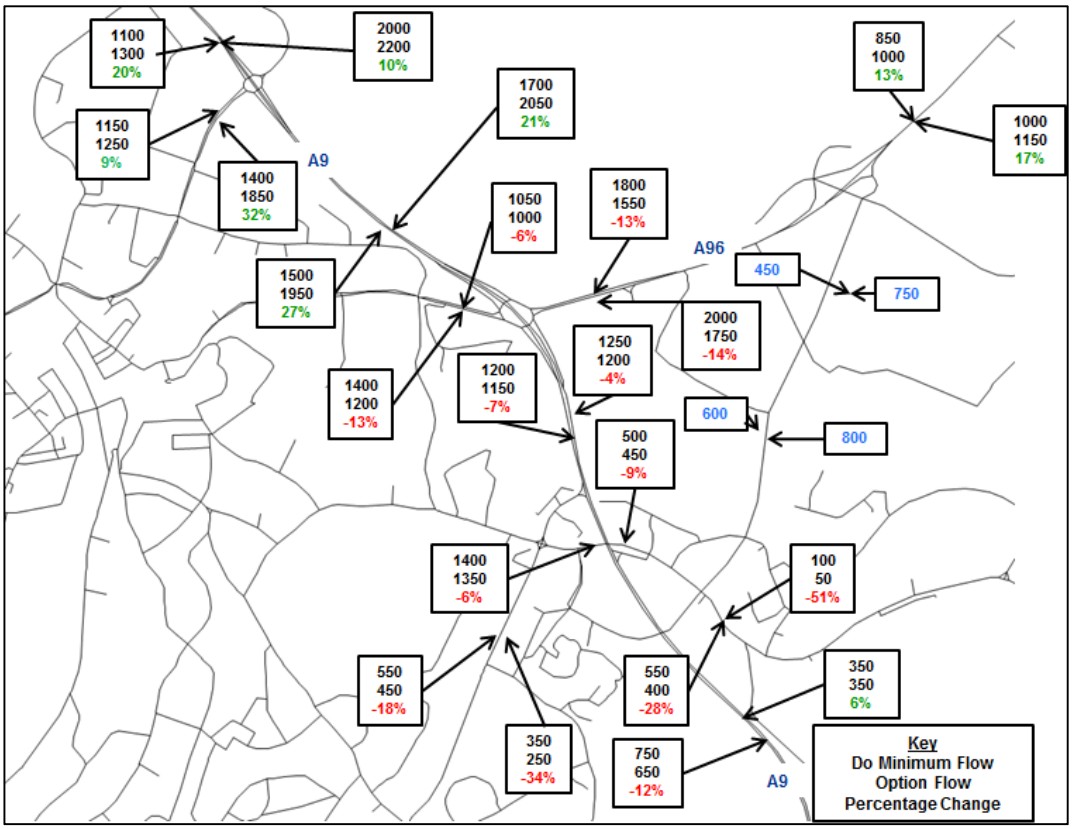


Figure 6-16 Option C 2031 AM Peak Flow Difference

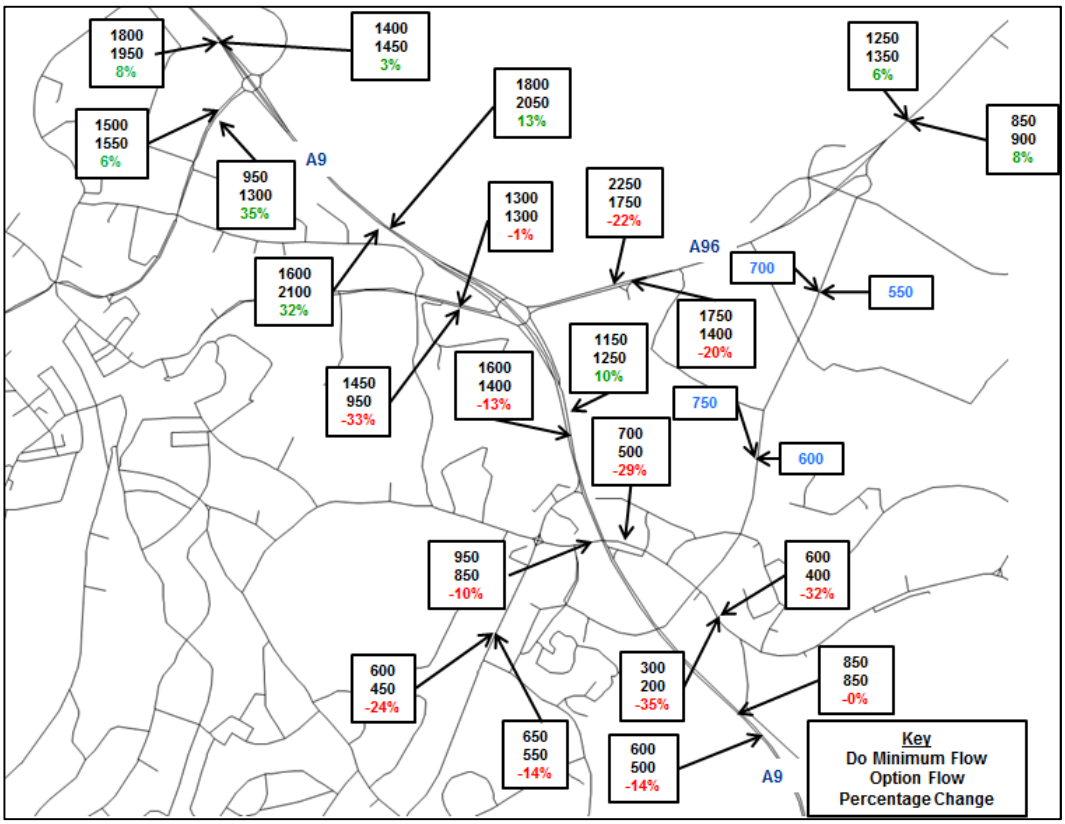
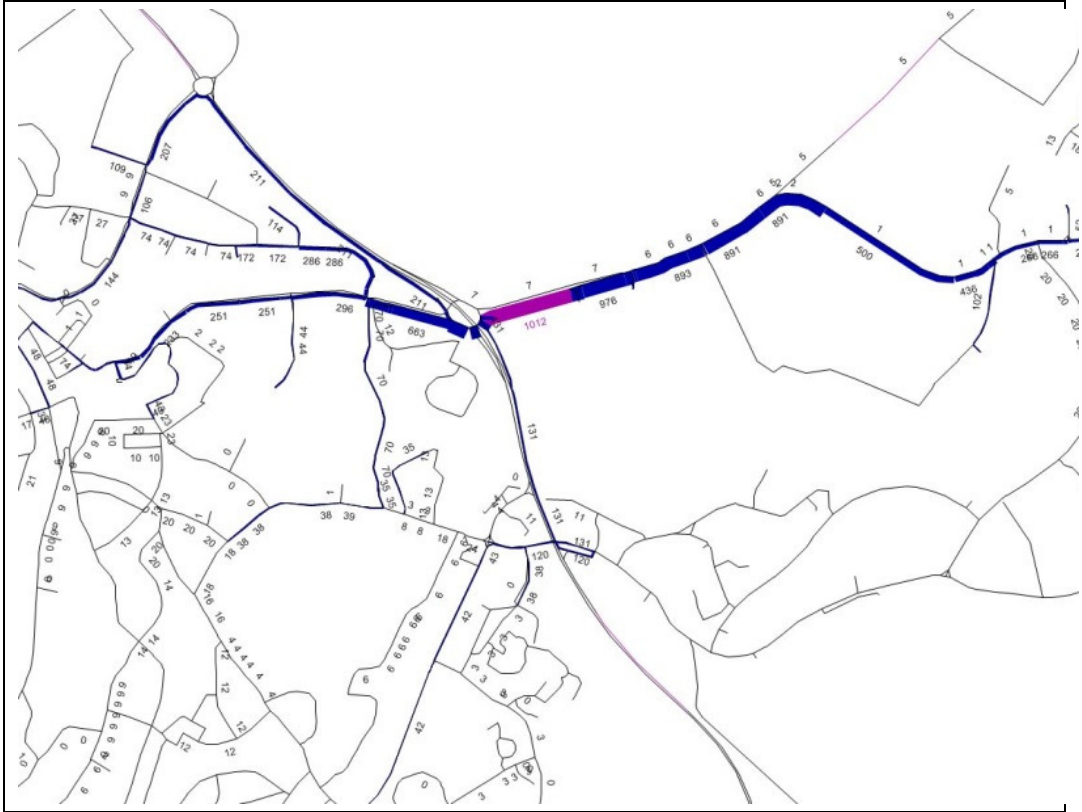


Figure 6-17 Option C 2031 PM Peak Flow Difference

The provision of the Inshes to Smithton link road reduces the conflict between local and strategic traffic at Raigmore Interchange. Whilst local and strategic trips will both use the link road, the number of local trips passing through Raigmore Interchange will reduce by approximately 18% westbound in the AM Peak and 24% eastbound in the PM Peak. This is illustrated through the select link analysis results shown in Figures 6-18 and 6-19.

The improvements at Longman Junction have resulted in an increase in local traffic using it to travel via the A82 in the westbound direction in the AM peak (53%), and in the eastbound direction in the PM peak (35%). Whilst local traffic levels using Longman Junction increase, overall the level of conflict between local and longer distance traffic is reduced as there is a reduction in the number of conflict points as a result of grade separating the A9 straight-through movements.

