A96(T)/A90(T) Haudagain Improvement

Aberdeen City Council
on behalf of
Transport Scotland and Nestrans

STAG Report

SIAS Limited

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A96(T)/A90(T) HAUDAGAIN IMPROVEMENT

Description: **STAG Report**

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1 INTRODUCTION

1.1 Purpose of Report

SIAS Limited (SIAS) in partnership with WSP Environmental, Roger Tym & Partners and Aberdeen City Council Design Services was commissioned to undertake the Scottish Transport Appraisal Guidance (STAG) of the A96(T)/A90(T) Haudagain Improvement.

The report provides the culmination of the STAG Part 2 appraisal, drawing on the previous STAG Part 1 appraisal to provide a fully comprehensive document with a clear synergy from the start to the end of the process.

It is a requirement that all transport proposals for which The Scottish Government support or approval is required shall be appraised in accordance with STAG. It is intended that the application of STAG will result in the development and implementation of proposals to the satisfaction of all stakeholders, most importantly the public.

Public and Stakeholder participation and consultation have been a key feature of the Haudagain STAG. Two major public and Stakeholder consultations have been undertaken to develop options, gather a range of opinions and utilise feedback in the STAG process.

1.2 Background

The Haudagain Roundabout is located in the north-west of Aberdeen at the meeting point of a number of strategic roads in the city, the A96(T) Auchmill Road, the A90(T) North Anderson Drive, the A90(T) Mugiemoss Road and the A96 Great Northern Road. These major routes all require access through the junction, with the A96(T) and A90(T) Trunk Roads serving as the main access into and around Aberdeen from the north and north-west.

At certain times during the peak periods the junction has significant queues, the A96(T) experiences traffic queuing for over a mile in the afternoon, with delays on all approach arms. Journey times are unreliable and public transport is impeded.

In the morning and evening peak periods over 130 buses pass through Haudagain roundabout. Bus priority measures are in place on A96(T) Auchmill Road and Great Northern Road but due to general traffic queues, these bus priority lanes are not easily accessed at peak times by the bus operators.

The Institute of Directors has commented that congestion at Aberdeen's Haudagain Roundabout is hampering the region's economic competitiveness, and is estimated to be costing the local economy between £15million and £30million annually.

There are regeneration proposals being developed by Aberdeen City Council for the Middlefield area, adjacent to Haudagain Roundabout. This is an area of multiple deprivation and is recognised as requiring regeneration as part of a larger effort by all Council and government agencies to improve the quality of life for all in Aberdeen City, to encourage the local economy and maintain a balanced population base over the next 20 years. Any transport improvements at Haudagain are being designed to complement the Middlefield scheme.

The purpose of the STAG 2 appraisal is to identify the measures that might best be employed to address transport problems and meet the wider planning objectives for the area. This will involve action over a range of scales, reflecting the diversity of impacts of the proposed development on walking, cycling, bus and road infrastructure.

The STAG 2 appraisal is a key step in identifying the most appropriate transport interventions for the improvement of Haudagain Roundabout. It will allow the subsequent delivery of the transport and accessibility solutions necessary to support the full potential of planning objectives.

The desire for improvement at Haudagain is set against a policy background that includes commitments to other transport interventions in and around Aberdeen. Interventions that have been included as part of the solution at Haudagain are the Aberdeen Western Peripheral Route (AWPR) and proposals for Access from the North (Third Don Crossing) as supported by Local and Regional Transport Strategies and described as 'vital' to delivering the emerging Structure Plan vision for Aberdeen City and Aberdeenshire.

2 PRE-APPRAISAL

This pre-appraisal section of the STAG report aims to highlight the analysis of problems and opportunities, objective setting and option generation, sifting and development that has taken place in this study. These elements make up the fundamental basis for the Haudagain STAG appraisal.

Evidence of the transport problems in the area have been investigated with particular reference to Aberdeen and north-east transport trends and the supporting evidence of the Haudagain baseline transport conditions in 2004. Where available, opportunities have been identified.

Objectives for the study were developed to direct the outcomes of the study. These local objectives are the main focus of initial assessment. Government objectives covering topics on the environment, safety, economy, integration, accessibility and social inclusion being addressed in later stages of the appraisal.

Options for consideration by the STAG process were generated through technical development and via public and stakeholder consultation. A listing of forty transport planning options was identified ranging from encouragement of walking to large scale junction improvements. Taking all these options on board they were sifted against local objectives and implementability criteria to develop a set of options suitable for initial appraisal.

2.1 Analysis of Problems and Opportunities

2.1.1 Underlying Transport Trends

The recent Aberdeen City *Local Transport Strategy* (*LTS*), March 2008, provides research on travel trends in the Aberdeen and the north-east area. This has been reproduced here to give a background to the context in which local transport problems at Haudagain are set.

In terms of **modal split**, the proportion of journeys to work by car in Aberdeen has risen from 61% in 1999/2000 (52% as the main driver, 9% as passengers) to 63% in 2005/2006 (59% as the main driver, 4% as passenger). This is in contrast to a 2% decline in Glasgow and a 4% decline in Edinburgh.

In 2005/2006, 14% of City residents **walked** to work in Aberdeen City, which is slightly higher than the 13% national average for Scottish urban areas.

Levels of **cycling** to work were 2% in Aberdeen City in 2005/2006, which is in line with the national average

In terms of **car ownership**, Aberdeen has the highest number of cars per household of Scotland's principal cities, but there are almost a third of households in Aberdeen that do not have access to a car.

Car use in the City is also high, with 42% of Aberdeen residents using a car every day compared to 41% in urban Scotland as whole.

According to Scottish Transport Statistics, **road traffic levels** on Aberdeen's roads increased by 5.8% between 2002 and 2006, which is higher than the levels of growth in Dundee, Glasgow and Edinburgh.

Local monitoring between 2002 and 2006 revealed rates of growth ranging from -6% on Union Street to +11% on Wellington Road. This variation in traffic growth patterns is likely to be influenced by a number of factors including:

- the dispersal of residents from the City to the surrounding areas, particularly where employment and shopping journeys are still made to the City
- the growth of peripheral employment sites
- the growth of housing areas (in Aberdeenshire) particularly to the south and west of the City
- congestion inhibiting traffic growth on some routes and diverting to less congested routes

The knock-on impacts of **Aberdeenshire's transport trends** on the City's transport network also require consideration in developing transport strategies for the City. For example, Aberdeenshire has the highest number of cars per head of population in Scotland, and the Aberdeenshire road network experienced traffic growth rates of over 11% between 2000 and 2006.

Travel to work by bus is currently up on previous years, standing at 17% in 2005/2006, compared to 12 or 13% on previous years. This is well above the Scottish average of 12%, but slightly less than the figure for large urban areas in Scotland, which currently stands at 18% from Scottish Household Statistics.

Bus use is relatively low in Aberdeen, although investment in improved services and fleet has resulted in growth in recent years. The introduction of the national concessionary fares scheme has also contributed to bus patronage increases.

Patronage levels on **Park & Ride** services in Aberdeen have generally been static or in decline. Recent snapshot car park occupancy surveys indicated that Bridge of Don (600 spaces) had a utilisation rate of 85%, while Kingswells (950 spaces) was just 35%.

Cost comparisons of monthly bus tickets in each of Scotland's cities reveal that the cost of bus travel in Aberdeen is considerably higher than in other cities. The **cost of public transport** has also risen higher than the cost of living, while the cost of motoring has decreased in real terms.

In Aberdeen City Centre, the cost of **car parking** has not increased in line with the cost of living. For example it has cost £1.80 for one hour on-street parking in the City Centre since 2002. The same applies for off-street car parks operated by the Council. Free parking provided by employers, plus the provision of company cars are also central to explaining the high car use levels for journeys to work in Aberdeen.

While the **rail network** in the north-east is very limited and less than 1% use rail for travel to work in the City, rail services play a vitally important role in terms of providing connectivity to the rest of Scotland and the UK, particularly for business and leisure trips.

Aberdeen **Airport** has experienced the fastest passenger growth of all Scottish airports over the past few years, handling over 3.4 million passengers per year. It is also the world's busiest heliport, handling over 35,000 helicopter movements every year, the majority serving the off-shore oil and gas industry.

Aberdeen **Harbour** is one of Scotland's major ports, annually handling over 5 million tonnages of cargo, valued at approximately £1.5 billion, to a range of industries. Passenger numbers on the Northern Isles ferry service have also continued to increase over the same period, with latest statistics showing that 141,000 passengers passed through the port in 2006.

An annual average of 15.4 million tonnes of **freight** moved within the Grampian region between 2000 and 2004; much of this is high bulk items moving short distances, which emphasises the importance of the local road network for the transport of freight.

2.1.2 Evidence of Problem – Observed Local Data Analysis

Traffic surveys recorded in 2004 provide evidence that there are unreliable journey times and significant traffic queues on the roads leading to Haudagain Roundabout at peak times of the day. The results are summarised in Table 2.1.

The data shows that in the morning The Parkway A90(T) and Auchmill Road A96(T) can experience traffic queues over a kilometre long. Journey time reliability for all vehicles on the Parkway is also highly variable ranging from 3 to 17 minutes for a southbound journey to travel only a few kilometres.

In the afternoon all arms of Haudagain roundabout have maximum queues of around a kilometre, with Auchmill Road A96(T) having queues extending nearly two kilometres. Journey time reliability on Auchmill Road in the afternoon is poor, with journey times ranging from 7 to 22 minutes to travel a few kilometres through Haudagain junction.

Bus lanes extend for 800metres on Auchmill Road A96(T) and Great Northern Road A96. The extent of general queuing traffic causes free running public transport access to the bus lanes to be blocked on Auchmill Road at both peak times and on Great Northern Road in the afternoon.

Over 130 buses pass through Haudagain at the peak times of day from a variety of operators including Firstbus and Stagecoach. The majority of bus movements are in the east-west and west-east directions. One bus service routes north to south and south to north. A couple of other bus services route west to south and south to west at Haudagain. One bus service, the No. 23, crosses North Anderson Drive at Hilton Drive/Manor Avenue using a specially installed signal controlled bus gate and so avoids the delays at Haudagain.

Table 2.1 : Observed Traffic Data 2004 Weekday

Route	Journey Times (minutes)			Maximum Queue (metres)
	Maximum	Minimum	Average	Length, Time occurring
Morning 06:30 - 09:30				
Northbound – North Anderson Drive A90(T)	9	4	5	270m at 09:00
Southbound – The Parkway A90(T)	17	3	9	1,280m at 07:30
Eastbound – Auchmill Road – A96(T)	7	4	5	1,360m at 08:30
Westbound – Great Northern Road A96	8	3	5	325m at 08:00
Afternoon 16:00 - 19:00				
Northbound – North Anderson Drive A90(T)	19	4	10	980m at 17:00
Southbound – The Parkway A90(T)	13	4	7	1,330m at 18:30
Eastbound – Auchmill Road – A96(T)	22	7	14	1,740m at 17:30
Westbound – Great Northern Road A96	16	4	10	930m at 16:30

Reference: Haudagain Model Development and Validation Report 2004, TPBODON/61871 Table 6.1, 6.2 & Appendix D

The pressure on Haudagain roundabout has led to 'rat running' in adjacent residential streets. Measures to prevent this have been taken by Aberdeen City Council, including street closures and traffic calming but the problem still persists as drivers take greater detours. This problem has been highlighted by local residents in public consultations and measured, using number plate recognition, in a traffic survey in 2007. Around 600 vehicles have been recorded rat running through the Middlefield area on a weekday afternoon between 16:00 – 19:00. Mugiemoss Road was also observed being used as an alternative route from the west to avoid delays on Auchmill Road.

2.1.3 Evidence of Problems - National Data Analysis

Nationally, traffic on trunk roads is monitored for congestion problems and is reported in the annual Scottish Transport Statistics publication. The reporting is presented as average travel time lost per vehicle-kilometer along selected routes. The Haudagain Roundabout features as the terminating point of 3 out of 22 of the recognized most congested routes in Scotland. During 2006, delay on routes to Haudagain ranged on average from 5 to 8 seconds lost per vehicle-kilometer, putting these routes among the worst in terms of traffic delay in Scotland. The monitored routes included other junctions other than Haudagain Roundabout and run for some distance, for example, from Stonehaven to Mugiemoss A90(T), Blackburn to MugiemossA96(T) and Balmedie to Mugiemoss A90(T). Haudagain sits at the hub of this recognised area of delay in the Trunk Road network.

2.1.4 Issues & Opportunities

Integration with national, regional and local policies is a requirement in STAG appraisal. In the context of Haudagain these include the influence of The Scottish Government's, Nestrans and Aberdeen City Council's Transport Strategies that are linked to Local and Structure Plan planning strategies. Issues contained in these strategies must be taken into consideration when developing objectives for the study. These include a range of concerns including the environment, safety, economy, integration, accessibility and social inclusion. The actions contained in these strategies provide opportunities to address problems

at Haudagain in an integrated and holistic way. The policies aim to tackle transport trends causing underlying congestion and wider environmental problems and by supporting sustainable economic development opportunities. This is done by supporting, for example, public transport priority infrastructure and other measures to change travel behavior from single car occupancy to more sustainable modes of transport such as bus, cycling and walking.