Do Min 2031 AM peak – Select Link Analysis A96 Westbound



Opt C 2031 AM Peak – Select Link Analysis A96 Westbound

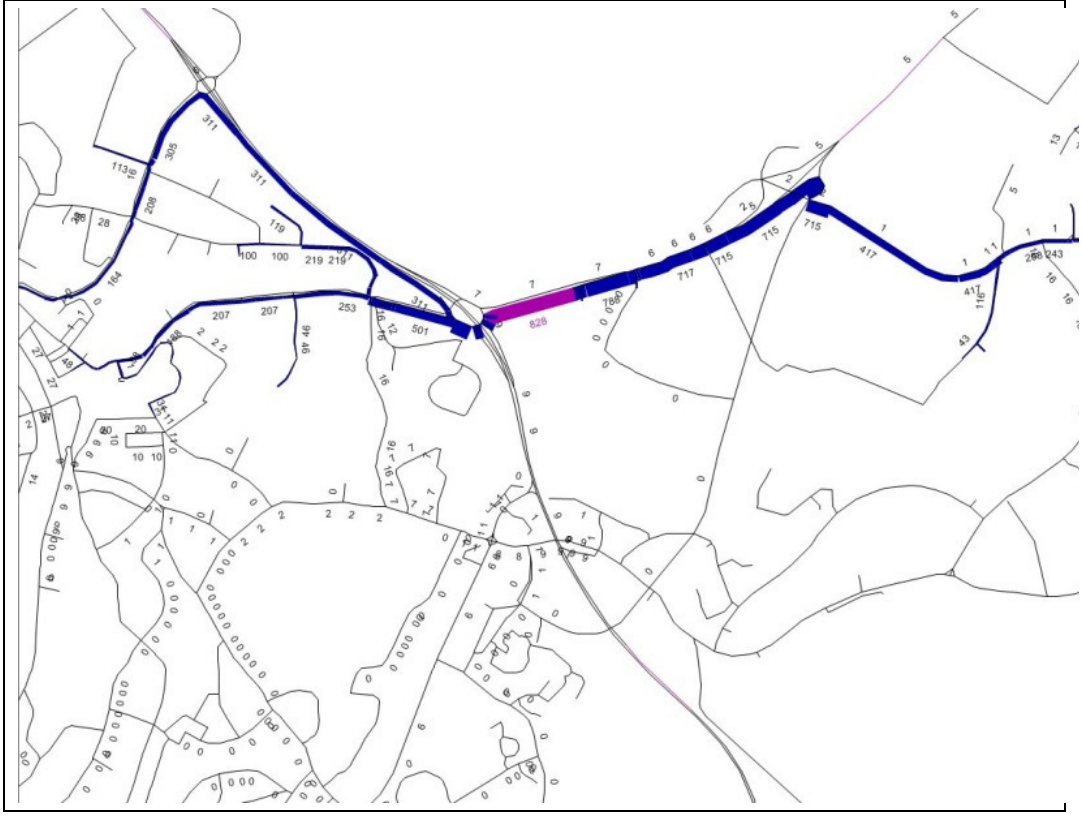
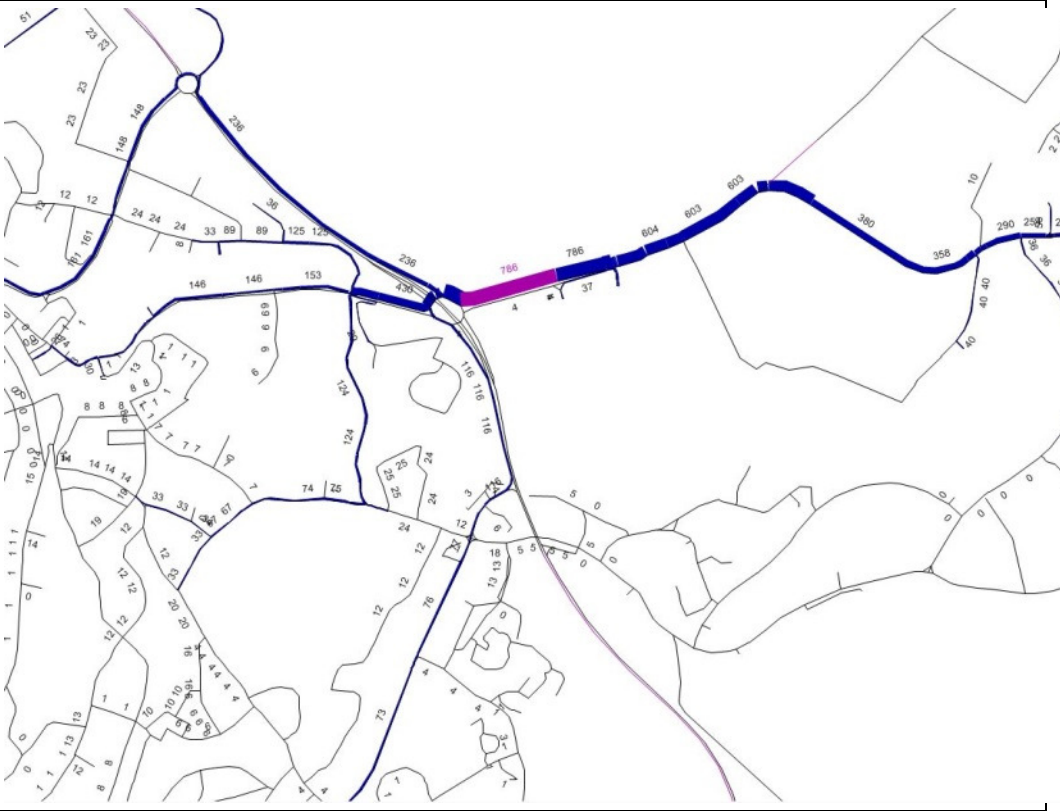


Figure 6-18 Select Link Analysis at Raigmore Interchange in the AM Peak

Do Min 2031 PM Peak – Select Link Analysis A96 Eastbound



Opt C 2031 PM Peak – Select Link Analysis A96 Eastbound

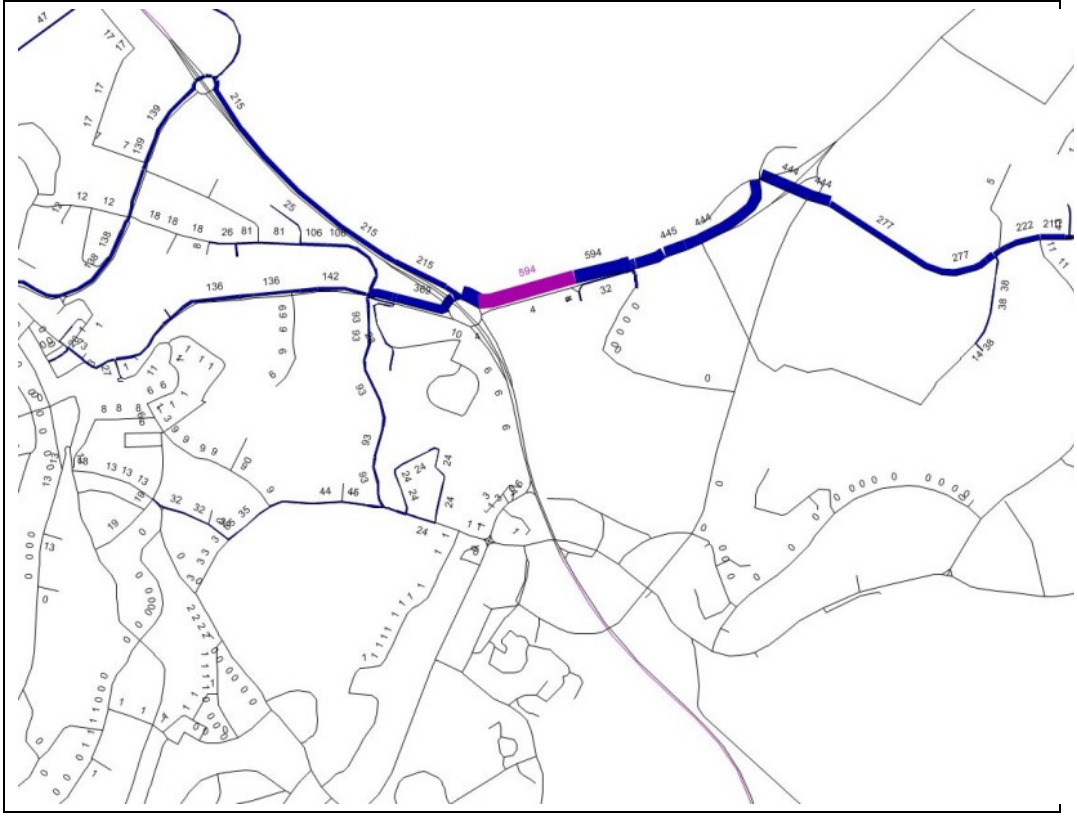


Figure 6-19 Select Link Analysis at Raigmore Interchange in the PM Peak

The indicative economic appraisal (TUBA only) shows that the option would provide moderate economic benefits in relation to the investment with a Benefit to Cost Ratio (BCR) of approximately 1.9[3].

The option also provides additional access into the retail park, via a new link connecting to the Inshes to Smithton link, and would provide further opportunities for connections to access Inverness East development area. This is likely to encourage wider economic growth in the area.

Table 6-6 contains a summary of the appraisal of Combined Option C against the transport planning objectives, and the key appraisal impacts of the option against the STAG criteria.

Table 6-6 Combined Option C – Appraisal Summary

Criterion	Combined Option C
Objective L1 – Improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness. (Appendix C3 Page 4)	**Moderate Benefit** This option removes the south to east and east to south movement from Raigmore Interchange, improving the operation of the junction, resulting in journey time savings approaching Inverness. Whilst this option does not directly increase the opportunities to travel by public transport, it will provide improvement in journey times for bus services accessing Inverness via the A96.
Objective L2.1 – Improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through rationalisation of local movements' use of trunk road junctions (Appendix C3 Page 4)	**Moderate Benefit** The road network hierarchy will be improved through the provision of grade separation at Longman, and the additional link between Smithton and Inshes that will also provide additional access to the Inverness east area. The secondary road network through Smithton sees a reduction in traffic flows as local trips transfer onto the new link road to access South Inverness and the A9. Creation of the additional crossing over the A9 between Inshes Retail Park and Culloden Road reduces the level of local traffic passing through the Inshes trunk road junction
Objective L2.2 – Reduce conflicts for longer distance and local traffic for planned development areas to the east. (Appendix C3 Page 5)	**Minor Benefit** The link road provides a dedicated link for traffic travelling between the A9 and the A96, whilst removing a degree of local traffic from Raigmore Interchange.
Objective L3 – Improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport. (Appendix C3 Page 5)	**Minor Benefit** The Inshes to Smithton Link Road will provide new opportunities for public transport and active travel links.
Objective L4 – Improve safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions. (Appendix C3 Page 6)	**Moderate Benefit** Longman will be built to modern safety standards. Grade Separation will remove the A9 through traffic from the junction. Longman Junction will be

[3] The TUBA appraisal software requires a single cost as input so for the purposes of the economic appraisal a capital cost estimate of £59.1m has been used.

	controlled by traffic signals, reducing the conflict between movements.
Objective L5.1 – Improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; South of Inshes and the Smithton Roundabout. (Appendix C3 Page 7)	**Moderate Benefit** The grade separation of Longman junction will separate long distance A9 traffic from local movements. The operation of Raigmore Interchange will improve as the Inshes to Smithton link road reduces the level of traffic passing through it. This option will contribute towards improving the operational performance of the A9 Inshes Junction by providing a new crossing over A9 for local movements travelling east to west and west to east across the A9.
Objective L5.2 – Improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network. (Appendix C3 Page 7)	**Minor Benefit** This option provides an alternative route for local traffic travelling between Smithton and Culloden, Inshes and the areas to the south of Inverness through the provision of the new link road. This leads to an improvement in the operational performance of the local road network through the reductions in traffic on Culloden Road, Harbour Road, Milburn Road and Sir Walter Scott Drive, and reduces traffic levels passing through the local Inshes roundabout junction.
STAG Environment (Appendix C3 Pages 8 - 14)	**Habitats and Biodiversity – Moderate to Major Impact** Construction of Longman Junction and the Inshes to Smithton link road could impact on the Moray Firth (SAC), Inner Moray Firth (SPA) and Longman and Castle Stuart Bays SSSI through disruption to foraging patterns and flightlines of qualifying species. Disruption of the former landfill could release potential contaminants. **Cultural Heritage – Major Negative Impact** Inshes to Smithton link road will result in the partial removal of the Aston Farm Cottages Ring Ditch and Pit Circles Scheduled Monument and impacts are also seen on the setting of the unaffected area of this monument to the west of the alignment. Scheduled Monument Consent would be required for the direct impacts on the Scheduled Monument and where preservation in situ is not viable, preservation by record is likely to reduce the impact. It is unlikely that mitigation will significantly reduce the potential impact on the setting of the scheduled monument. This option would have the potential impact on the setting of one Category B Listed Building – Castlehill.
STAG Safety (Appendix C3 Page 15)	**Moderate Benefit** Grade separation of Longman Junction will remove some of the conflict at the junction and make it safer for NMUs. There are traffic reductions on the A96 approach to Raigmore and the local road network around Inshes that will improve safety.
STAG Economy (Appendix C3 Pages 16)	**Moderate Benefit** Significant benefits are derived from traffic travelling between the A96 and South Inverness, traffic travelling along the A9 and traffic travelling between

	the Kessock Bridge and A96 . The option provides additional access into Inverness Retail Park BCR of approximately 1.9
STAG Integration(Appendix C3 Page 16 and 17)	**Moderate Benefit** The new secondary road links provide additional opportunities for new bus services and active travel links to encourage non-motorised transport and interchange. The new link road between Smithton and Caulfield Road would facilitate access to the Inverness east development area as well as remove some of the additional traffic from the A96. The new road would also provide a connection to the Inverness Retail and Business Park, and would facilitate future connections to the Inverness east development area.
STAG Accessibility & Social Inclusion (Appendix C3 Page 18)	**Minor Benefit** Inshes to Smithton Link Road passes mainly through land which is currently undeveloped, and so minimal impacts during construction are likely. The route option is likely to improve journey times and therefore connectivity between Inshes, Cradlehall and Smithton. A Core Path and National Cycle route are severed, however as this route is a local route, it should be easier to cross than Option A.

This option performs well against the transport planning objectives and the appraisal criteria and integrates well with the Highland Council development plan aspiration. The option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

The improvements at Longman Junction provide journey time savings for all movements through the junction. The inclusion of the Inshes to Smithton Link Road results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

This option provides a continuous link from Smithton Roundabout over the A9, with a connection to Caulfield Road. The continuation of the link road over the A9 alleviates traffic congestion Culloden Road Overbridge, particularly in the PM peak.

As the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness. The option is therefore deemed to provide a minor benefit to accessibility and social inclusion and provide moderate benefits to the economy and integration.

The option results in a smaller reduction in traffic flows on the trunk roads (A96 and A9) and Inshes Overbridge when compared to Options A and D, and retains the existing A9 southbound slip roads at Inshes. There are some moderate negative impacts associated with this option under the environmental criteria.

It is recommended that this option be taken forward for design development.

6.3.4 Combined Option D

The operational performance of Combined Option D has been assessed with respect to journey times and traffic flows extracted from the transport model, with the outcomes of the appraisal contained in the AST included at Appendix C4.

Journey time information has been extracted from MFTM between the following key locations:

1. A9 Kessock Bridge;
2. Stadium Road;
3. A96 East of Smithton;
4. Barn Church Road;
5. Culloden Road east of the B9177;
6. A9 South of the Milton of Leys Junction;
7. Sir Walter Scott Drive South of Stevenson Road;
8. Old Perth Road;
9. Millburn Road; and
10. Harbour Road.

The locations of these points are shown in Figure 6-20.

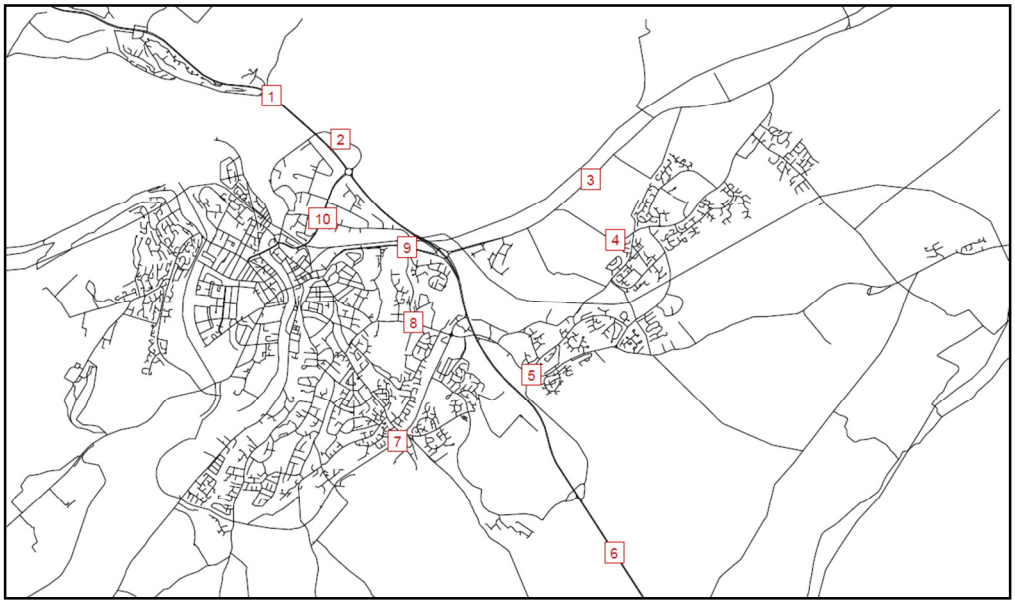


Figure 6-20 Journey Time Locations

A selection of journey time results are included in Table 6-7, with the most significant journey time changes as a result of Combined Option D discussed below.

The upgrade at Longman Roundabout improves journey times in the area. The journey times between the A96 East of Smithton and the A82 via Longman Junction are reduced by 41% in the AM peak and 26% in the PM peak. In the opposite direction there are more modest savings, with the AM peak journey time reducing by approximately 5% and the PM Peak journey time reducing by 11%.

The improvements at Longman roundabout also provide significant journey time savings for traffic travelling to and from the Kessock Bridge in the both peaks, with reductions in journey times for the A96, Culloden Road, the A9 South of Milton of Leys and the Southern Distributor Road movements (Table 6-7).

The inclusion of the Inshes to Smithton link road within this option removes the South to East and East to South movement from Raigmore Interchange and in doing so improves the performance of Raigmore Interchange. Journey times between the A96 East of Smithton and the Milburn Road / Harbour Road junction are reduced by 38% in the AM peak and by 16% in the PM peak. In the opposite direction, journey times are reduced by 7% in the AM peak and by 10% in the PM peak.

The continuation of the Inshes to Smithton Link Road over the A9 reduces the journey time between Barn Church Road and the Southern Distributor Road by approximately 40% in both peaks. In the opposite direction the saving is approximately 35% in the AM peak and 30% in the PM Peak.

The provision of a new southbound merge increases the journey time savings to the A9 Milton of Leys compared to Option C. The journey time between Barn Church Road and the A9 South of the Milton of Leys reduces by 34% in the AM Peak and 7% in the PM peak.

A more detailed set of journey time analysis results are found on pages 28 and 29 of Appendix C2 (Combined Option B AST).