Policy Actions in the adopted and approved *Local Transport Strategy* (*LTS*) and final *Regional Transport Strategy* (*RTS*) include supporting traffic relief measures, such as the Aberdeen Western Peripheral Route (AWPR) and Access from the North proposals. Combined together these elements will help to address transport problems at Haudagain, but the existing and projected problems are to such an extent at this key location in the strategic network that additional measures may be required in the short and longer term. The National Transport Strategy (NTS) has outcomes of 'improving journey times and connections', 'reducing emissions' and 'improving quality, accessibility and affordability' and has policy actions which will aid transport problems at Haudagain, such as support for smart measures to encourage change in travel behaviour to more sustainable modes.

The STAG process is intended to provide sufficient information to allow the public and decision makers to identify an optimum option for addressing problems taking due cognisance of all the issues of the day, but also ensuring integration with the overarching transport and land-use strategies.

The **AWPR** is a proposed dual carriageway route around the periphery of Aberdeen. Transport model testing has been undertaken as part of the AWPR and Stonehaven Fastlink appraisal. The analysis, presented at the public exhibition in October 2007, has shown that there is expected to be a reduction in annual average daily traffic (AADT) at Haudagain with the implementation of the AWPR. On Auchmill Road A96(T) in 2012 the reduction has been published as a change from 41,700 to 35,900 vehicles per day, this is a reduction of 14%. On North Anderson Drive A90(T) in 2012 the change is expected to be from 38,900 to 32,300 vehicles per day, this is a reduction of 17%. The traffic figures demonstrate that the AWPR will reduce the volume of traffic to pre-2005 levels, which will improve the operation of Haudagain roundabout. In the longer term traffic growth, as a result of economic growth and development, is expected to overtake the benefits of the AWPR traffic reduction at Haudagain and bring traffic volumes over 2005 levels by 2027. The junction had some operational problems in 2004 and further improvement is needed over and above that provided by traffic relief from the AWPR.

The **Third Don Crossing** is an additional supporting element of infrastructure improvement that has been taken into consideration. The Third Don Crossing is part of the Access from the North proposal for a single carriageway bridge and associated walking, cycling and public transport schemes linking the A90(T) with the A978 St Machar Drive. It provides a crossing of the River Don between Persley Bridge and the Bridge of Don. It is not a nationally strategic route, but would provide a distributor function as an alternative route for public transport and local trips in the north of Aberdeen away from the principal river crossing routes of Persley Bridge, just north of Haudagain and the Bridge of Don. Testing of the effects with and without the Third Don have been undertaken as part of this study and it was concluded that the Third Don Crossing was an integral part of the solution at Haudagain, due to the synergy of transport routeing over the River Don between the two proposals. Although important, the Third Don Crossing does not have the potential to fully address the multi-faceted extent of problems at Haudagain, which includes traffic movements to the West not catered for by the Third Don Crossing proposal. Haudagain will remain as a key strategic point for accessing the north and west of Aberdeen. A further explanation of sensitivity testing is given in Section 4.9.

Commitment to the Access from the North Proposal (Third Don Crossing) is detailed in the **Aberdeen City Local Transport Strategy** as an action referenced as ADDUI2. Whereby it is stated:

> *ADDUI2 - ACC is committed to the development of the Access from the North Proposal (Third Don Crossing). To assist in this, the Council will undertake and 'Access from the North' study (Integrated Transport Solution), examining how walking, cycling and public transport improvements or priorities can be 'locked in' or optimised through this scheme.*

The Third Don Crossing is also supported by the ***Nestrans Finalised RTS April 2008*** and detailed under reference 'IC2' Roads Improvements in the Internal Connections Strategy. The Strategic Roads (Quality

and Capacity Improvements) section of the RTS details parts of the road network that have been identified as priorities for action. The Delivery Plan sets out in more detail individual projects, which will require to be delivered in partnership with Transport Scotland and the local authorities, including:

Upgrading the A90/A96 Haudagain junction including the third Don crossing

The Third Don proposal is also viewed as a fundamental prerequisite in the **consultative draft Aberdeen City and Aberdeenshire Structure Plan** which is due for public consultation in 2008. The Structure Plan document highlights that completing key transport interventions will be *vital* to delivering the structure plan vision. Key transport interventions identified include: the Aberdeen Western Peripheral Route, rail improvements (increased frequency and new stations), Haudagain improvements and the Third Don Crossing.

Area wide transport model testing has shown that improvements at Haudagain could potentially be subject to a rebalancing of traffic from other complementary routes. The Third Don Crossing proposal is a commitment of Aberdeen Council and would reduce the risk of the any improvements at Haudagain being overtaken by additional traffic redistributing from other routes, particularly in the north-south directions over the River Don. Where connectivity is greater in the north of Aberdeen with more routes to choose from, then the potential for a universal shift to the Haudagain route is reduced. The Third Don Crossing provides the additional connection necessary to reduce, to a less significant extent, the demand and rebalancing of traffic via Haudagain Roundabout should it be improved.

Geographically Haudagain is constrained to the north by the River Don and the main Aberdeen to Inverness Rail line. It is also constrained by the presence of existing buildings on three sides. Its proximity to one of only two existing major crossings of the Don in Aberdeen combined with being the strategic junction between the A96(T) Aberdeen to Inverness and the A90(T) Aberdeen to Dundee and Aberdeen to Peterhead routes make it a key element in the transport network, not only of Aberdeen, but of the region as a whole. Figure 2.1 shows the location and geographical context of Haudagain.

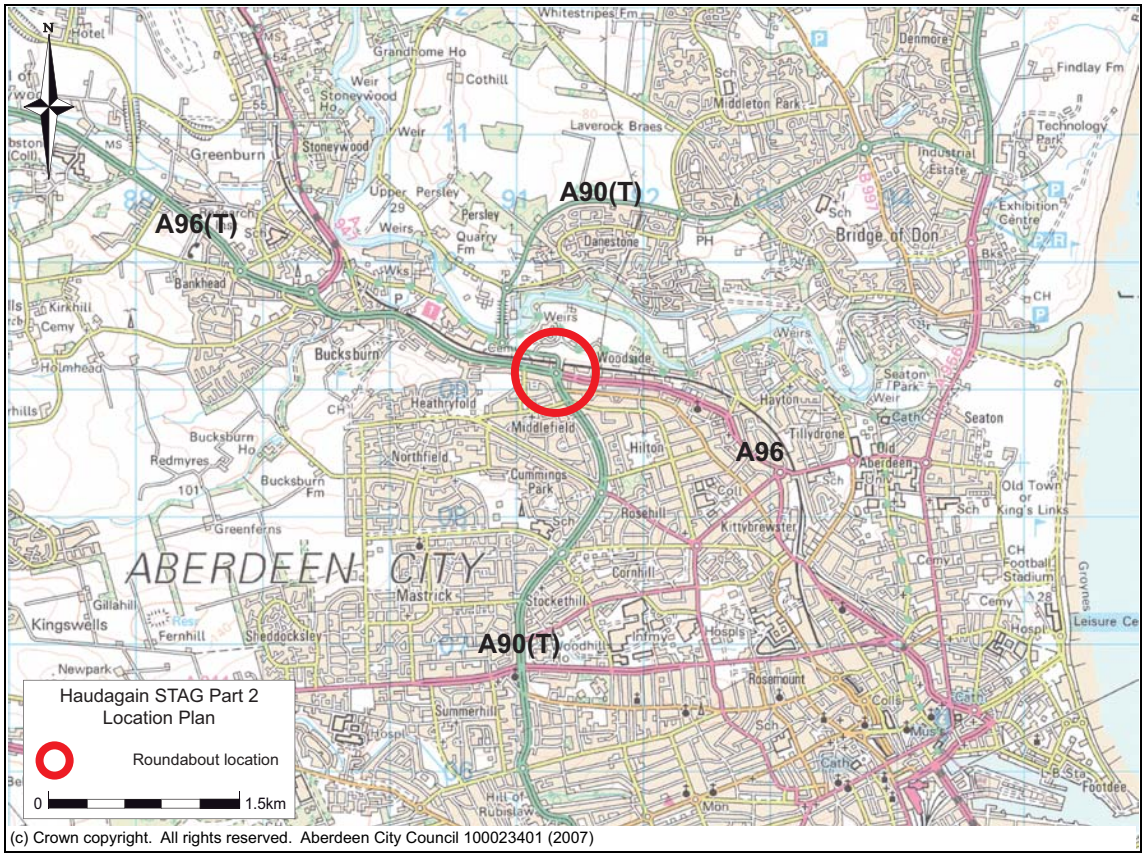

Figure 2.1 : Location and Geographical Context

In the **social context** locally there is the opportunity to complement the regeneration of Middlefield. This is one of six regeneration areas identified by Aberdeen City Council. The Community Planning in the Aberdeen document *Regeneration Outcome Agreement 2005-200*8 states:

> *The dynamic hub of the North East, Aberdeen sits between the rivers Dee and Don facing out over the North Sea. With a population of 210,000, nearly full employment and high average wages, Aberdeen is a key driver of the Scottish economy with its energy company base. Within easy reach of beautiful countryside and dramatic coastlines, 'The Granite City' is rated as one of the most desirable cities in the UK in which to live and work. But this perception of Aberdeen as a prosperous city is not entirely accurate. Recent surveys have shown Aberdeen to be a city of extremes, with 1 in 10 people living in poverty and deprivation. The Scottish Index of Multiple Deprivation has highlighted the deep socio-economic problems across Aberdeen.*

Economically operational problems at Haudagain Roundabout can effect access to Aberdeen Airport located off the A96(T) and access to industrial areas around Dyce. The Dyce area has a Traffic Management Organisation (TMO) that has been set up to promote an area travel plan to encourage more sustainable travel. The Dyce TMO describes the characteristics of the area and transport conditions as follows:

> *The Dyce region has two distinct areas; an original village and residential area, and several industrial estates mainly serving the oil industry.*
>
> *The Dyce industrial area including the Kirkhill, Pitmedden Road, Farburn and Stoneywood Industrial Estates is a major employment area in North-East Scotland. Its proximity to Aberdeen Airport is potentially a huge advantage but also leads to conflict between commuting, freight and airport traffic. With peak-hour congestion at the Haudagain and Dyce Drive roundabouts, the area is generally acknowledged to have the worst traffic problem of any part of Aberdeen. In the longer-term, the Aberdeen Western Peripheral Route and additional park and ride schemes will be a major benefit but, as the area holds a high proportion of Aberdeen City's business development land allocation, early remedial action is needed to minimise further traffic growth and to secure the value of these important transport infrastructure improvements . It is estimated that more than 18,000 people commute into Dyce daily.*

Aberdeen and Grampian Chamber of Commerce provide an outline description of the economy of the area as follows.

> *Aberdeen and Grampian is one of Scotland's biggest success stories. As the centre of Europe's oil and gas industry, the region is a key driver in the Scottish and UK economies with an aspirational business agenda and major opportunities for growth. The continuing strength of Aberdeen's economy has consistently bucked national and international trends with its high wage, high levels of business start ups and consistently low levels of unemployment.*
>
> *Consistently ranked as one of the UK's most competitive business bases, Aberdeen and Grampian offers a thriving, internationally-focused location, a highly skilled workforce, world class educational and healthcare facilities, a rich culture heritage and an outstanding quality of life.*
>
> *Among its many assets, the city has an international harbour and airport, major research institutes, a college of further education and two universities. It is a prestigious and thriving corporate community which includes many international companies. Businesses based in the region export to countries worldwide.*
>
> *The region's key industry sectors include construction, education, engineering, farming, fishing and food processing, paper production, professional services, transport and tourism. The international oil and gas industry is its primary economic driver, directly employing some 37,000 people in Aberdeen and Grampian in 2006 and supporting jobs throughout the UK.*

In summary, Haudagain has significant traffic delays affecting a wide area of Aberdeen and its economy over and above its immediate locale.

2.2 Objective Setting

2.2.1 Basis for Objective Setting

Local Planning objectives for Haudagain improvements were developed to test possible options; these were developed from existing policies in consultation with Aberdeen City Council, Aberdeenshire Council, NESTRANS and the Transport Scotland and other Stakeholders. The STAG for Haudagain was originally commissioned in January 2006 and took cognisance of local, regional and national policy documents of that time, including:

- *North East Scotland Together, Aberdeen & Aberdeenshire Structure Plan, 2001-2006*
- *Green Spaces – New Places, The Aberdeen City Local Plan*
- *The Aberdeen City Community Plan*
- *NESTRANS Modern Transport System*
- Aberdeen City Council *Local Transport Strategy (LTS), December 2000*
- *Scotland's Transport Future – The transport white paper, June 2004*
- *Scottish Planning Policy SPP17 – Planning for Transport, August 2005*

Before commencing the detailed STAG Part 2 a STAG Part 1 review was undertaken to review the policy context of the objectives to make sure they were still relevant. There were a couple of significant transport policy documents published that needed to be taken into consideration, namely the *National Transport Strategy* (*NTS*), December 2006, and the consultation draft of the *Regional Transport Strategy* (*RTS*), December 2006.