Table 6-7 2031 Journey Time Changes (Seconds) for Option D

From Point	To Point	Do min		Opt D		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	Stadium Road	398	181	199	178	-200	-3	-50%	-2%
A9 Kessock Bridge	A96 East of Smithton	523	343	291	271	-232	-72	-44%	-21%
A9 Kessock Bridge	Barn Church Road	559	391	342	340	-217	-51	-39%	-13%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	310	311	-286	-108	-48%	-26%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	364	360	-248	-37	-41%	-9%
A9 Kessock Bridge	Sir Walter Scott Drive South of Stevenson Road	702	721	401	443	-301	-278	-43%	-39%
A9 Kessock Bridge	Old Perth Rd	663	663	488	421	-174	-242	-26%	-37%
A9 Kessock Bridge	Milburn Rd	582	344	389	282	-192	-62	-33%	-18%
A9 Kessock Bridge	A82	429	201	227	189	-202	-11	-47%	-6%
Stadium Road	A9 Kessock Bridge	453	409	252	243	-201	-166	-44%	-41%
Stadium Road	A96 East of Smithton	299	343	345	332	47	-10	16%	-3%
Stadium Road	Barn Church Road	335	390	396	401	61	11	18%	3%
Stadium Road	Culloden Road east of B9177	372	418	365	372	-7	-46	-2%	-11%
Stadium Road	A9 South of Milton of Leys	388	397	419	421	30	24	8%	6%
Stadium Road	Sir Walter Scott Drive South of Stevenson Road	478	721	455	504	-22	-217	-5%	-30%
Stadium Road	Old Perth Rd	439	662	543	481	104	-181	24%	-27%
Stadium Road	Milburn Rd	358	344	444	343	86	-1	24%	0%
Stadium Road	A82	220	265	266	268	46	3	21%	1%
A96 East of	A9 Kessock Bridge	761	492	387	307	-374	-185	-49%	-38%

From Point	To Point	Do min		Opt D		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Smithton									
A96 East of Smithton	Stadium Road	848	535	487	387	-361	-148	-43%	-28%
A96 East of Smithton	Barn Church Road	81	95	72	87	-9	-9	-11%	-9%
A96 East of Smithton	Culloden Road east of B9177	502	366	194	205	-308	-161	-61%	-44%
A96 East of Smithton	A9 South of Milton of Leys	518	344	315	327	-203	-16	-39%	-5%
A96 East of Smithton	Sir Walter Scott Drive South of Stevenson Road	607	668	339	398	-268	-270	-44%	-40%
A96 East of Smithton	Old Perth Rd	568	609	422	373	-147	-236	-26%	-39%
A96 East of Smithton	Milburn Rd	396	175	245	148	-151	-28	-38%	-16%
A96 East of Smithton	A82	696	432	414	318	-283	-114	-41%	-26%
Barn Church Road	A9 Kessock Bridge	809	530	499	377	-310	-153	-38%	-29%
Barn Church Road	Stadium Road	896	572	600	456	-296	-116	-33%	-20%
Barn Church Road	A96 East of Smithton	92	85	110	83	18	-3	20%	-3%
Barn Church Road	Culloden Road east of B9177	549	403	250	233	-300	-171	-55%	-42%
Barn Church Road	A9 South of Milton of Leys	566	382	371	355	-195	-26	-34%	-7%
Barn Church Road	Sir Walter Scott Drive South of Stevenson Road	655	706	396	425	-259	-280	-40%	-40%
Barn Church Road	Old Perth Rd	616	647	478	401	-138	-246	-22%	-38%
Barn Church Road	Milburn Rd	444	213	357	217	-87	4	-20%	2%
Barn Church Road	A82	725	451	506	369	-219	-82	-30%	-18%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	406	389	-292	-166	-42%	-30%

From Point	To Point	Do min		Opt D		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Culloden Road east of B9177	Stadium Road	785	598	507	469	-278	-129	-35%	-22%
Culloden Road east of B9177	A96 East of Smithton	548	529	207	212	-341	-317	-62%	-60%
Culloden Road east of B9177	Barn Church Road	584	577	225	212	-359	-365	-61%	-63%
Culloden Road east of B9177	A9 South of Milton of Leys	190	190	189	190	-1	0	0%	0%
Culloden Road east of B9177	Sir Walter Scott Drive South of Stevenson Road	319	319	319	319	0	0	0%	0%
Culloden Road east of B9177	Old Perth Rd	304	256	227	232	-78	-24	-26%	-9%
Culloden Road east of B9177	Milburn Rd	425	351	354	308	-71	-43	-17%	-12%
Culloden Road east of B9177	A82	633	495	433	400	-200	-95	-32%	-19%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	348	355	-222	-129	-39%	-27%
A9 South of Milton of Leys	Stadium Road	657	527	449	435	-208	-93	-32%	-18%
A9 South of Milton of Leys	A96 East of Smithton	420	458	403	405	-17	-54	-4%	-12%
A9 South of Milton of Leys	Barn Church Road	457	506	454	474	-2	-33	-1%	-6%
A9 South of Milton of Leys	Culloden Road east of B9177	236	264	232	238	-4	-26	-2%	-10%
A9 South of Milton of Leys	Sir Walter Scott Drive South of Stevenson Road	357	385	361	393	4	8	1%	2%
A9 South of Milton of Leys	Old Perth Rd	314	338	318	344	3	6	1%	2%
A9 South of Milton of Leys	Milburn Rd	297	281	288	274	-10	-7	-3%	-2%
A9 South of Milton of Leys	A82	505	425	375	367	-130	-58	-26%	-14%

From Point	To Point	Do min		Opt D		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Sir Walter Scott Drive South of Stevenson Road	A9 Kessock Bridge	718	542	463	397	-255	-145	-35%	-27%
Sir Walter Scott Drive South of Stevenson Road	Stadium Road	871	591	573	484	-298	-107	-34%	-18%
Sir Walter Scott Drive South of Stevenson Road	A96 East of Smithton	576	522	374	374	-202	-148	-35%	-28%
Sir Walter Scott Drive South of Stevenson Road	Barn Church Road	613	570	392	406	-220	-164	-36%	-29%
Sir Walter Scott Drive South of Stevenson Road	Culloden Road east of B9177	346	308	295	287	-51	-21	-15%	-7%
Sir Walter Scott Drive South of Stevenson Road	A9 South of Milton of Leys	458	441	360	356	-98	-86	-21%	-19%
Sir Walter Scott Drive South of Stevenson Road	Milburn Rd	391	345	389	323	-2	-21	-1%	-6%
Sir Walter Scott Drive South of Stevenson Road	A82	592	489	499	416	-92	-73	-16%	-15%
Old Perth Rd via A9	A9 Kessock Bridge	582	497	354	357	-228	-139	-39%	-28%
Old Perth Rd via A9	Stadium Road	670	539	455	437	-215	-103	-32%	-19%
Old Perth Rd via A9	A96 East of Smithton	433	470	410	407	-23	-64	-5%	-14%
Old Perth Rd via A9	Barn Church Road	469	518	400	450	-70	-68	-15%	-13%
Old Perth Rd via A9	A9 South of Milton of Leys	429	495	425	451	-4	-44	-1%	-9%
Old Perth Rd via Local Roads	A9 Kessock Bridge	598	521	435	460	-163	-61	-27%	-12%
Old Perth Rd via Local Roads	Stadium Road	686	564	485	489	-200	-75	-29%	-13%
Old Perth Rd via Local Roads	A96 East of Smithton	283	298	265	276	-18	-21	-6%	-7%

From Point	To Point	Do min		Opt D		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
Old Perth Rd via Local Roads	Barn Church Road	320	346	316	345	-4	0	-1%	0%
Old Perth Rd via Local Roads	Culloden Road east of B9177	249	291	236	274	-12	-17	-5%	-6%
Old Perth Rd via Local Roads	Sir Walter Scott Drive South of Stevenson Road	210	291	211	261	0	-30	0%	-10%
Old Perth Rd via Local Roads	A82	296	306	278	277	-18	-29	-6%	-9%
Milburn Rd	A9 Kessock Bridge	421	329	193	200	-228	-128	-54%	-39%
Milburn Rd	Stadium Road	509	371	294	280	-215	-92	-42%	-25%
Milburn Rd	A96 East of Smithton	179	190	167	171	-13	-18	-7%	-10%
Milburn Rd	Barn Church Road	216	238	218	240	2	3	1%	1%
Milburn Rd	Culloden Road east of B9177	344	381	301	308	-43	-73	-13%	-19%
Milburn Rd	A9 South of Milton of Leys	360	359	354	357	-6	-3	-2%	-1%
Milburn Rd	Sir Walter Scott Drive South of Stevenson Road	449	683	391	440	-58	-243	-13%	-36%
A82	A9 Kessock Bridge	299	208	153	177	-146	-32	-49%	-15%
A82	Stadium Road	393	251	211	206	-182	-46	-46%	-18%
A82	A96 East of Smithton	366	387	349	346	-17	-42	-5%	-11%
A82	Barn Church Road	402	435	399	414	-3	-21	-1%	-5%
A82	Culloden Road east of B9177	584	489	368	386	-216	-104	-37%	-21%
A82	A9 South of Milton of Leys	600	468	422	434	-178	-34	-30%	-7%
A82	Sir Walter Scott Drive South of Stevenson Road	689	792	458	517	-231	-274	-34%	-35%
A82	Old Perth Rd	650	733	546	495	-105	-239	-16%	-33%

The introduction of the Inshes to Smithton Link Road attracts approximately 1,400 vehicles (two-way) in both peaks as shown in Figures 6-21 and 6-22. This results in a reduction in traffic on the A96 to the east of Raigmore Interchange and on the A9 between Raigmore Interchange and Inshes Junctions. The inclusion of an additional crossing of the A9 provides a significant reduction in traffic flows on the Culloden Road overbridge in both peaks as shown in Figures 6-21 and 6-22.

The improvements at Longman have improved the operation of the junction, which results in increased the traffic flows on the surrounding links in both peaks as seen in Figure 6-21 and 6-22.

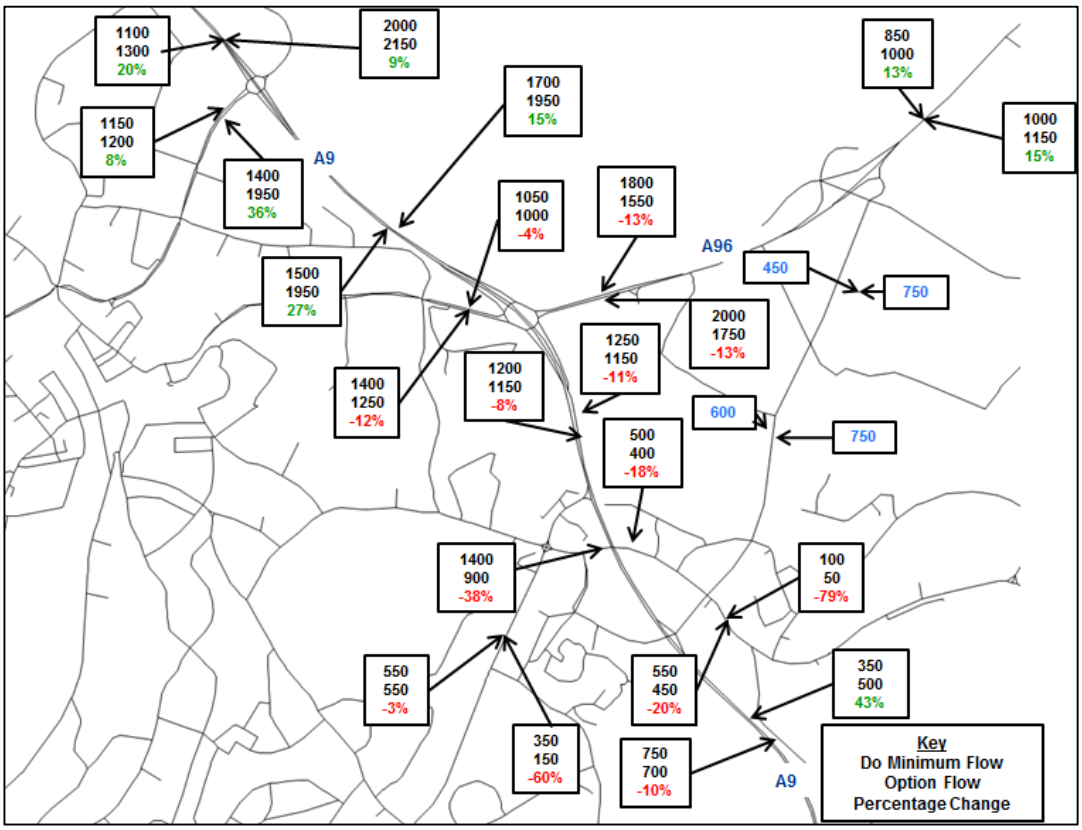


Figure 6-21 Option D 2031 AM Peak Flow Difference

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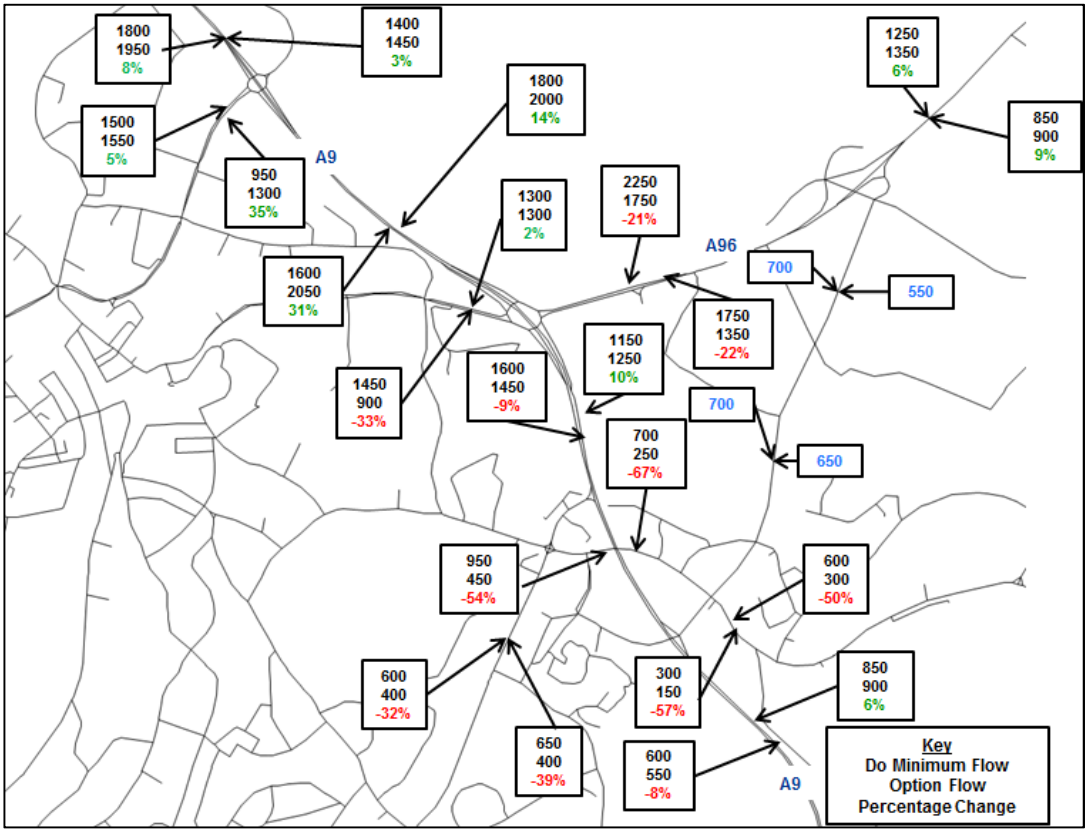

Figure 6-22 Option D 2031 PM Peak Flow Difference

The provision of the Inshes to Smithton link road reduces the conflict between local and strategic traffic at Raigmore Interchange. Whilst local and strategic trips will both use the link road, the number of local trips passing through Raigmore Interchange will reduce by approximately 17% westbound in the AM Peak and 23% eastbound in the PM Peak. This is illustrated through the select link analysis results shown in Figures 6-23 and 6-24.

The improvements at Longman Junction has resulted in an increase in local traffic using it to travel via the A82 in the westbound direction in the AM peak (54%), and in the eastbound direction in the PM peak (35%). Whilst local traffic levels using Longman Junction increase, overall the level of conflict between local and longer distance traffic is reduced as there is a reduction in the number of conflict points as a result of grade separating the A9 straight-through movements.

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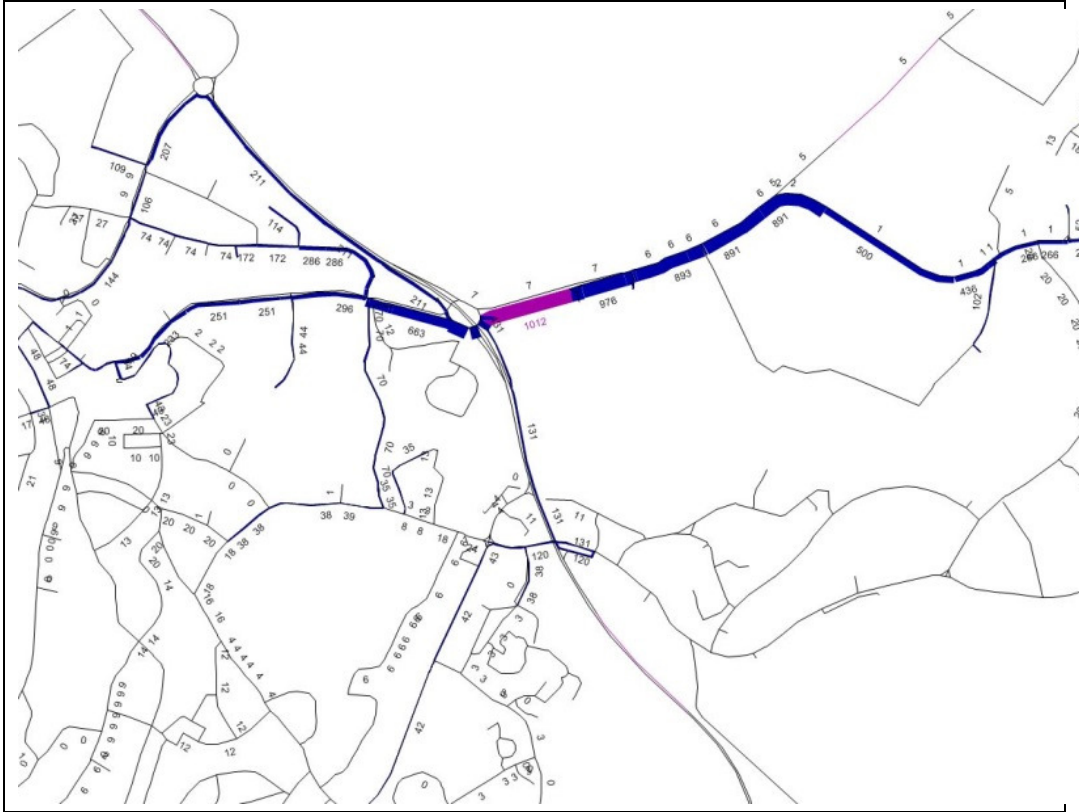
Do Min 2031 AM peak – Select Link Analysis A96 Westbound