It was found that the three outcomes from the *NTS* have particular relevance to the Haudagain Part 2 appraisal. They are to:

- **improve journey times and connections,** to tackle congestion and the lack of integration and connections in transport which impact on our high level objectives for economic growth, social inclusion, integration and safety
- **reduce emissions**, to tackle the issues of climate change, air quality and health improvement which impact on our high level objective for protecting the environment and improving health
- **improve quality, accessibility and affordability**, to give people a choice of public transport, where availability means better quality transport services and value for money or an alternative to the car

The review found that national policies did still support the planning objectives for Haudagain; with particular relevance to strategic outcomes in relation to improved journey times, which impact on national economic growth and social inclusion objectives.

In terms of the new *RTS* it was found that the STAG Part 1 appraisal remained unaffected by the new Regional Strategy and is indeed supported by the objectives, priorities and intelligent transport innovations proposed in the *RTS For Consultation*. Since this time the *RTS* was published (March 2007) largely unchanged from that reviewed. A *Finalised RTS* was published in April 2008 taking on board comments from the Scottish Government.

Recently the Aberdeen City Council *LTS*, March 2008, has been published . It has aims and objectives that accord with those developed for the Haudagain STAG.

2.2.2 Transport Planning Objectives

The objectives for the Haudagain improvements were developed through a Stakeholder pre-appraisal workshop in January 2006 and developed to be SMART (specific, measurable, achievable, realistic and timed), set on appropriate local transport polices the most relevant to Haudagain were selected by stakeholders and are as follows:

- To reduce congestion and unreliability by improving and sustaining base year 2004 journey times for commercial and public transport traffic until 2021
- Measures must minimise the risk of transport related accidents especially for vulnerable users in the vicinity of the junction to improve on 2001-2004 casualty levels
- To make socially-inclusive and healthy transport modes more attractive to use, including cycling, walking and public transport measures to be promoted in all measures
- To minimise traffic induced severance on communities by ensuring measures do not have a significant detrimental impact on 2004 walk time accessibility
- To contribute to the City Council's regeneration aims by complementing the development of the Logie/Manor area of Middlefield

The unaltered continuation of these planning objectives from the STAG Part 1 to the STAG Part 2 appraisal provide a meaningful and robust framework to undertake the study. Planning objectives have been checked to see that they were directly relevant to established problems and opportunities. The key problems have been derived from a collation of workshop comments and discussion, and are summarised as follows:

- Congestion causing delay to existing Public Transport
- Congestion causing commercial traffic diversion with impact on regional economic efficiency and subsequent impact on local communities and other inadequate infrastructure
- Restriction on economic re-development of the local vicinity that is an area of multiple social deprivation, who's development would support Local Plan aims to make the City of Aberdeen more attractive to families
- The desire to promote more sustainable, socially inclusive and healthy modes of transport facilities (i.e. proposed Park & Rides and new bus services) will be hampered by inability to operate effectively in Haudagain Roundabout's severely congested network
- Visual Blight on major routes into the city
- Perception that busy roads are more dangerous causing reduced walking/cycling activity and community severance

2.3 Option Generation, Sifting & Development

2.3.1 Introduction

Options were identified which may have the potential to ameliorate the transport problems identified and contribute to planning objectives of the appraisal. Options were originally generated in a previous technical study by SIAS and also collected from suggestions received during a public consultation exercise.

The full list of option schemes included forty possible measures. These options were sifted against planning objectives. Any options that were found to be detrimental to any planning objectives were discarded after due consideration of implementability.

2.3.2 Development of Measures

The problems, opportunities and objectives have guided the development of measures to focus on junction improvements as the most appropriate intervention combined with other walking, cycling and public transport measures to contribute to the effective operation of the transport system in the Haudagain area.

The key reasoning for this is that the junction in 2004 was already operating over capacity at certain peak times with around 20,000 vehicles passing through the junction during extended peak periods. Delays to public transport have worsened over the last few years, with access to bus lanes being curtailed. The necessary modal shift that could be achieved from other measures would be unable to satisfactorily meet the objectives. The plans in the Regional Transport Strategy, such as the proposed Park & Ride sites at Chapelbrae (1,000 spaces) and A947 (400 spaces) would be made more effective with measures to improve the operation of the Haudagain junction, but by themselves only have the potential to relieve the junction of a maximum of 1,400 vehicles at peak times, i.e. 7% of traffic. The AWPR is due to relieve Haudagain of some traffic, but this is not programmed to be operational until the end of 2012 and will not provide sufficient relief to meet long term journey time objectives set for the study.

2.3.3 Options Previously Identified

In a previous traffic study, *A90(T)/A96(T) Junction Improvemen*t, August 2005 (SIAS Ref. 63775) twelve scheme options were tested for impacts on journey times using a peak period S-Paramics microsimulation model. Out of these twelve measures only six improved the journey time effectiveness of the junction in 2004. The most popular planning objective to key Stakeholders had been that journey times should improve. The six options that performed worse than the existing 2004 condition were rejected in the sifting stage. This left options No.s 5 (**Dual Link Road**), 5a (**Link Road**), 7 (**West/South Flyover**), 9 (**Gyratory**), 10 (**West/South Flyover & Signals**) and 11 (**Dual Link & signals**) to undergo sifting against planning objectives.

It was explained in the previous traffic study that while some of the options in the original twelve appeared to be reasonable suggestions at improving the junction the transport modelling had shown that, due to the heavy right turn and conflicting movements with the high opposing flows, some of the options did not operate well in traffic so were not worth pursuing any further. All the schemes from the previous traffic study were presented to the public in an extensive public consultation (July/August 2006) and their general performance against the planning objectives appraised.

2.3.4 Wide Selection of Other Options

During the public consultation, held 24 July to 18 August 2006, the public and stakeholders were invited to put forward their own options for consideration. They were asked the question “Do you have an alternative solution for consideration that would achieve the key objectives?” To this there was a series of responses that it was possible to collate into 28 options. These options were considered under the same objectives and implementability criteria as those previously developed. The options ranged from **minor lane marking alterations** to ambitious **full grade separated interchange** proposals. Options identified by the public/stakeholders also included **walking** and **cycling,** demand management and **bus priority** intensification measures.

The list of all the options is located in Appendix A. Some of the options involve major construction elements be they **north/south flyover** or **east/west underpass**, **full cloverleaf junctions** or **skyways** flying over the cemetery to link to the Parkway. While these options may provide traffic relief, their construction costs are high, there is limited immediate benefit to the regeneration of Middlefield and the disruption during the lengthy construction phase would be extensive.

The desire for a “**flyover**” was identified during the public consultation in 2006 and also been documented in local Aberdeen press (Evening Express, 27 March 2007). The design of a flyover in the north-south A90(T) direction is difficult due to the steep gradients necessary to reach Persley Bridge. The land topography falls away from the current level of Haudagain Roundabout down to Persley Bridge and

there is not sufficient distance to meet road standards. To achieve a flyover to an acceptable and safe design would involve a skyway across the Don valley, which would have significant environmental impact, cost implications and have an adverse impact on the local area and not support the planning objectives of the STAG study.

A concept for an east/west A96 underpass was reviewed and it was found that delays still occurred as it did not address the main traffic movements causing delay at the junction. A further slip road flyover concept that removed west/south and south/west traffic from the Haudagain junction was more successful in its operation, but it was found that a design of this type would have a detrimental impact on the local area and vulnerable road users, so did not support the planning objectives of the STAG study.

2.3.5 Option Sifting of Forty Options

Taking all these options on board and undertaking a sift against the objectives, as shown in Appendix A concluded that from the previously developed options that Options 5, 5a, 9 and 11 should go through to further STAG part 1 appraisal. Subsequently a further option, Option 12 was included for consideration at the request of Transport Scotland, for an upgrade of the existing roundabout to a larger full standard design roundabout.

In the options there was always a fundamental commitment by Transport Scotland, Nestrans and the Local Authorities to promote facilities for walking, cycling and public transport as part of any option taken forward. This is enshrined in the planning objectives. Highlighting the sustainable transport elements in a complementary "core" option is a clear way of ensuring walking, cycling and public transport measures are given a high priority and focus. From the options identified by the public and stakeholders a set of sustainable "core" measures (walking, cycling and public transport) were available that could complement the infrastructure options to give a complete multi-modal package of improvements.

There were two measures identified by the public and organisations that went some way to benefiting planning objectives, but whose implementability within the context of the current exercise may not be technically, politically or financially feasible. These were:

- Crossrail suburban rail services with a new station at Haudagain
- Road Tolling

Crossrail is currently being investigated by Nestrans, but involves third party rail operational issues. Local road tolling or congestion charging is neither supported by Aberdeen City Council nor NESTRANS.

The "core" option elements that remain and will form the basis of any proposed option package include:

- pedestrian crossing facilities and associated footway access
- cycle facilities including consideration of crossings and segregated/shared use off road facility
- a continuous bus lane or bus metering with lights

Bus metering, in this context is the application of pre-signals for buses at junctions in order that they can move into bus advance areas. Pre signals are installed to allow buses to bypass queuing traffic.

2.3.6 Option Development

Taking all these options on board and undertaking a sift against the objectives, as shown in Appendix A, concluded that from the previously developed options that Options Do-Minimum, 5, 5a, 9 and 11 should go through to further STAG part 1 appraisal. Subsequently a further option, Option 12 was included for consideration at the request of Transport Scotland, this was for upgrade of the existing roundabout to a larger full standard design roundabout.

These options were then developed to a point where they could be independently assessed.

3 PART 1 APPRAISAL

3.1 Transport Planning Objectives

3.1.1 Introduction

This chapter presents a summary of the STAG Part 1 appraisal of the Core option and the other options (Do-Minimum, 5, 5a, 9, 11, 12), that are the key options for appraisal to come from the initial sift process and Stakeholder contribution. It briefly sets out the key issues arising from the appraisal of the options against the planning objectives and sets out the rationale for their retention or rejection as candidate interventions for the improvement of Haudagain.

At the time of the STAG Part 1, during 2006, the appraisal was based upon qualitative information on impacts in line with the guidance, but utilising the available quantitative information where applicable. No new data or additional transport modelling was undertaken for the STAG Part 1, although reference was made to a previous junction operation study, undertaken in 2005 (SIAS Ref. 63775) that had tested a range of potential options for improvement at Haudagain. The appraisal has been based upon the professional judgement of the project team which consists of Transport Planners, Transport Engineers and Community Regeneration specialists.

The planning objectives are:

- Objective 1 – To reduce congestion and unreliability by improving and sustaining base year 2004 journey times for commercial and public transport traffic until 2021
- Objective 2 – Measures must minimise the risk of transport related accidents especially for vulnerable users in the vicinity of the junction to improve on 2001–2004 casualty levels
- Objective 3 – To make socially–inclusive and healthy transport modes more attractive to use, including cycling, walking and public transport measures to be promoted in all measures
- Objective 4 – To minimise traffic induced severance on communities by ensuring measures do not have a significant detrimental impact on 2004 walk time accessibility
- Objective 5 – To contribute to the City Council's regeneration aims by complimenting the development of the Logie/Manor area of Middlefield

3.1.2 Transport Planning Objectives

A series of seven options, a Do-Minimum, the Core option and five other options, derived from the pre-appraisal process were put through an initial appraisal against planning objectives. All the options are indicatively illustrated in Figure 3.1 apart from the Core option which is described in the following sections.