Opt D 2031 AM Peak – Select Link Analysis A96 Westbound

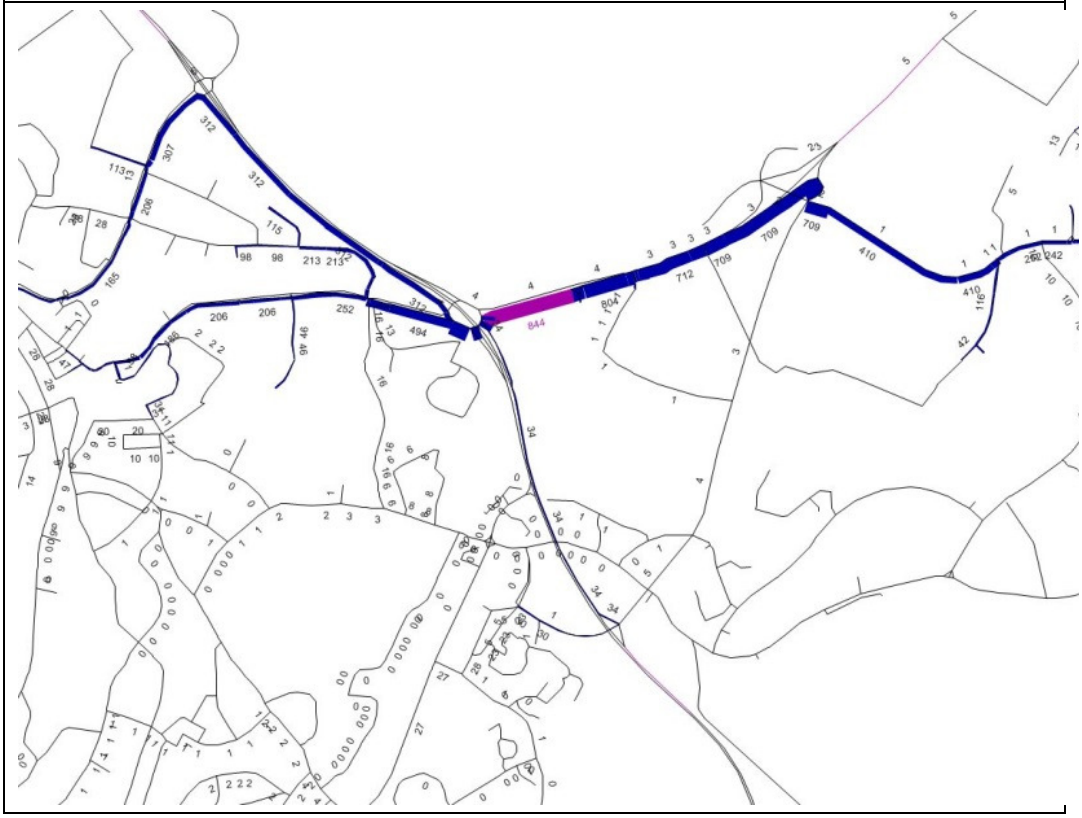


Figure 6-23 Select Link Analysis at Raigmore Interchange in the AM Peak

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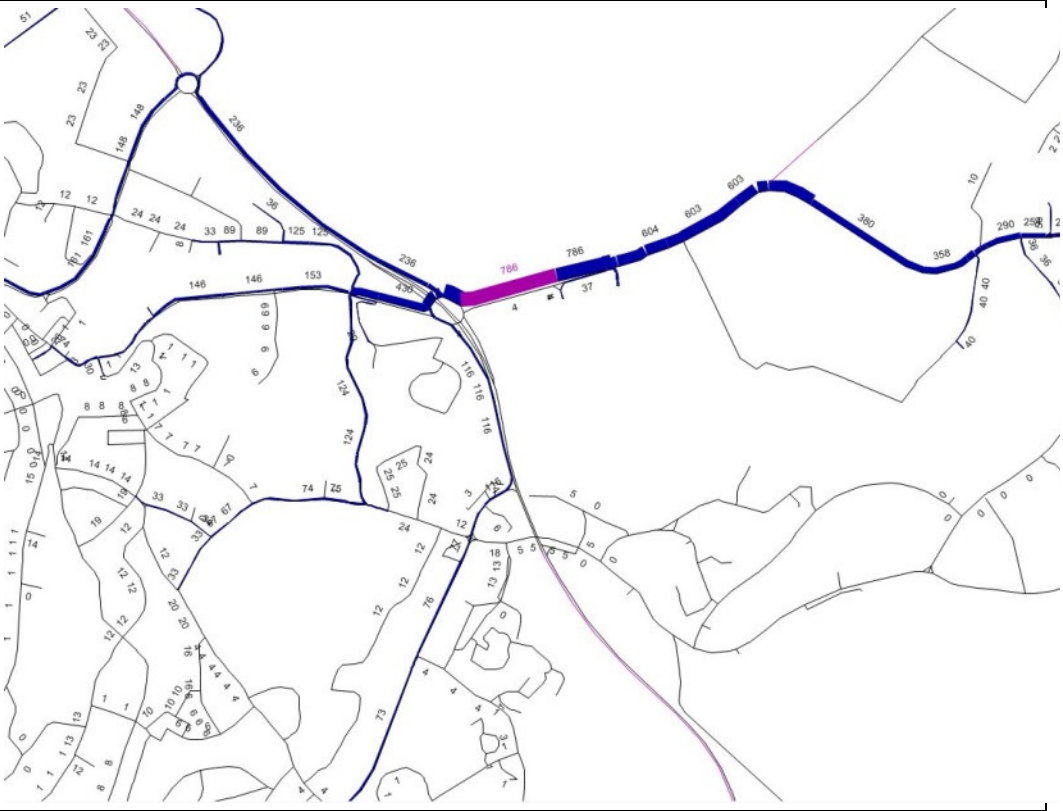
Do Min 2031 PM Peak – Select Link Analysis A96 Eastbound



Opt D 2031 PM Peak – Select Link Analysis A96 Eastbound

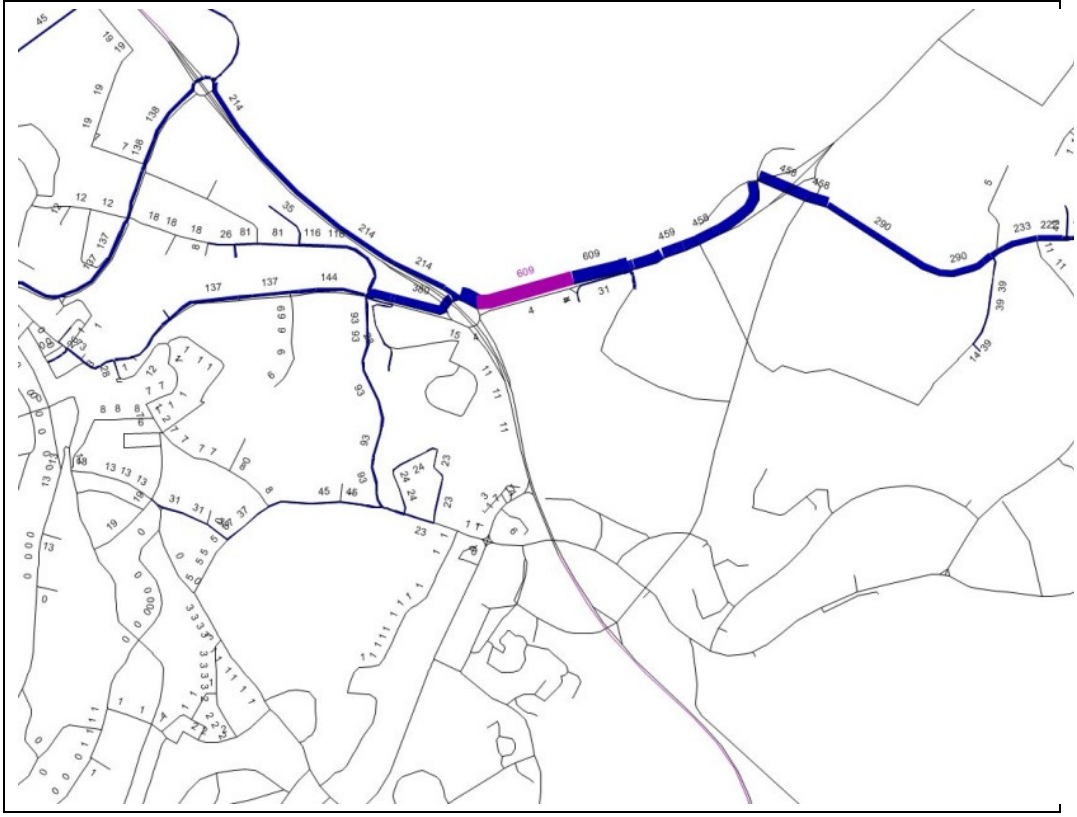


Figure 6-24 Select Link Analysis at Raigmore Interchange in the PM Peak

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The indicative economic appraisal (TUBA only) shows that the option would provide moderate economic benefits in relation to the investment with a Benefit to Cost Ratio (BCR) of approximately 1.6[4].

The option also provides additional access into the retail park, via a new link connecting to the Inshes to Smithton link, and would provide further opportunities for connections to access Inverness East development area. This is likely to encourage wider economic growth in the area.

Table 6-8 contains a summary of the appraisal of Combined Option D against the transport planning objectives, and the key appraisal impacts of the option against the STAG criteria.

Table 6-8 Combined Option D Summary

Criterion	Combined Option D
Objective L1 – Improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness. (Appendix C4 Page 4)	**Moderate Benefit** This option removes the south to east and east to south movement from Raigmore Interchange, improving the operation of the junction, resulting in journey time savings approaching Inverness. Whilst this option does not directly increase the opportunities to travel by public transport, it will provide improvement in journey times for bus services accessing Inverness via the A96.
Objective L2.1 – Improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through rationalisation of local movements' use of trunk road junctions (Appendix C4 Page 5)	**Moderate Benefit** The road network hierarchy will be improved through the provision of grade separation at Longman, and the additional link between Smithton and Inshes that will also provide additional access to the Inverness east area. The secondary road network through Smithton sees a reduction in traffic flows as local trips transfer onto the new link road to access South Inverness and the A9. Creation of the additional crossing over the A9 between Inshes Retail Park and Culloden Road reduces the level of westbound local traffic passing through the Inshes trunk road junction
Objective L2.2 – Reduce conflicts for longer distance and local traffic for planned development areas to the east. (Appendix C4 Page 5)	**Minor Benefit** The link road provides a dedicated link for traffic travelling between the A9 and the A96, whilst removing a degree of local traffic from Raigmore Interchange. The introduction of the new southbound slips encourages traffic travelling via the A9 to use the southbound diverge to access the University of the Highlands and Islands Beechwood Campus, and the Inshes area and may increase conflicts with local traffic on Culloden Road and Caulfield Road North.

[4] The TUBA appraisal software requires a single cost as input so for the purposes of the economic appraisal a capital cost estimate of £66.1m has been used..

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Objective L3 – Improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport. (Appendix C4 Page 6)	**Minor Benefit** The Inshes to Smithton Link Road will provide new opportunities for public transport and active travel links.
Objective L4 – Improve safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions. (Appendix C4 Page 6)	**Moderate Benefit** Longman will be built to modern safety standards. Grade Separation will remove the A9 through traffic from the junction. Longman Junction will be controlled by traffic signals, reducing the conflict between movements. The layout of the new A9 Inshes southbound diverge and merge slip roads will be built to modern standards and so should improve safety and reduce accident rates compared to the existing southbound slip roads arrangement.
Objective L5.1 – Improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; South of Inshes and the Smithton Roundabout. (Appendix C4 Page 7)	**Moderate Benefit** The grade separation of Longman junction will separate long distance A9 traffic from local movements. The operation of Raigmore Interchange will improve as the Inshes to Smithton link road reduces the level of traffic passing through it. This option will contribute towards improving the operational performance of the A9 Inshes Junction by providing a new crossing over the A9 for local movements travelling east to west and west to east across the A9.
Objective L5.2 – Improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network. (Appendix C4 Page 7)	**Minor Benefit** This option provides an alternative route for local traffic travelling between Smithton and Culloden, Inshes and the areas to the south of Inverness through the provision of the new link road. This leads to an improvement in the operational performance of the local road network through the reductions in traffic on Culloden Road, Harbour Road, Milburn Road and Sir Walter Scott Drive, and reduces traffic levels passing through the local Inshes roundabout junction.
STAG Environment (Appendix C4 Pages 9 - 15)	**Habitats and Biodiversity – Moderate to Major Impact** Construction of Longman Junction and the Inshes to Smithton link road could impact on the Moray Firth (SAC), Inner Moray Firth (SPA) and Longman and Castle Stuart Bays SSSI through disruption to foraging patterns and flightlines of qualifying species. Disruption of the former landfill could release potential contaminants. **Cultural Heritage – Major Negative Impact** Inshes to Smithton link road will result in the partial removal of the Aston Farm Cottages Ring Ditch and Pit Circles Scheduled Monument and impacts are also seen on the setting of the unaffected area of this monument to the west of the alignment. Scheduled Monument Consent would be required for the direct impacts on the scheduled monument and where preservation in situ is not viable, preservation by record is likely to reduce the impact. It is unlikely that mitigation will significantly

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	reduce the potential impact on the setting of the scheduled monument. This option would have the potential impact on the setting of one Category B Listed Building – Castlehill.
STAG Safety (Appendix C4 Page 16)	**Moderate Benefit** Grade separation of Longman Junction will remove some of the conflict at the junction and make it safer for NMUs. There are traffic reductions on the A96 approach to Raigmore and the local road network around Inshes that will improve safety
STAG Economy (Appendix C4 Pages 17)	**Moderate Benefit** Significant benefits are derived from traffic travelling between the A96 and South Inverness, traffic travelling along the A9 and traffic travelling between the Kessock Bridge and A96 . The option provides additional access into Inverness Retail Park BCR of approximately 1.6
STAG Integration(Appendix C4 Pages 17 to 19)	**Moderate Benefit** The new secondary road links provide additional opportunities for new bus services and active travel links to encourage non-motorised transport and interchange. The new link road between Smithton and Caulfield Road would facilitate access to the Inverness east development area as well as remove some of the additional traffic from the A96. The new road would also provide a connection to the Inverness Retail and Business Park, and would facilitate future connections to the Inverness east development area.
STAG Accessibility & Social Inclusion (Appendix C4 Page 20)	**Minor Benefit** Inshes to Smithton Link Road passes mainly through land which is currently undeveloped, and so minimal impacts during construction are likely. The route option is likely to improve journey times and therefore connectivity between Inshes, Cradlehall and Smithton. A Core Path and National Cycle route are severed, however as this route is a local route, it should be easier to cross than Option A.

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This option performs well against the transport planning objectives and the appraisal criteria and integrates well with the Highland Council development plan aspiration. The option would directly contribute towards the objectives of improving the effectiveness of the road network hierarchy, improving safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions, and improve the operational performance of the trunk road network and junctions on the A9.

The improvements at Longman Junction provide journey time savings for all movements through the junction. The inclusion of the Inshes to Smithton Link Road results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

This option provides a continuous link from Smithton Roundabout over the A9, with a connection to Caulfield Road and southbound merge and diverge slip roads with the A9. The continuation of the link road over the A9, combined with the introduction of the southbound merge and diverge slip roads removes a significant amount of traffic from Culloden Road Overbridge in both peaks. The impact at this location in greater in this option compared to Option C.

As the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness. The option is therefore deemed to provide a minor benefit to accessibility and social inclusion and provide moderate benefits to the economy and integration.

There is likely to be additional disruption related to the replacement of the existing Culloden Road overbridge for the southbound merge and diverge slip roads, and the option has a higher capital cost than Option C. There are some moderate negative impacts associated with this option under the environmental criteria.

It is therefore recommended that this option be taken forward for design development.

6.4 Combined Options - Summary Comparison

Table 6-9 below has been produced in order to summarise the key appraisal aspects for each option, in a format where they can be more easily compared across the four Combined Options.

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Table 6-9 *Summary of Combined Option Key Benefits/Impacts*

Criterion	Combined Option A	Combined Option B	Combined Option C	Combined Option D
Objective L1 – Improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness.	✓✓	✓	✓✓	✓✓
Objective L2.1 – Improve the effectiveness of the road network hierarchy in addressing the conflict between longer distance and local traffic through rationalisation of local movements' use of trunk road junctions	✓✓	o	✓✓	✓✓
Objective L2.2 – Reduce conflicts for longer distance and local traffic for planned development areas to the east.	✓.	o	✓	✓
Objective L3 – Improve connectivity, particularly by public transport and active travel, between Inverness city centre and the growth area to the east including Inverness Airport	×	✓	✓	✓✓
Objective L4 – Improve safety for motorised and non-motorised users by reducing the accident rate at trunk road junctions	✓✓	✓	✓✓	✓✓
Objective L5.1 – Improve the operational performance of the trunk road network and junctions on the A9 and A96 as they approach Inverness from the Kessock Bridge; South of Inshes and the Smithton Roundabout.	✓✓	✓	✓✓	✓✓
Objective L5.2 – Improve the operational performance of the secondary network and junctions where this may improve the operation of the trunk road network	✓	✓	✓	✓✓
STAG Environment	**Habitats and Biodiversity ✓✓/✓✓✓** **Landscape and Visual ×××** **Global and**	**Habitats and Biodiversity ✓✓/✓✓✓** **Cultural Heritage ×××**	**Habitats and Biodiversity ✓✓/✓✓✓** **Cultural Heritage ×××**	**Habitats and Biodiversity ✓✓/✓✓✓** **Cultural Heritage**

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Criterion	Combined Option A	Combined Option B	Combined Option C	Combined Option D
	Local Air Quality/Noise and Vibration ×××			
STAG Safety	✓✓	✓	✓✓	✓✓
STAG Economy	×	✓✓	✓✓	✓✓
STAG Integration	×	✓✓	✓✓	✓✓
STAG Accessibility & Social Inclusion	××	✓	✓	✓✓

✓✓✓ Major Benefit ✓✓ Moderate Benefit ✓ Minor Benefit o Neutral
× Minor Negative ×× Moderate Negative ××× Major Negative

The table shows that Combined Option A performs well in terms of traffic reductions on the trunk road network, in particular on the A96, and in terms of journey time improvements for key movements in the study area. It also contributes positively to reducing the level of conflict between local and longer distance traffic, meeting key objectives. However, it is clear that the option is likely to have specific major negative impacts on the environmental criteria of Landscape and Visual, and Air Quality and Noise. The option also performs poorly in terms of Integration as it does not compliment key local policies as set out in the Highland Wide Local Development Plan (HWLDP), and the Inner Moray Firth Local Development Plan (IMFLDP). Option A provides significant journey time benefits, however as this option has a relatively high capital cost estimate the economic assessment result yields a Benefit to Cost Ratio (BCR) of less than 1.0.

Combined Option B results in slightly lower traffic reductions on the trunk road network, and journey time reductions for key movements within the study area. The option performs well in terms of the likely environmental impact compared with the other options, although it does present a major negative impact on Cultural Heritage due to the proposed Stevenson Road link and its proximity to the listed buildings on the west side of the A9. It integrates well with HWLDP and IMFLDP policies providing opportunities for access to the Inverness east development area, and increased opportunities for new public transport and active travel links. Due to its relatively low cost estimate it would provide a moderate benefit in terms of the economy with a BCR of approximately 1.7.

Combined Options C and D both provide a very similar level of performance in terms of traffic reductions and journey time improvements as Option A. These options also contribute positively to a reduction in the level of conflict between local traffic and longer distance traffic. They have a significantly lower environmental impact than Option A in terms of Landscape and Visual, and Air Quality and Noise impacts, although they do have a Cultural Heritage impact on scheduled ancient monument sites lying to the east of the A9. Both options would complement the relevant HWLDP and IMFLDP policies, and would provide greater opportunities for public transport and active travel links.

In terms of the economic benefits, Option C provides the highest level of potential benefit with a BCR of approximately 1.9. Option D provides the opportunity to improve the existing Inshes junction configuration through the provision of new southbound merge and diverge slip roads. The layout of the new A9 Inshes

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southbound diverge and merge slip roads would be built to modern standards and so should improve safety and reduce accident rates compared to the existing southbound slip roads arrangement. This will provide a positive contribution to safety benefits, although the additional cost associated with the provision of the new A9 southbound slip roads in Option D results in a slightly lower BCR of approximately 1.6.

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7 Summary of Consultations

7.1 Introduction

Transport Scotland has worked closely with THC throughout the development of the A9/A96 Connections Study, and have been involved in consultations with THC through regular monthly meetings. Four combined option packages were developed for public consultation through exhibitions held in May and June 2014. Prior to this, public exhibitions had been held for the A96 Inverness to Nairn (including the Nairn Bypass) project during November 2013, which included a section on the A9/A96 Connections Study.

The exhibitions held on the 30 May and 03 June 2014, were held jointly with THC, with Transport Scotland presenting the A9/A96 Connections Study, and THC presenting the Inshes to Raigmore Development Brief and the Inshes Junction Improvements – Phase 2. This section of the report summarises the findings, related to the A9/A96 Connections Study, from the public exhibition process.

The public exhibitions were attended by 287 people over the course of the two days. The attendees were encouraged to provide feedback on the options presented using the feedback sheet provided, completing the online feedback form on the project website, writing via email to the project email address or writing a letter to Transport Scotland.

Feedback was provided by 54 attendees, approximately 10% of which were from affected landowners. The feedback also included the formal response from THC. The key points from the feedback responses are summarised in the following sections.

7.2 Longman Junction

Overall, support for improvements at Longman Junction were positive as it will ease congestion, with 12 of the 54 respondents indicating support for the plans, and no negative feedback being received. It was suggested that part-time traffic signals during the AM peak may be required.