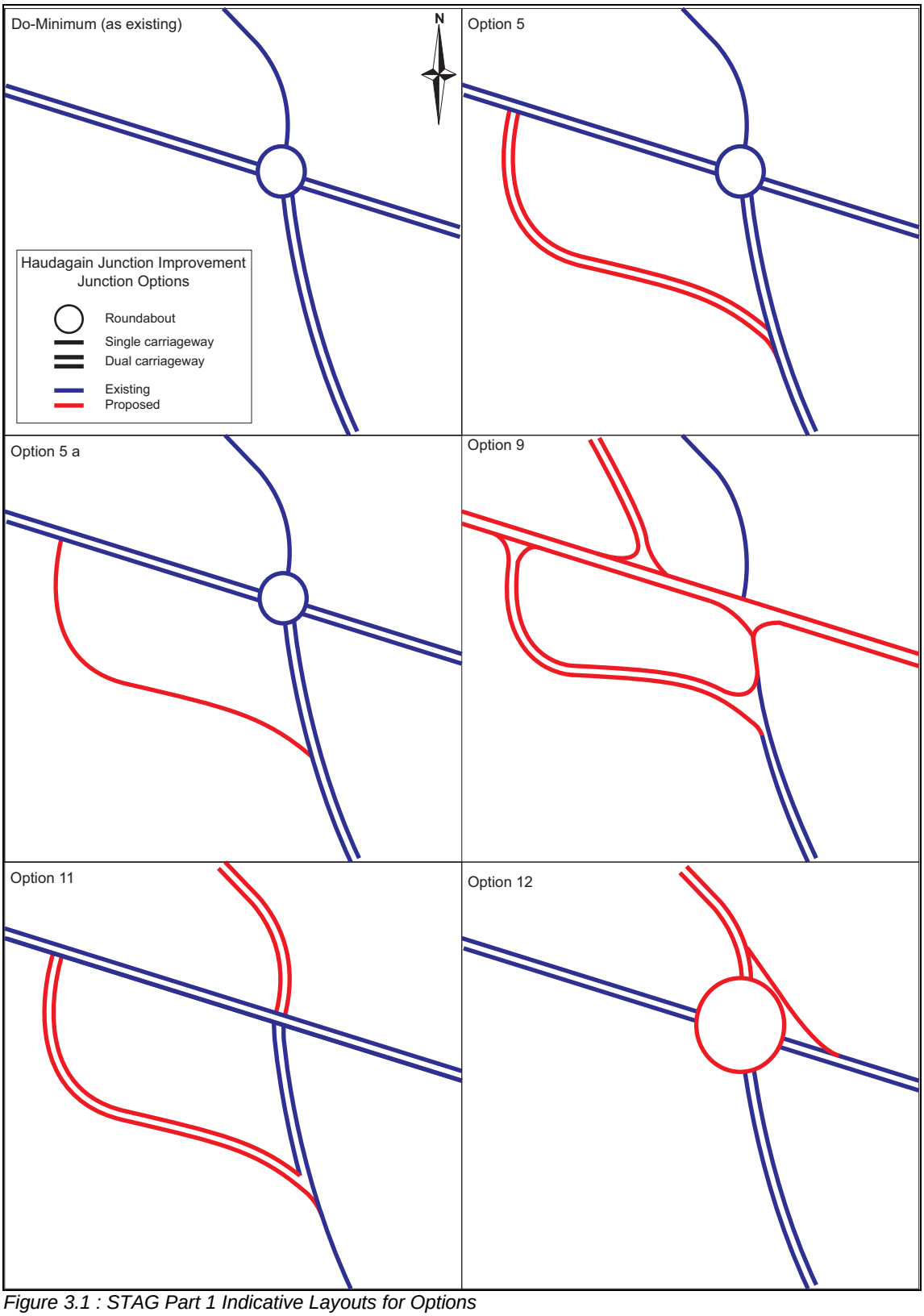

Figure 3.1 : STAG Part 1 Indicative Layouts for Options

3.1.3 Do-Minimum

The outline concept drawing of the Do-Minimum is shown in Figure 3.1. The Do-Minimum is essentially the existing Haudagain roundabout layout with associated existing pedestrian and public transport priority bus lanes without any changes being made. This option does include the outside influences of the AWPR and Third Don Crossing.

At the time of undertaking the STAG Part 1 it had been found, through traffic modelling, that in the medium term delay at the Haudagain Roundabout may increase by nearly 40% from 2004 to 2011 in the AM and PM peak periods. Delays to buses will also increase as they are unable to access the bus priority lanes.

Similarly, at the time of undertaking the STAG Part 1 in the long term by 2021, even with the introduction of the AWPR, delay in the PM peak to all vehicles at Haudagain roundabout is set to rise by an average of over 10 minutes per vehicle. This is over $2^{1}/_{2}$ times the delay experienced in 2004. Bus journey times would also continue to be affected with an average increase of bus delay of 60% greater than in 2004 PM peak.

The Third Don crossing had been assumed as being in place in the information that was used to inform the STAG Part 1.

3.1.4 Core Option

The “Core” option elements that form the basis of any proposed option package include:

- pedestrian crossing facilities and associated footway access
- cycle facilities including considerations of crossings and segregated/shared use off road facility
- a continuous bus lane or bus metering with lights

The main benefit of the core measures will be to significantly address the key objective to make socially inclusive and healthy transport modes attractive to use, including cycling, walking and public transport measures to be included in all schemes.

The whole package of core options would also minimise the risk of transport related accidents especially for vulnerable road users in the vicinity of the junction to improve on the 2001-2004 casualty levels.

The measures will also assist in improving and sustaining base year 2004 journey times for public transport traffic until 2021.

Alone these measures would only provide minor benefit to reduce congestion and unreliability for commercial traffic between 2004 and 2021 and alone they do not contribute to the City Council’s regeneration aims by contributing to the regeneration of the Logie/Manor area of Middlefield.

Although these measures do go some way in meeting certain planning objectives and do not negatively impact on other objectives they are required to be combined in an overall package of options to meet all the criteria for a successful funding bid.

Implementability of the core option elements are only minor considerations in terms of technical and financial issues. Operationally and publicly there is a small benefit.

3.1.5 Option 5

The Option 5 measure is for the existing Haudagain roundabout infrastructure to be kept, but with a new dual lane link road added for traffic approaching from the south and turning west and traffic approaching from the west and turning south, to enable more free flowing traffic. This concept is illustrated in Figure

3.1. The junctions connecting this link to Auchmill Road and North Anderson Drive would be traffic signal controlled. The link road could complement any possible regeneration proposals for a commercial zone.

3.1.6 Option 5a

A supplementary option for Option 5 is as Option 5, but with only a single lane road added for traffic approaching from the south and turning west and approaching from the west and turning south to enable more free flowing traffic. This is illustrated in Figure 3.1. The junctions connecting this link to Auchmill Road and North Anderson Drive will also be traffic signal controlled. The link road could complement regeneration proposals for a commercial zone.

3.1.7 Option 9

The Option 9 proposal is for a one-way gyratory system but with the existing roundabout changed to a complex signalised junction with the southbound approach arm to the west of the northbound approach arm. An additional railway bridge to accommodate access from Mugiemoss Road would also be required. This is illustrated in Figure 3.1. The link road may complement regeneration proposals for a commercial zone.

3.1.8 Option 11

Option 11 is as Option 5, but with the Haudagain Roundabout changed to a signalised junction and widening of the Mugiemoss Road Railway Bridge. This is illustrated in Figure 3.1. The link road would complement regeneration proposals for a commercial zone.

3.1.9 Option 12

The Option 12, a larger roundabout proposal with associated infrastructure, which was introduced at the request of Transport Scotland during a review of the Part 1 process. The layout is illustrated in Figure 3.1. Details of the exact format of the junction were not developed in detail at this stage but it was determined, via operational assessment, that a fifth arm could not be introduced to allow access into any potential development area in Middlefield.

3.2 STAG Criteria - Government Objectives

Each scheme is summarised in the preliminary scoping appraisal taking consideration of the impacts of the proposal against the Government's five objectives. A seven point scale has been used for considering the relative size or scale of a schemes impact, and it has been noted whether the proposal would bring:

- major benefit (✓✓✓) – these are benefits or positive impacts which, depending on the scale of benefit of impact, the project team feels should be a principal consideration when assessing a proposal's eligibility for funding
- moderate benefit (✓✓) – the proposal is anticipated to have only a moderate benefit or positive impact. Moderate benefits and impacts are those which taken in isolation may not determine a proposal's eligibility for funding, but taken together could do so
- minor benefit (✓) – the proposal is anticipated to have only a small benefit or positive impact. Small benefits or impacts are those which are worth noting, but the project team believes are not likely to contribute materially to determining whether a proposal is funded or otherwise
- no benefit or impact (-) – the proposal is anticipated to have no or negligible benefit or negative impact

- small minor cost or negative impact (x) – the proposal is anticipated to have only a small cost or negative impact. Small costs or impacts are worth noting, but the project team believes are not likely to contribute materially to determining whether a proposal is funded or otherwise
- moderate cost or negative impact (xx) – the proposal is anticipated to have only a moderate cost or negative impact. Moderate costs/ negative impacts are those which taken in isolation may not determine a proposal's eligibility for funding, but taken together could do so
- major cost or negative impacts (xxx) – these are costs or negative impacts which, depending on the scale of cost or severity of impact, the project team should take into consideration when assessing a proposal's eligibility for funding

The following Table 3.1 summarises results of the initial Part 1 appraisal against government objectives. This was at the time based upon a qualitative assessment and subsequently investigated in more detail for selected options during the Part 2 appraisal.

Table 3.1 : Part 1 Initial Appraisal Government Objectives

Issues	Do-Minimum	Core Option	Option 5	Option 5a	Option 9	Option 11	Option 12
Environment	xx	✓✓	✓	✓	x	✓✓	✓✓
Safety	x	✓✓	✓	✓	-	✓✓	✓
Economy	xxx	-	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
Integration	x	-	-	-	-	-	-
Accessibility & Social Inclusion	xxx	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓

3.3 Feasibility

In line with STAG guidance the feasibility of options was considered in terms of technical and operational difficulties.

Do-Minimum – There is no feasibility issues with leaving existing junction arrangement as it is.

Core Option – The land required, in the existing carriageway, is predominately under the ownership of Aberdeen City Council.

Option 5 – There is no new technology required for the design and construction of the proposed link road and associated signalised junctions. The land required is predominately under the ownership of Aberdeen City Council with a small quantity under private ownership on or close to Auchmill Road.

Option 5a – There is no new technology required for the design and construction of the proposed link road and associated signalised junctions. The land required is predominately under the ownership of Aberdeen City Council with a small quantity under private ownership on Auchmill Road.

Option 9 – There is no new technology required for the design and construction of the proposed link road and associated signalised junctions although the new bridge may be a technical challenge. Most of the land required is predominately under the ownership of Aberdeen City Council with a small quantity under private ownership on or close to Auchmill Road, but it may be that the new bridge would impact on the new development that has just received planning permission.

Option 11 – There may be some technical issues with widening the bridge. There is no new technology required for the design and construction of the proposed link road and associated signalised junctions. The land required is predominately under the ownership of Aberdeen City Council with a small quantity under private ownership on or close to Auchmill Road.

Option 12 – There may some technical issues with building a new rail bridge. The land required is under various ownerships, including the ownership of Aberdeen City Council. Construction on the site of the existing roundabout could be an issue causing major disruption during the construction phase.

3.4 Affordability

An indicative set of costs were developed at this initial stage, as follows:

- **Do-Minimum** Capital costs/grant: <£1m
- **Core Option** Capital costs/grant: £1 – 3m
- **Option 5** Capital costs/grant: £5 – 10m
- **Option 5a** Capital costs/grant: £5 – 0m
- **Option 9** Capital costs/grant: £10 – 15m
- **Option 11** Capital costs/grant: £10 – 15m
- **Option 12** Capital costs/grant £15 –2 0m

3.5 Public Acceptability

3.5.1 Public & Stakeholder Consultation July/August 2006

A public and Stakeholder consultation was undertaken in July/August 2006 and the results collated as summarised below:

- **Do-Minimum** – Increasing public discontent over the worsening operational characteristics of the existing junction.
- **Core Option** – The core option was made up of proposals from the public derived during a public consultation. The proposal on its own may not deliver significant traffic relief, but it is seen as being beneficial as a component part of another option. There is significant local and regional interest and support for a proposal that improves the operation of the existing junction as well as improving facilities for sustainable modes.
- **Option 5** – This proposal, among others has been welcomed by the local public and representative groups. There is significant local and regional interest and support for a proposal that improves the operation of the existing junction.
- **Option 5a** – This proposal, among others has been welcomed by the local public and representative groups. There is significant local and regional interest and support for a proposal that improves the operation of the existing junction.
- **Option 9** – This proposal has been supported by some members of the public and business groups in the area but there was stakeholder concern regarding the implementation of a complex gyratory system.
- **Option 11** – This proposal has been welcomed by the local public and business groups in the area. There is significant local and regional interest and support for a proposal that improves the operation of the existing junction.
- **Option 12** – There is significant local and regional interest and support for a proposal that improves the operation of the existing junction.

3.6 Rationale for Selection or Rejection

The rationale for selection or rejection of Options that underwent initial STAG Part 1 appraisal is given below. The rationale relates to the available documentation at the time of writing the STAG Part 1 Report in October 2006.

Do-Minimum – the Do-Minimum scenario does nothing to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic or safety, sustainability and community objectives. It also contributes nothing to wider Council and NESTRANS aims for a Modern Transport System (now the RTS) or national policies to promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency. [Subsequently **rejected but taken forward as a means of comparison]**

Core Option – the Core Option scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport, safety, sustainability and community objectives, but does not aid commercial traffic and does not have an impact on regeneration plans. It also contributes to wider Council and NESTRANS aims for a Modern Transport System (now the RTS) and national policies to promote sustainable modes of transport. [Subsequently **selected and taken forward** as part of a package of measures into detailed STAG Part 2 assessment].

Option 5 – the Option 5 scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic or safety, sustainability and community objectives. It also contributes to wider Council and NESTRANS aims for a Modern Transport System (now the RTS) and national policies to promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency. [Subsequently **selected and taken forward** as part of a package of measures into detailed STAG Part 2 assessment with Option 5a].

Option 5a – the Option 5a scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic or safety, sustainability and community objectives. It also contributes to wider Council and NESTRAN aims for a Modern Transport System (now the RTS) and national policies to promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency. [Subsequently **selected and taken forward** as part of a package of measures into detailed STAG Part 2 assessment with Option 5].

Option 9 – the Option 9 scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic, but there are some concerns over safety, distances travelled and making walking and cycling more attractive. [Subsequently Option 9 was **rejected** as it did not rate highly as a package against planning objectives and with particular regard to the environment and safety. It also did not rate highly with regard to public acceptability].

Option 11 – the Option 11 scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic or safety, sustainability and community objectives. It also contributes to wider Council and NESTRAN aims for a Modern Transport System (now the RTS) and national policies to promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency. [Subsequently **selected and taken forward** as part of a package of measures into detailed STAG Part 2 assessment].

Option 12 – the Option 12 (Four-Arm) roundabout scenario goes some way to address the planning objectives of improving the operation of the Haudagain junction for public transport and commercial traffic but safety, sustainability and community objectives do not score well. The scheme would contribute to wider Council and NESTRAN aims for a Modern Transport System (now the RTS) and national policies to promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency, but does little for accessibility and social inclusion. More detail assessment will allow a clearer comparison with other options. [Subsequently **selected and taken forward** as part of a package of measures into detailed STAG Part 2 assessment]

4 PART 2 APPRAISAL

4.1 Detailed Appraisal

4.1.1 Introduction

The aim of this Chapter is to outline in detail the options that were selected for assessment in Part 1 of the STAG process. Transport planning objectives have been reviewed and a detailed assessment of environmental criteria has been made, safety and security issues have been assessed, economic factors have been evaluated, integration with modes of transport and wider policy has been made and finally, accessibility and social inclusion appraisal has been undertaken.

All factors are brought together in Appraisal Summary Tables (ASTs) contained in Appendix G.

The following Options were taken into STAG part 2 Appraisal, with details of each contained in the following sections:

- Do-Minimum including existing elements of walking, cycling and public transport priority
- Option 5/5a including Core option elements of walking, cycling and public transport
- Option 11 including Core option elements of walking, cycling and public transport
- Option 12 including Core option elements of walking, cycling and public transport

4.1.2 Transport Modelling

Transport modelling has helped to inform the detailed appraisal. This has been fundamentally based upon the wide area Aberdeen Sub Area Model (ASAM3b) data input into a local S-Paramics Haudagain microsimulation model. The ASAM3b data utilised included a range of assumptions including the AWPR and the Third Don Crossing with sensitivity tests being undertaken on the effects of traffic rebalancing due to improvements. This modelling has provided information on the operational ability of the options presented to meet the planning objective to reduce congestion and unreliability by improving and sustaining journey times for commercial and public transport traffic.

4.1.3 Do-Minimum

The general layout of the Do-Minimum Option is shown in Figure 4.1.

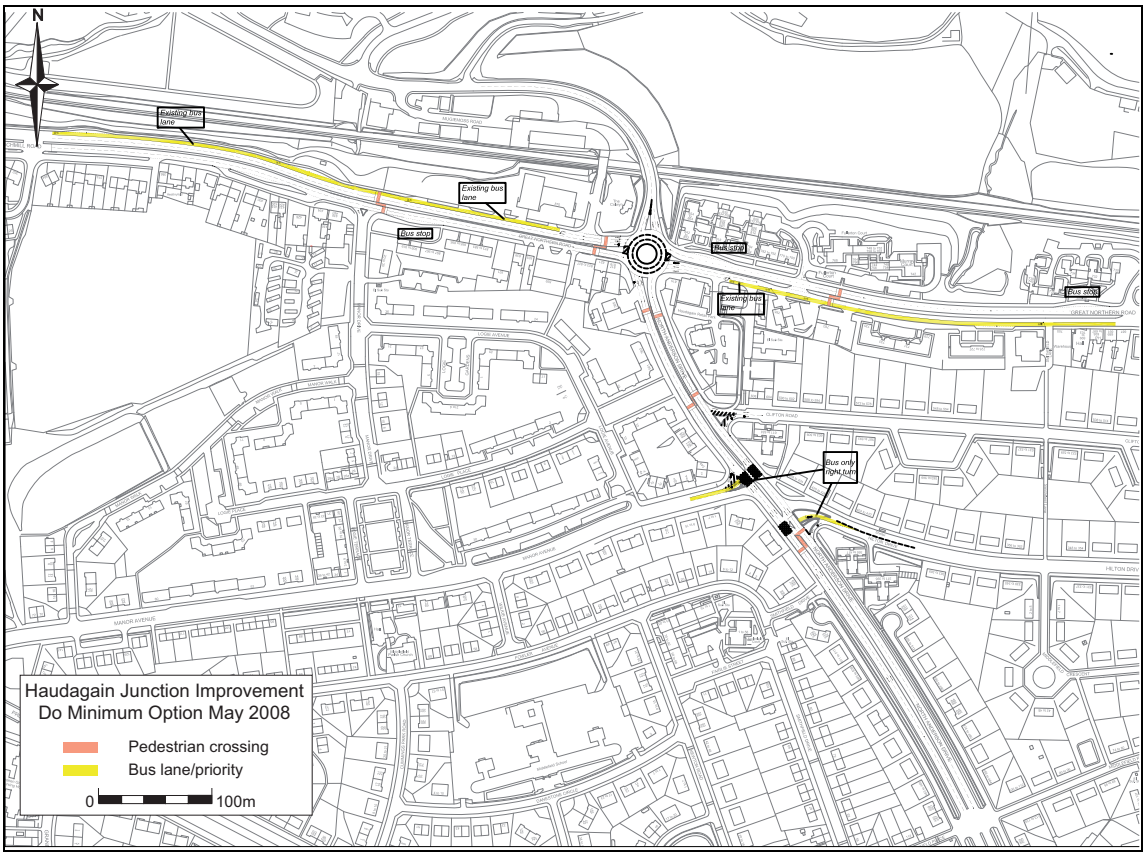

Figure 4.1 : Do-Minimum

4.1.4 Option 5/5a Development

Option Development

The general layout of Option 5 is shown in Figure 4.2. A detailed transport modelling assessment of the alternative Option 5a found that the single carriageway link road was required to be dualled to enable its traffic signal control to operate effectively. The inclusion of a mid-way junction, for public transport and local access into Middlefield, supported the need for a dual link solution in the south to west direction. The need for a dual link was further accompanied by the requirement for a double left turn from the link road at the Auchmill Road junction. The need to incorporate a double right turn from Auchmill Road for the west to south movement, prior to the opening of the AWPR, also necessitated a dual link solution accompanied by a dual right turn needed at the Great Northern Road junction. Subsequently the single carriageway link was rejected and the dual carriageway Option 5 only taken forward.

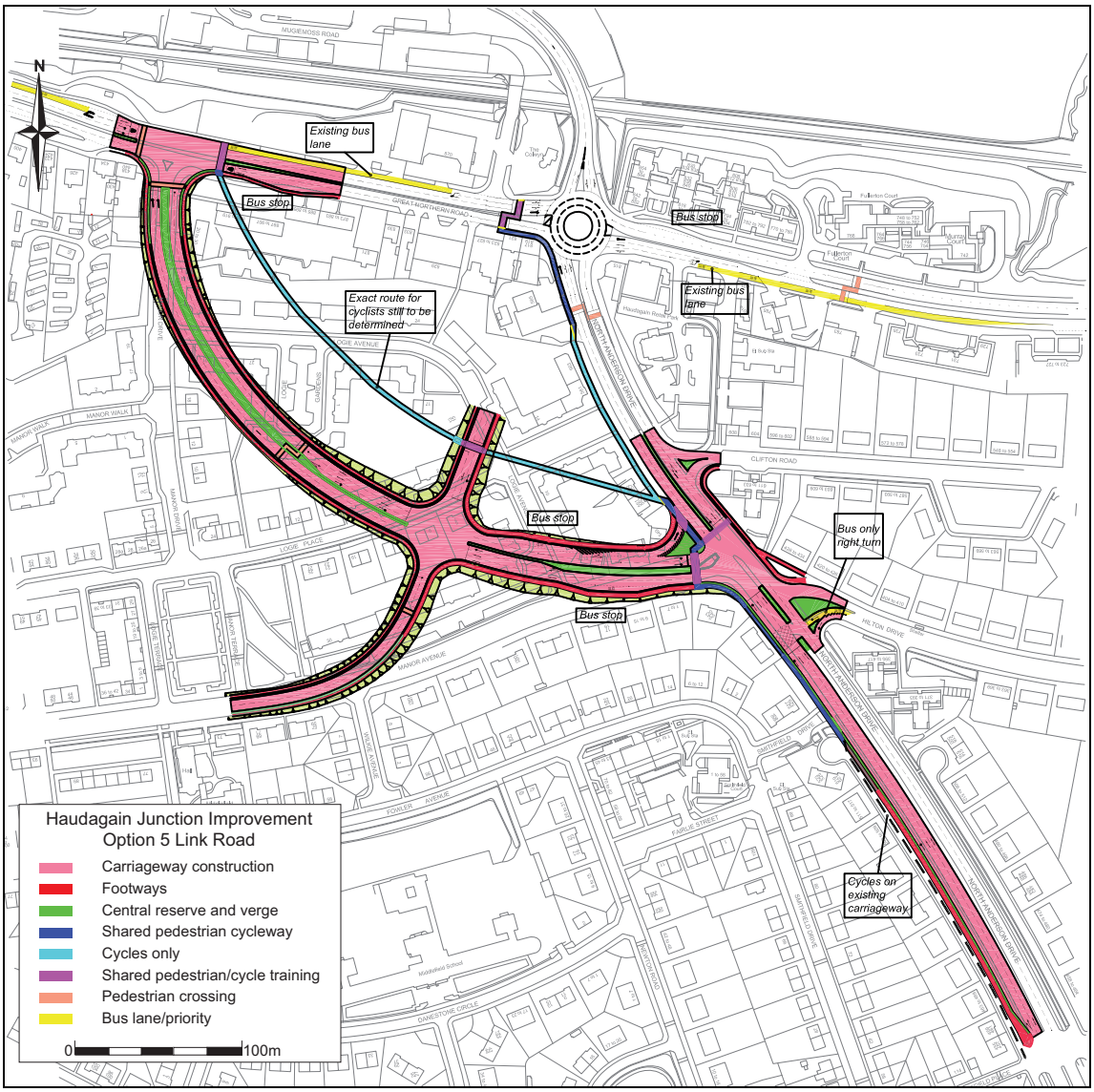

Figure 4.2 : Option 5 General Layout

Description: The main features of Option 5 are the retention of the existing roundabout at Haudagain and a new dual carriageway link road is proposed to connect North Anderson Drive (the southern arm of the roundabout) with Auchmill Road (the western arm). This link road would also provide access to the proposed regeneration area at Middlefield. The junctions for this link road would be traffic signal controlled. Pedestrian, cycle and public transport facilities have been developed as part of this option.

How it would operate: In traffic operating terms the link road relieves the existing Haudagain roundabout of the dominant right turning movement from Auchmill to North Anderson Drive and the left turn from North Anderson to Auchmill. This frees up Haudagain roundabout to operate more efficiently with balanced traffic flows. The link road could also provide an opportunity to access the road network by some potential commercial development. Traffic signals on the link road would be set to allow a progression of traffic along the link road to minimise delays.

In the short term, to achieve the greatest benefits of this option, it is recommended that no development take place off the link road before the AWPR is available. From a review of transport modelling this option will see improved journey times in the short term but in the long term this benefits may be eroded for the route on Mugiemoss Road A90(T) in the morning peak but other routes will continue benefit.

Temporary Traffic Management Arrangements: It should be possible to construct the new signalised junctions on Anderson Drive and Auchmill Road by using lane closures without the need for contra flows. Dependant upon progress with the regeneration of Logie. Local diversions in the Logie housing area may be required.

Traffic Delays During Construction: Major delays will only occur during construction of the signalised junctions on North Anderson Drive and Auchmill Road. These delays will result from the need for lane closures but should be of short duration.

Timescales for Construction: 9 months

4.1.5 Option 11 Development

The general layout of Option 11 is shown in Figure 4.3.