There were concerns raised in relation to the existing junction signalisation and layout, with specific points made in relation to the safety of the three lane circulating carriageway, particularly when an HGV is using the junction.

7.3 Option A

There were eight respondents that mentioned Option A, with three stating that it was their preferred option while the other five were against the option. This option was supported as it alleviates the queuing issue on the southbound diverge at Inshes and relieves pressure on the roundabout. It was highlighted that as Transport Scotland has proposed that this option was would not being taken forward, it may lead to a bias in the responses, with comments on Option A not being provided as it had already been discounted. An alternative proposal largely based on Option A was also suggested by an attendee, which included a single carriageway link road and removing the link to Culloden Road.

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7.4 Option B

Option B received the most positive responses alongside Option D, with 13 respondents stating it as their preferred option. The respondents preferred Option B as it had less impact on properties and residents, while some felt that the link at Stevenson Road would allow traffic to bypass Inshes and provide a good connection to the new crossing of the river and canal. The fact that this option has the lowest cost was also highlighted as a benefit by four respondents.

Concerns were raised over the lack of a connection to the A9, as the direct connection to Culloden Road would increase traffic on the Culloden Road overbridge and at Inshes Roundabout. The proposed crossing of the A9 was deemed to be too far south by some respondents and as a result would be poorly used. Concerns were also raised regarding the routing of traffic along Stevenson Road, which is used by children to access Inshes Primary School. There was particular concern over the speed of traffic on this section of the network, which is currently deemed to be too high. This option was also opposed on environmental grounds, as it may increase flooding issues on Drumossie Brae, will result in a loss of green space, and will have an impact on listed buildings. There were also concerns from the affected land and property owners.

7.5 Option C

Option C received the least number of positive responses of the options, with only six respondents stating that it was their preferred route. As with Option B, there were concerns raised over the lack of connection to the A9 increasing traffic on the Culloden Road overbridge and at Inshes Roundabout. However, it was recognised that the crossing of the A9 was more in keeping with the perceived desire line of traffic. Concerns were raised over routing traffic through the residential area of Inshes, which some residents currently perceive to be heavily trafficked. This option was also opposed on environmental grounds, with the loss of green space, pollution after opening, and the impact on heritage sites being cited as a concern.

7.6 Option D

It was recognised that Option C and D were generally the same, with similar concerns raised for both, however the addition of the A9 southbound slip roads meant that this option was the joint favourite option, with 13 respondents stating it was their preferred option. Although the same issues occur as Option C, the southbound diverge helps to alleviate the current queuing issue on this slip road, which is perceived as a major safety issue. It was proposed that the connection to the A9 should allow for all movements. Concerns were raised over the potential disruption that may be caused by reconstructing the Culloden Road overbridge, however this was also seen as a positive by some, as it could be widened to increase the capacity.

7.7 Other Comments

Seven of the respondents were not convinced that the new link was necessary, which is as significant a response as those who indicated a preferred route. Those that were against the scheme entirely listed a variety of reasons, such as there being no improvement to the traffic flows at Raigmore Interchange and Raigmore Junction having unused capacity. There were concerns raised over the economic justification of the options, and that the study was only being progressed to ‘open up’ development land. The main areas of congestion were identified as Raigmore

Interchange and Inshes Roundabout, with the UHI access also being a main source of congestion. The alternative access into the West Seafield retail park was well received, as it was recognised that this will reduce congestion on the A96.

It was suggested that more detailed, up-to-date, traffic modelling was required to prove the benefit of the scheme, with it being suggested that bottlenecks will simply move to other locations. The lack of public transport options were also raised as a concern.

Environmental issues were raised in a number of responses, with particular concerns over air and noise pollution, flooding and the impact of the local listed buildings and scheduled monuments. The impact of additional traffic on the local road network, particularly in the residential areas of Inshes and around Stevenson Road was also a cause for concern. There were also suggestions that the UHI campus should have a dedicated link either from the Inshes to Smithton Link Road, from the A9 or from Raigmore Interchange.

7.8 Summary

In general the options were well received, with Options B and D being the preferred routes. The main advantage of Option D is the access onto the A9, which is seen as a major benefit as it alleviates the major safety concern that is caused by the sub-standard southbound diverge at Inshes. Option B was recognised as being the least disruptive to residents, and the option with the lowest cost. The proposal for a second access to the West Seafield Retail and Business Park was well received by those who expressed an opinion.

8 Conclusions

Transport Scotland commissioned Jacobs to develop and assess alternative options to the original A9-A96 East Trunk Road Link under the A9/A96 Connections Study, which was undertaken following Scottish Transport Appraisal Guidance (STAG) principles.

The A9/A96 Connections Study has involved working closely with The Highland Council and their consultants, in relation to revisions to the Moray Firth Transport Model to reflect alternative growth forecasts, through frequent progress meetings at key stages of the appraisal process.

To provide confidence to both Transport Scotland and other key stakeholders that the most appropriate intervention is identified for the A9/A96 connection, a review of the existing and future year problems was undertaken. This review allowed a set of refined objectives to be developed and agreed with The Highland Council, and from these a range of options were developed.

These individual options were assessed against the defined objectives and the STAG criteria, with the results of the assessments presented in a set of Appraisal Summary Tables (AST). A number of options were sifted out at this stage and the remaining options were taken forward for detailed appraisal as part of amalgamated 'packages' of selected options in combination.

The four combined option packages comprised an option to grade separate Longman junction, in combination with a range of interventions to provide a link between the A9 Inshes and the A96 Smithton junction. The four combined options were:

- Combined Option A - the original Inshes to Smithton Trunk Road Link plus Longman Option 1.
- Combined Option B - Inshes to Smithton Link Road Option 1 plus Stevenson Road to Culloden Road Link Option 1 plus Longman Option 1.
- Combined Option C - Inshes to Smithton Option 3 plus Longman Option 1.
- Combined Option D - Inshes to Smithton Option 4 plus Longman Option 1.

The four combined options were then taken forward for detailed appraisal. Following the appraisal. further investigation of and refinements to the combined option model scenarios were undertaken to finalise the transport modelling aspects of the appraisal process.

The STAG appraisal components were finalised, and a final set of Appraisal Summary Tables produced to present the performance of each option against the transport planning objectives and the STAG appraisal criteria. The appraisal process has shown that Combined Option A, which includes the East Trunk Road Link, has significant negative impacts in terms of the Environment, Integration, Accessibility and Social Inclusion, and Economy as a result of the relatively high capital cost estimate in comparison with the other options.

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The appraisal has shown that Combined Options B, C and D can provide similar benefits in terms of the operational performance (traffic reductions and journey time savings) as Option A, but with much lower impacts in terms of key Environmental, Integration and Accessibility and Social Inclusion criteria. They also provide more complementary solutions to the relevant local policies set out in the Highland Wide and Inner Moray Firth Local Development Plans.

Overall, the Combined Options B, C and D perform well against the transport planning objectives and STAG appraisal criteria, and integrate well with The Highland Council's development plans.

Combined Option B results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

In addition, as the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness.

However, traffic flows on Culloden Road Overbridge and Culloden Road to the East of the Inshes to Smithton Link Road connection increase in Option B. This is a result of the Inshes to Smithton Link Road and the Stevenson Road Link not being continuous. The discontinuous nature of these links and the distance of the additional A9 crossing from Inshes encourages traffic onto Culloden Road, and results in an increase in traffic flow at this already congested area of the network.

Option B also has the lowest combined journey time savings on key routes, and the lowest reduction in traffic flows on the trunk roads (A96 and A9) compared to the other options. There are some moderate negative impacts associated with this option under the environmental criteria, as the option results in an adverse impact on listed buildings from new crossing of A9.

Combined Option C results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

Option C provides a continuous link from Smithton Roundabout over the A9, with a connection to Caulfield Road. The continuation of the link road over the A9 alleviates traffic congestion Culloden Road Overbridge, particularly in the PM peak.

In addition, as the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness.

However, Option C results in a smaller reduction in traffic flows on the trunk roads (A96 and A9) and Inshes Overbridge when compared to Option D, and it retains the existing A9 southbound slip roads at Inshes. There are also some adverse impacts

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associated with this option under the environmental criteria, affecting a scheduled monument and listed building on the east side of the A9.

Combined Option D also results in journey time savings between the A96 East and Inverness South and the A96 East and Inverness Centre, whilst also improving the operation of Raigmore Interchange by reducing traffic levels approaching the junction from the east. Traffic levels also reduce on the A9 between Raigmore and Inshes southbound.

Option D again provides a continuous link from Smithton Roundabout over the A9 with a connection to Caulfield Road, and also provides new southbound merge and diverge slip roads with the A9. The continuation of the link road over the A9, combined with the introduction of the southbound merge and diverge slip roads removes a significant amount of traffic from Culloden Road Overbridge in both peaks. The option provides the opportunity to improve the existing Inshes junction configuration through the provision of new southbound merge and diverge slip roads. The layout of the new A9 Inshes southbound diverge and merge slip roads would be built to modern standards and so should improve safety and reduce accident rates compared to the existing southbound slip roads arrangement.

In addition, as the new Inshes to Smithton Link Road is a single carriageway local distributor road, it will allow crossing opportunities for pedestrians and cyclists alike, encouraging active travel. The options should also improve the opportunities for active travel from the development areas to the east of Inverness by providing new links into Inverness.

However, with Option D there is likely to be additional disruption related to the replacement of the existing Culloden Road overbridge for the southbound merge and diverge slip roads, and the option has a higher capital cost estimate than Option C. There are also some adverse impacts associated with this option under the environmental criteria, affecting a scheduled monument and listed building on the east side of the A9.

Based on the appraisal evidence Combined Options C and D are therefore considered the best performing options.

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Appendix A MFTM Alternative Demand Scenario

Appendix B1 Option Drawings

Appendix B2 Workshop Presentation

Appendix B3 Individual Option Appraisal Summary Tables

Appendix B4 Option Sifting Workshop

Appendix C1 Combined Option A AST

Appendix C2 Combined Option B AST

Appendix C3 Combined Option C AST

Appendix C4 Combined Option D AST

Appendix C5 Combined Option Presentation

Appendix C6 Combined Option Workshop