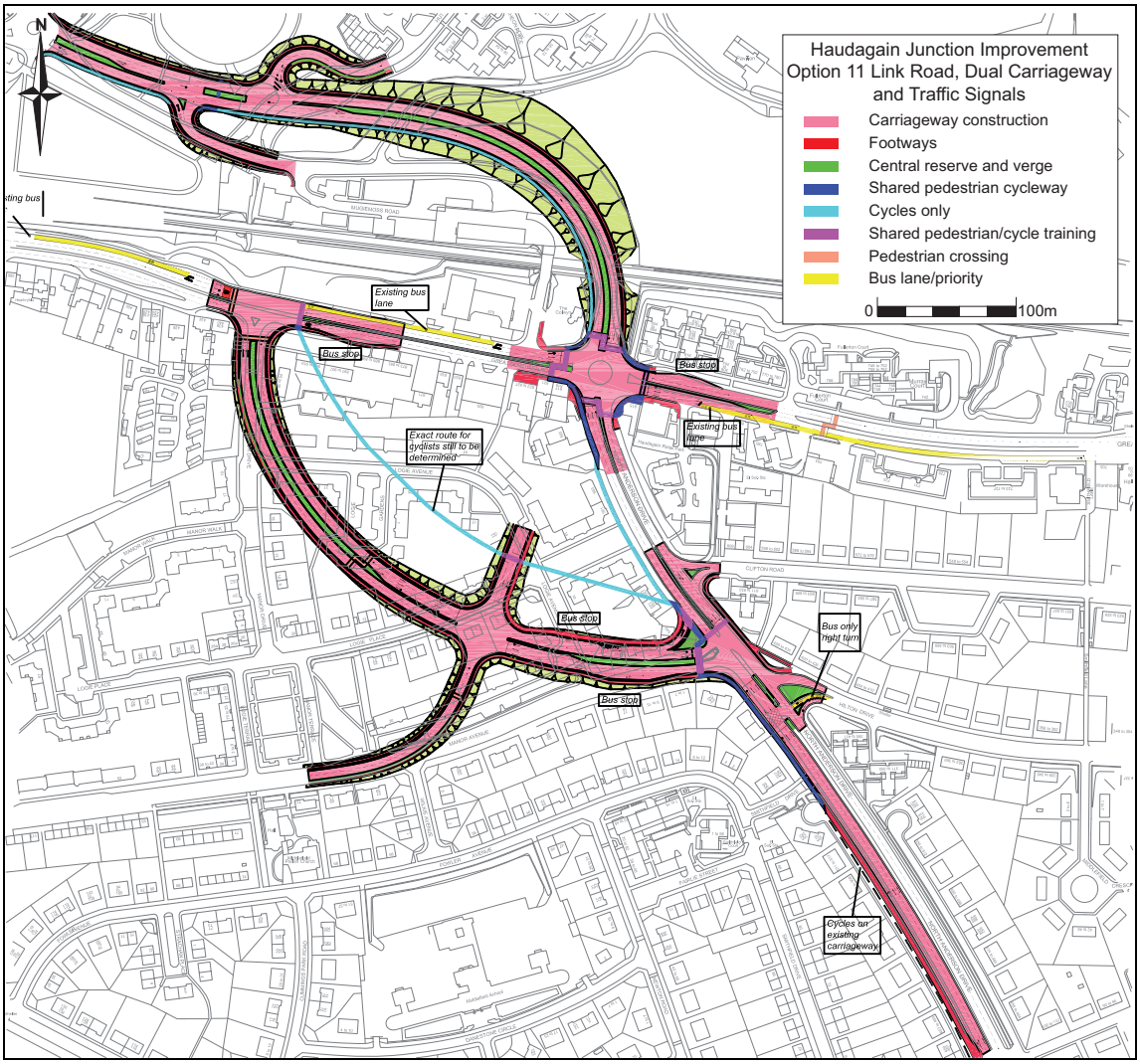

Figure 4.3 : Option 11General Layout

Description: The main features of Option 11 are the alteration of the existing roundabout at Haudagain to form a signalised junction, the widening of the rail bridge on Mugiemoss and a realigned dual carriageway constructed on Mugiemoss Road to the Persley Bridge/Mugiemoss roundabout. A new dual carriageway link road is proposed to connect North Anderson Drive (the southern arm of the roundabout) with Auchmill Road (the western arm). This link road would also provide access to the proposed

regeneration area at Middlefield. The junctions for this link road would be traffic signal controlled. Pedestrian, cycle and public transport facilities have been developed as part of this option.

How it would operate: In traffic operating terms the link road relieves the existing Haudagain roundabout of a dominant right turning movement from Auchmill to North Anderson Drive and the left turn from North Anderson to Auchmill. This frees up a Haudagain to be signalised and operate with the high level of control attributed to signal controlled junctions. This would remove some of the current indecision and driver frustration at the existing roundabout. Widening and realigning Mugiemoss would allow two lanes to move from North Anderson Drive to Mugiemoss without having to merge into one lane which is currently a problem. The link road provides an opportunity to access the road network for some potential commercial development.

In the short term, to achieve the greatest benefits of this option, it is recommended that no development take place off the link road before the AWPR is available. In the long term this option sees benefits on all routes.

Temporary Traffic Management Arrangements: It should be possible to construct the new signalised junctions on Anderson Drive and Auchmill Road by using lane closures without the need for contra flows.

The construction of the new Haudagain signalised junction will be complex. In particular, the removal of the existing Haudagain roundabout may require the creation of a temporary signalised junction. The construction of the junction carriageway will require a series of fluctuating diversions through it. Temporary lane closures will also be needed on the approaches to the junction. In order to reduce delays, it may be beneficial to have the link road through Logie partially open prior to commencing work on the signalisation.

Temporary diversions will be necessary on Mugiemoss Road prior to the existing Haudagain roundabout to permit construction of the new embankment and crossing of the railway line.

Dependant upon progress with the regeneration of Logie, local diversions in the Logie housing area might be required. Local diversions will be required to accommodate the construction of the new access into the Hutcheon Low area.

Traffic Delays During Construction: Major delays will occur during construction of the signalised junctions on North Anderson Drive, Auchmill Road and on Mugiemoss Road. These delays will result from the need for lane closures.

Major delays will also result from the signalisation of the current Haudagain junction. Extensive queuing may occur at peak times. These delays could be reduced if the link road through Logie were partially open to traffic prior to commencement of the signalisation.

Timescales for Construction: 15 months (Assuming a phased construction).

4.1.6 Option 12 Development

The general layout of Option 12 is shown in Figure 4.4.

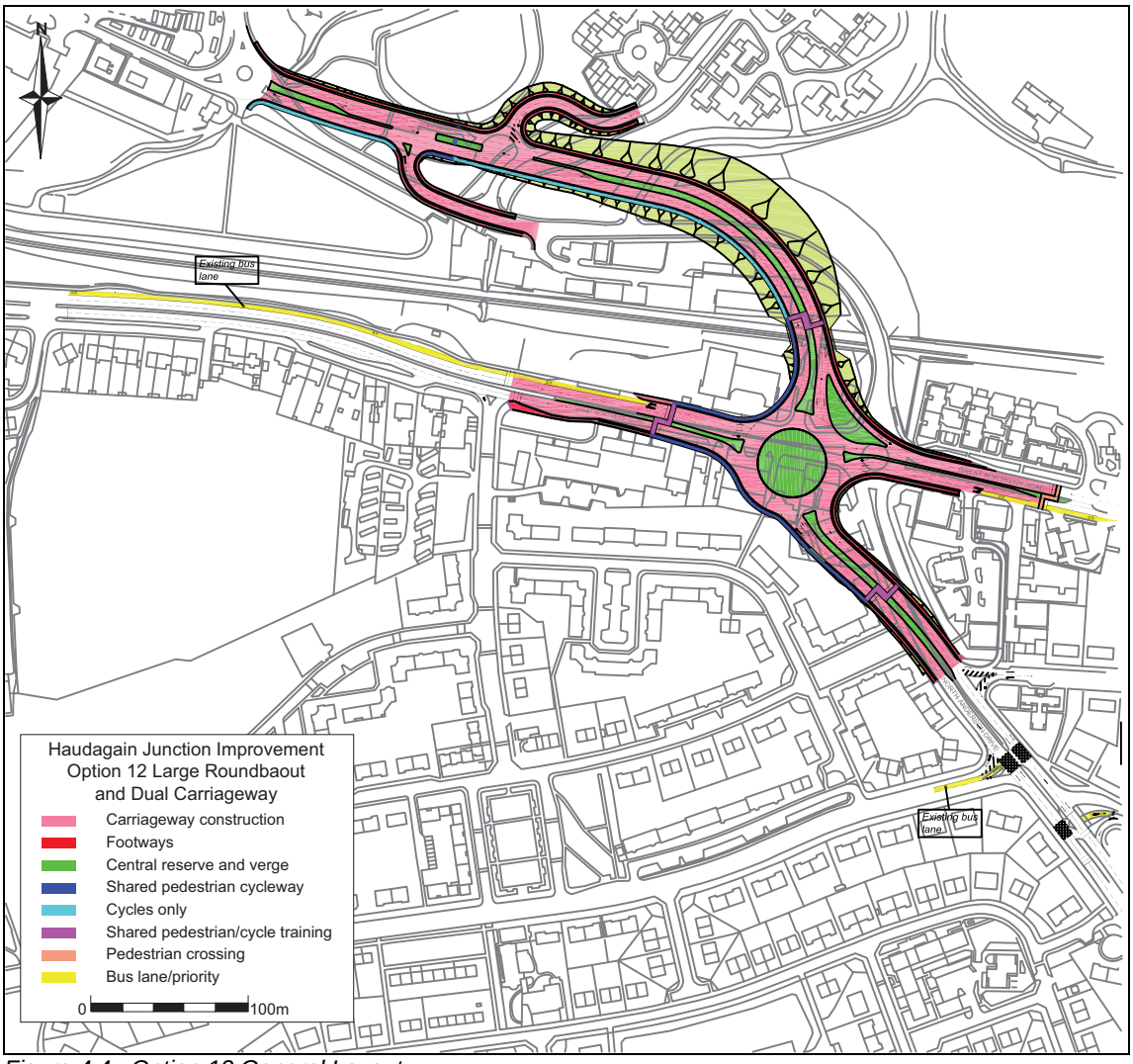

Figure 4.4 : Option 12 General Layout

Description: The main feature of Option 12 is a larger relocated roundabout at Haudagain. A new rail bridge would be required and Mugiemoss Road realigned and made dual carriageway to the Persley Bridge/Mugiemoss roundabout. Pedestrian, cycle and public transport facilities have been developed as part of this option.

How it would operate: In traffic operating terms a larger roundabout provides more opportunities to access the roundabout by providing larger gaps between vehicles and entry arms. Widening and realigning Mugiemoss would allow two lanes to move from North Anderson Drive to Mugiemoss without merging into one lane which is currently a problem. This option does not provide any opportunity to access the road network for potential commercial development.

The design itself does not rebalance flows at the proposed roundabout and the Auchmill to North Anderson Drive right turning traffic will see minimal benefit with this option.

In the long term this option may not see benefits on the route along Auchmill Road A96(T), but other routes would benefit.

Temporary Traffic Management Arrangements: Contra flows/lane closures will be necessary on Anderson Drive, Great Northern Road and Auchmill Road for extended periods. Temporary diversions will also be necessary on Mugiemoss Road at the point where the new embankment crosses the existing road. Local diversions will be required to accommodate the construction of the new access into the Hutcheon Low area.

Traffic Delays During Construction: Option 12 will create delays to traffic during the construction period. In particular, the contra flows/lane closures on Anderson Drive, Great Northern Road and Auchmill Road will cause substantial delays with potentially extensive queuing at peak times.

Timescales for Construction: 12 months

4.2 Transport Planning Objectives

4.2.1 Transport Planning Objectives Review

The local objectives of the study were brought forward from the STAG Part 1 into the STAG Part 2 process. The only alteration made to the original objectives was to update the target date for the congestion scenario to integrate with transport modelling of the wider AWPR that had been updated in the intervening period. This made the assessment of options more robust by adhering to a new target date of 2027 rather than 2021. The objectives for the STAG Part 2 were then set as follows:

- To reduce **congestion** and unreliability by improving and sustaining base year 2004 journey times for commercial and public transport traffic until 2027
- Measures must minimise the risk of transport related **accidents** especially for vulnerable users in the vicinity of the junction to improve on 2001-2004 casualty levels
- To make socially-inclusive and healthy transport modes more attractive to use, including **cycling, walking and public transport measures** to be promoted in all measures
- To minimise traffic induced **severance** on communities by ensuring measures do not have a significant detrimental impact on 2004 walk time accessibility
- To contribute to the City Council's **regeneration** aims by complimenting the development of the Logie/Manor area of Middlefield

The Transport Planning Objectives have been supported by the public and Stakeholders during two public consultations (July/August2006, May 2008).

A summary of resultant effects of options on Transport Planning objectives are shown in the options comparison Table 4.1.

Table 4.1 : Summary of Transport Planning Effects

Issues	Do-Minimum	Option 5	Option 11	Option 12
Congestion	Severe congestion in the short term. Some reduction in overall journey times during peak periods (due to influence of AWPR and 3rd Don proposal) but still congested in the long term	Reduces overall journey times during peak periods however benefits to Mugiemoss Road A90(T) will gradually reduce in the longer term AM peak	Reduces overall journey times during peak periods in the long term, benefiting all routes	Reduces overall journey times during peak periods but minimal benefit to Auchmill Road A96(T) at peak times
Safety	No effect	The proposed design is safer than the existing layout.	The proposed design is safer than the existing layout.	The proposed design is safer than the existing layout.
Cycling, walking, public transport, accessibility	No effect	Pedestrians, cyclists and public transport access maintained with crossings and new routes. No new crossing of Mugiemoss Road.	Pedestrians, cyclists and public transport access maintained with crossings and new routes. New crossing of Mugiemoss Road.	Pedestrians, cyclists and public transport access maintained with crossings. New crossing of Mugiemoss Road.
Community Severance	No effect	Some routes with minor severance created but at-grade crossings and masterplan to limit impact.	Some routes with minor severance created but at-grade crossings and masterplan to limit impact.	Some routes with minor severance created but at-grade crossings to limit impact.
Regeneration	Does not reduce likelihood of rat running. Impact on viability of any commercial development in Logie area.	Reduces likelihood of rat running. Potential for new commercial development but not on a large scale.	Reduces likelihood of rat running. Potential for new commercial development but not on a large scale.	Reduces likelihood of rat running. Impact on viability of any commercial development in Logie area.

4.2.2 Transport Modelling

A series of technical work supports the transport modelling side of the assessment. This has included the assumption that the AWPR and Third Don Crossing will form part of the overall long term combined solution at Haudagain. It has also been assumed that through positive measures the 'rat running' traffic, through Middlefield and Mugiemoss Road, would be re-assigned back to the trunk road network in the afternoon peak. Measures developed for walking, cycling and public transport strategies for each option have been included in the transport models.

The outcome of transport micro-simulation model work to review effects of congestion for each option is shown in Figure 4.5 and Figure 4.6. The results they are shown as Total Vehicle Travel Time (TVTT) over the model periods AM (06:30 - 09:30.) and PM (16:00 - 19:00.). TVTT is a key indicator for checking that options are meeting the journey time objective of the study as the graphs reflect the total time taken for all traffic to undertake their journey across the Haudagain model network. The lower the hours of TVTT the more efficiently the network is operating as journey times have been improved. The main results are a fixed trip assessment (with a set amount of traffic). Also shown are some scenarios with more traffic included as a sensitivity test for Option 5 & 11 with additional development assumed in the Logie Haudagain corner area.

Further investigation was undertaken into the effects on particular arms of the junction and it was found that the balance of improvement differed between the options. Where particular arms of the junction have been observed to exhibit minimal journey time benefit this has been indicated in Table 4.1.

The results show that Options 5, 11 and 12 meet the main congestion objectives of improving and sustaining base year 2004 journey times.

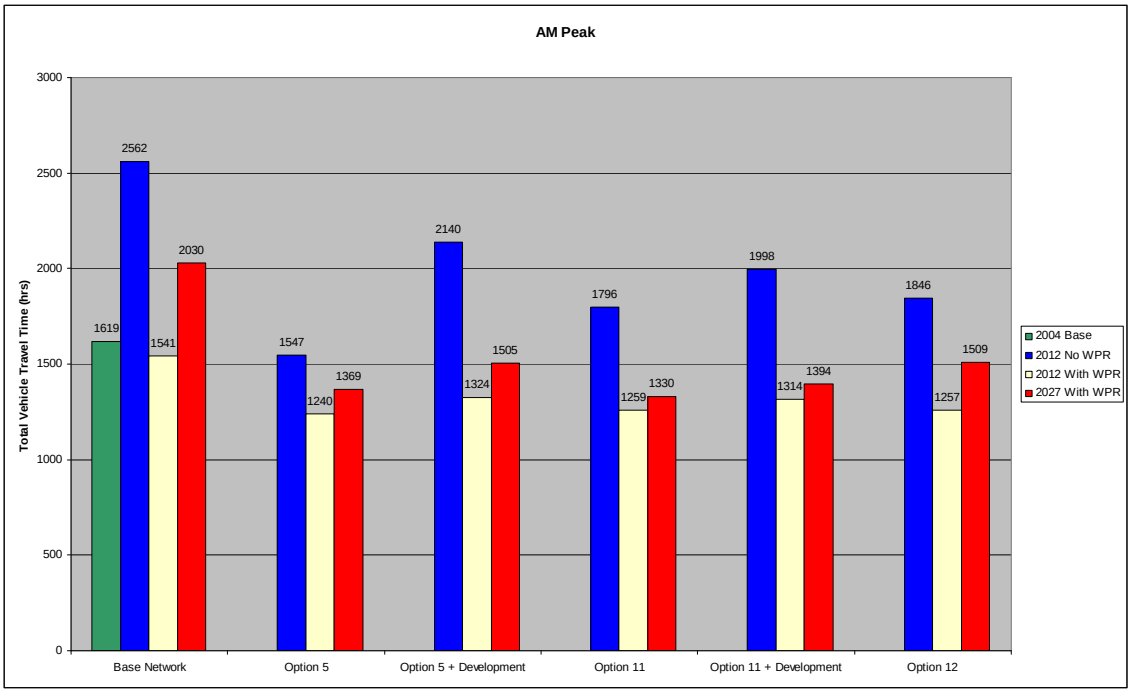

Figure 4.5 : TVTT – AM Peak

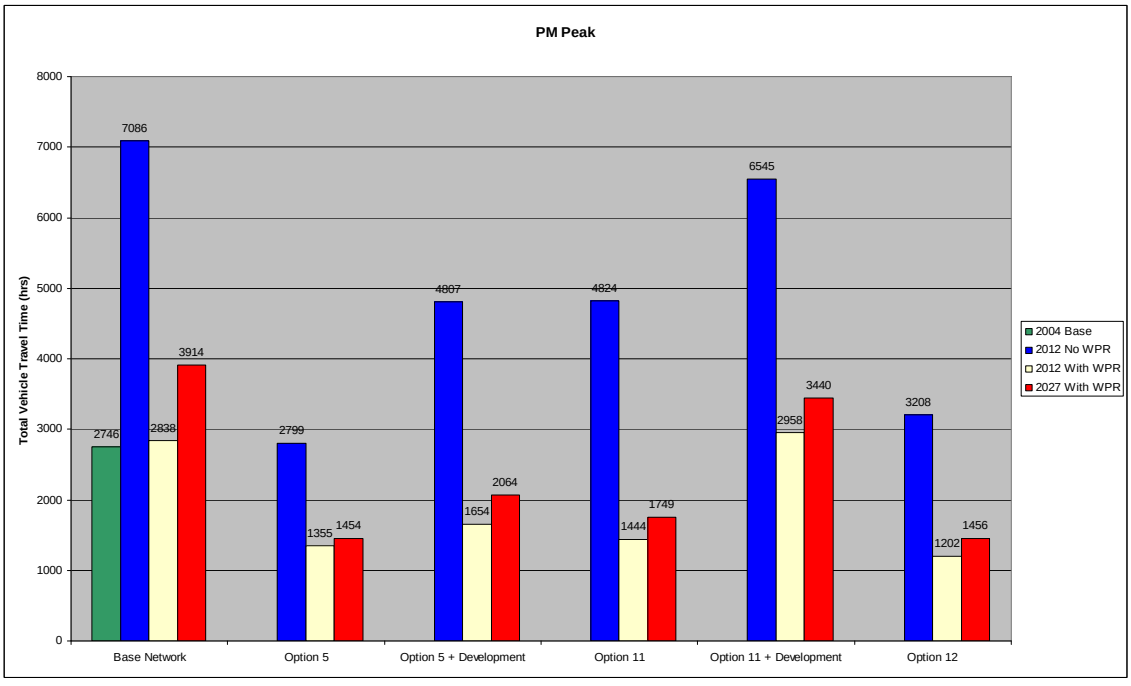

Figure 4.6 : TVTT – PM Peak

(Ref. TPATCHAD/68218)

4.2.3 Potential Development Sensitivity Testing

Should either of two of the options, Option 5 and Option 11 proceed then an 'island' of development land bounded by Auchmill Road and North Anderson Drive would be created. The Middlefield Masterplan, as included in Appendix E.3 supports the possible commercial development of this area.

A sensitivity test to demonstrate that some development could be accommodated in the island of development land and still meet objectives of the study was undertaken following a scoping exercise agreed with Transport Scotland. It should be noted that in reality a great deal more assessment of land-uses, planning process and a full person trip Transport Assessment (TA) would be required to establish the nature and impact of any possible development in this location. For the scenario exercise it was agreed to go to a high level of development to test a worst case scenario. There has been no market testing of the viability of such a development in the area as part of this exercise.

The total number of new vehicular trips (arrivals plus departures) used as the scenario in the sensitivity test for the 'island' development site were agreed with the Steering Group and equate to a total of around:

- 300 new vehicular trips in the morning weekday hour 08:00-09:00
- 600 new vehicular trips in the afternoon weekday hour 17:00-18:00

In sensitivity testing of the development scenario it was found that in 2012, without the AWPR, journey times would be impacted significantly by the introduction of development traffic to the area. This can be seen in Figure 4.6 where the afternoon peak Total Vehicle Travel Time (TVTT) rises to levels that would be unacceptable and not be consistent with the desired objective of improvement on 2004 TVTT levels. In the scenario where the AWPR is in operation, in 2012, the introduction of development traffic has less impact.

The results in Figure 4.6 show that Option 5, in the long term, operated satisfactorily with the development scenario. Option 11 did not meet long term objectives in the afternoon with the development scenario but could accommodate some additional traffic. Related to TVTT and long term objectives Option 11 may be able to accommodate around 50% of development scenario trips in the afternoon peak. The reason for the lesser amount in Option 11 is that the layout contains a set of traffic signals at the current location of Haudagain Roundabout that operates most effectively where the AWPR has been introduced and is less flexible in reacting to the varying impacts of development traffic. Option 12 could not accommodate any additional development traffic at this location.

The sensitivity test was used to determine the principle of development and is not a definitive test case for development at the island site. To provide guidance on development potential to achieve long term objectives there must be many factors taken into consideration including the risks associated with rebalancing of traffic due to any improvements at Haudagain, as described in Section 4.9. On this basis a restrained approach to development at the island site should be used before and after implementation of major transport interventions, further to a review of accumulated effects.

Consideration of future development in the Option 5 and Option 11 scenarios should take account of the following:

- before implementation of the AWPR and after the Haudagain improvements are in place no development should be undertaken at the island site, subject to monitoring and evaluation of the Haudagain transport network
- after implementation of the AWPR and after the Haudagain improvements are in place there is potential for some development at the island site, the type and size of development shall need to be determined via more detailed studies and be subject to monitoring and evaluation of the Haudagain transport network

To realise any commercial development in the 'island' of land bounded by Auchmill Road and North Anderson Drive, in Option 5 and Option 11, the access junction to Middlefield on the proposed link road will need to be constructed to permit or at least not preclude access to a potential development.

4.3 Environment

4.3.1 Introduction to the Environmental Assessment

The environmental assessment was carried out by WSP Environmental UK, a specialist consultant. The methodology of the assessment was agreed after consultation with Transport Scotland. The full technical report on the environmental assessment for the STAG Part 2 is contained in Appendix B.

4.3.2 Summary of Effects

A summary of the findings of the environmental appraisal of each Option is presented in Table 4.2. A carbon assessment had been scoped out of the study.

Table 4.2 : Summary of Environmental Effects

Sub Objective	Do-Minimum	Option 5	Option 11	Option 12
Noise and vibration	No effect	Moderate positive	Moderate positive	No effect
Global and local air quality	No effect	Minor negative	Minor negative	No effect
Water quality, drainage and flood defence	No effect	No effect	No effect	No effect
Geology, Agriculture and Soils	No effect	No effect	No effect	No effect
Biodiversity	No effect	Minor negative	Minor negative	Minor negative
Landscape	No effect	Minor/moderate negative	Moderate negative	Moderate negative
Visual	No effect	Minor/moderate negative	Moderate negative	Moderate negative
Cultural heritage	No effect	Minor negative	Minor negative	Minor negative

On balance, the appraisal of environmental effects indicates that there would be no significant shift from baseline environmental conditions if the 'Do-Minimum' option is followed.

Option 5 is considered likely to have moderate benefits associated with noise for notional receptors on Auchmill Road and North Anderson Drive in both the year of opening and worst case years. Minor to moderate negative effects on landscape and views are predicted. Minor negative effects are also predicted on biodiversity, mainly associated with increased traffic leading to increased collisions with wildlife and disturbance to wildlife foraging. There may also be minor negative effects on the setting of Listed Buildings and extant sensitive cultural heritage assets. Construction of the link road is considered likely to cause a minor negative change to air quality for nearby residential properties.

The predicted effects of Option 11 are generally similar to those of Option 5, with moderate positive noise effects considered likely for notional receptors on Auchmill Road and North Anderson Drive and minor negative effects associated with air quality, biodiversity and the setting of cultural heritage resources. The loss of mature woodland planting and changes to long distance views are considered to be moderate negative effects on the landscape and visual amenity of the area.

It is considered unlikely that Option 12 will cause a significant change in air quality or noise levels. As with Option 11, the loss of mature woodland planting and changes to long distance views are considered to be moderate negative effects on the landscape and visual amenity of the area. Minor negative effects on biodiversity and cultural heritage resources are also predicted.

None of the options appraised are considered likely to have any significant positive or negative effects in hydrological or geological resources.

Based on the assessment of the proposals, it is considered that Option 5 will have the least environmental impact. Options 11 and 12 appear to be generally similar in level of effect.

4.4 Safety

4.4.1 General

The safety objective covers two sub-objectives:

- Accidents (including a review of existing accidents and an assessment of accident impacts)
- Security (including impacts on personal security)

4.4.2 Accidents

A road safety assessment has been carried out in the study area, using the modelled traffic flows and accident data provided by Aberdeen City Council over a five year period to identify any specific accident issues. This has enabled SIAS to assess which user groups are affected by the proposals. Assessment of the received accident data has also enabled SIAS to identify where and how incidents have occurred.

As will be described, accidents have generally been grouped together based on location.

4.4.3 The Study Area

The area over which accident data has been collected and the locations of Personal Injury accidents recorded are shown in Figure 4.7.

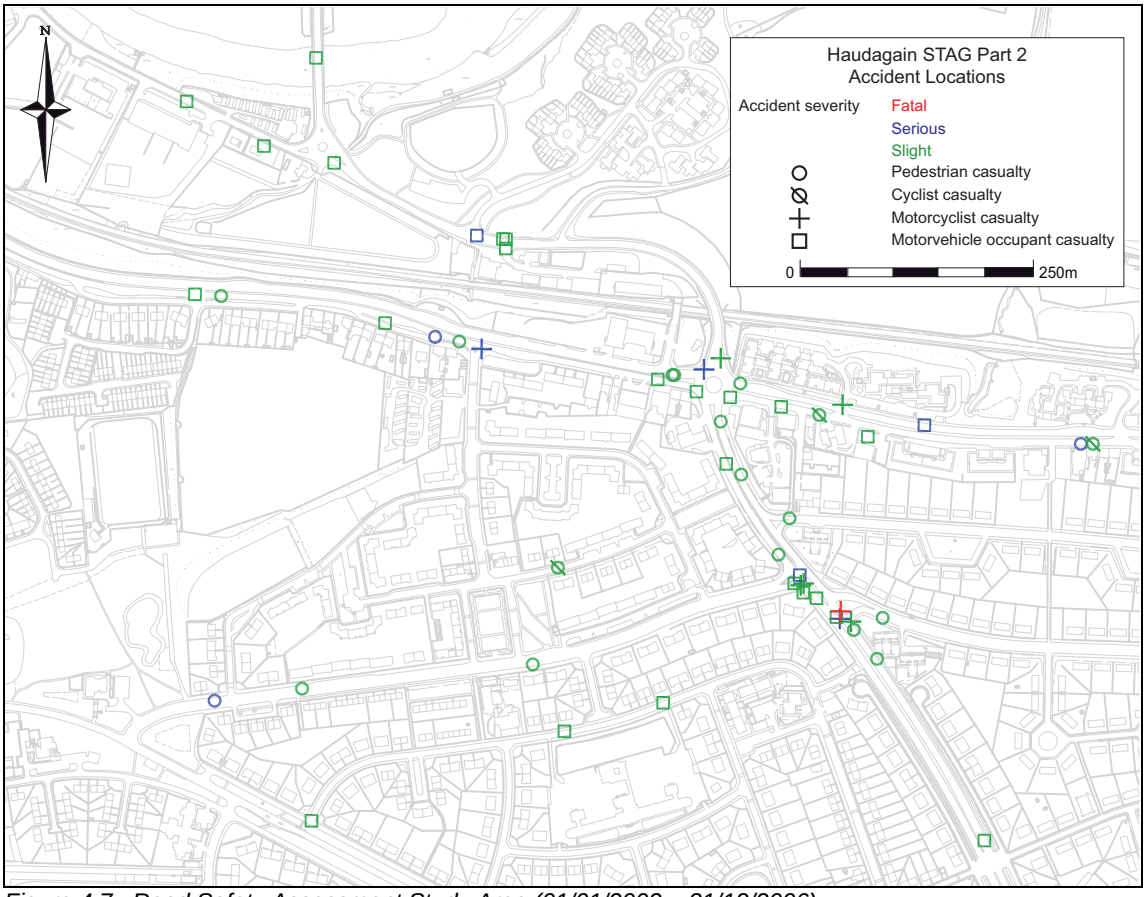

Figure 4.7 : Road Safety Assessment Study Area (01/01/2002 – 31/12/2006)

4.4.4 Severity of Accidents by Street

It is noted that the largest proportion of accidents occurred on the busiest routes through the area, namely North Anderson Drive, Great Northern Road, Auchmill Road and Mugiemoss Road.

4.4.5 Further Comment on Accident Statistics

BEAR Scotland, who manage and maintain the North East Trunk Road network, have commented on accident statistics in the Haudagain area as follows:

> *The fatal accident which occurred at the junction of North Anderson Drive and Hilton Drive on 18 May 2006 was due to inattention on the part of a 52 year old male motorcyclist who proceeded through a red light in a southbound direction and collided with a bus emerging from Hilton Avenue on a green light. The new traffic signal system had been in place for just over a week. "New traffic signals ahead" signs were in place. The fatal accident inquiry in March 2007 concluded that there was no case to answer from a roads point of view, and that driver error caused the accident.*
>
> *The cluster of accidents around Hilton Drive/Manor Avenue 2004-2006 included accidents which involved turning movements now prohibited following the redesign of the junctions and an alcohol related accident. There were no recorded injury accidents in 2007.*

The cluster of accidents at Haudagain roundabout between 2004-2006 included 3 pedestrian accidents just west of the roundabout, notwithstanding the presence of a puffin crossing and pedestrian guardrail. Only one injury accident occurred in 2007, when two vehicles negotiating the roundabout in a westerly direction collided.

4.4.6 NESA Assessment

Network and Evaluation from Surveys and Assignment (NESA) is a computer program developed and maintained by Transport Scotland that is used to assess proposed road schemes, measuring their impact on traffic and the economy in the surrounding area. Accident costs are one element of a NESA assessment. It is necessary to put a monetary value on accidents savings, so that they are given an appropriate evaluation relative to that given to travel time and construction costs.

The recommended methodology is to adopt local accident rates and default costs in the Base and default rates and default cost in the design. Despite the number of accidents recorded, given the high volumes of traffic using the network, the local accident rates are lower than the default values [Ref: *DMRB* 15, Table 6/6/1, August 2002].

This would result in an increase in accidents between the Base and Design which is counter intuitive. Consequently, default accident rates and default costs have been adopted in both Base and Design networks using a recommended methodology.

4.4.7 Accident Benefit Summary

The results of the accident assessment indicate that each of the options will realise savings in accidents.

- Option 5 £0.64M
- Option 11 £1.01M
- Option 12 £2.57M

It should be noted that both Options 5 and 11 include new sections of carriageway. Consequently, both will incur accidents and partially offset the savings at Haudagain itself.

4.4.8 Perceived Safety

Safety and personal security, either actual or perceived is a key deterrent for people travelling by foot or cycle. The number of points at which pedestrians and cyclists are required to cross roads is also a deterrent for walkers and cyclists. The degree of difficulty in crossing is the main issue. The speed of traffic along roads adjacent to paths is a significant deterrent with reductions in speed resulting in less accidents or at least improving the perception of safety.

4.4.9 Security

The most important factors which contribute to peoples feelings of unsafe personal security are anti-social behaviour, poor lighting, and places for strangers can hide. Places where there are limited other people or where there is the presence of those under the influence of alcohol and drugs are also of significant concern, as are secluded subways and alleyways. On the whole, these personal security issues appear to be of greater importance for many people than other safety issues such as uneven pavements, fast traffic or busy roads.

For pedestrians, the fear of crime can be significant when deciding whether to walk or not. Small improvements such as better lighting on a route can lead to an increase in pedestrian activity. In general, people living in urban areas feel safer in areas which are busy with people going about their daily activities.

The initial assessment of security is primarily a qualitative exercise and considers the impact of the proposal on vulnerable sections of the community such as the young, the elderly and infirm and women travelling alone. Factors which influence the public's perception of safety include:

- clearly laid out and well lit streets
- good inter-visibility between the street and surrounding properties
- avoidance of potentially dangerous areas
- adoption of at-grade crossings in preference to underpasses or footbridges which may attract less desirable elements of the local community and are also more onerous for the Council to maintain

Where trunk roads are involved, the Trunk Road Authority can focus on security and safety by considering the needs of pedestrians at all stages of trunk road scheme development, in consultation and collaboration with other parties. They can also aim to ensure good access arrangements for pedestrians in and around developments near trunk roads and ensure that maintenance of footways and crossings is carried out regularly to the benefit of pedestrians, and use maintenance schemes to provide enhanced facilities for pedestrians.

SPP17 states "pedestrians should not generally be segregated from the roadway or other activity which encourages natural surveillance". This could be also true of cycling. Such paths are often isolated and perceived to be less safe than paths through residential areas. Each situation must be considered on an individual basis as segregation may be the most appropriate option where there are high volumes of pedestrians and cyclists, but inappropriate where they are unlikely to be well used.

All the options in this study have been designed with consideration of safety and security. At-grade crossings have been adopted particularly with regard to the public's perceived security issues associated with other crossing types. Footways are adjacent to roads and segregated cycle provision included where possible and shared facilities elsewhere.

4.5 Economy

4.5.1 Introduction

Appraisal under the Economy objective has two components which, between them, should summarise the full extent of economic impacts resulting from a proposal. The first, Transport Economic Efficiency (TEE), covers the benefits ordinarily captured by standard cost-benefit analysis - the *transport* impacts of a scheme. The second, Economic Activity and Location Impacts (EALIs), allows the impact of schemes to be expressed in terms of their effects on the local and/or national economy. Economic assessment has been undertaken with regard to two main criteria:

- Transport Economic Efficiency (TEE)
- Economic Activity and Locational Impacts (EALI)

4.5.2 TEE

The TEE assessment comprises the translation of travel time and vehicle operating costs calculated using the S-Paramics traffic models into monetary values using PEARS [Programme for the Economic Assessment of Roads Schemes]. It also includes a calculation for lost efficiency during construction. The TEE provides indications of efficiency effects for three types of road users:

- Consumer Users
- Business Users
- Private Sector Provider Impacts

The full background to the TEE assessment is given in Appendix D.

In summary the total present value of TEE benefits are:

- Option 5 £239.14M
- Option 11 £216.23M
- Option 12 £238.80M

This analysis, as discussed with Transport Scotland's Traffic Advisor and Auditor, is based on local traffic growth and local economic growth. Costs are in 2002 prices in multiples of a Millions of pounds and are discounted to 2002. The evaluation period is 15 years, which was assumed to be a reasonable assumption of timescale, aligning with the objectives of the study and for this type of fixed trip assessment where many accompanying infrastructure and land-use changes may effect operation past the design life timescale. The First scheme year is 2012. The current year is 2005. The Discount Rate is 3.5% for 15 years.

4.5.3 EALI

Economic Activity and Location Impacts (EALI) have been assessed by Roger Tym & Partners, a specialist consultant in economic appraisal. A summary of the findings are shown below. Full details of the report supporting this work are detailed in Appendix D.

Haudagain junction plays an important and strategic role in the functioning of the Aberdeen City and Aberdeenshire economies. The importance of the junction for airport related traffic and the dynamics of the economy mean that traffic flows will continue to increase along the A90 and A96. The future economic performance of the local and wider area will potentially be impacted by the quality of the transport infrastructure.

Set in the context of an expanding economy, transport infrastructure in the area is currently a constraint on economic growth. The Institute of Directors in Scotland consider Haudagain roundabout as a major issue and problem in the City and Shire - resulting in the loss of time, environmental pollution from traffic emissions, fuel consumption and productivity loss. Their view is that £15m-£30m per year is lost to the economy due to these problems.

The Aberdeen and Grampian Chamber of Commerce considered key developments in the city are currently being constrained by access considerations: Airport expansion: growth of Ellon, Exhibition and Conference Events, Science Park and Energy Corridor.

Aberdeen City Council is of the view that significant development constraints exist in northern parts of the City including the Bridge of Don, Dyce and the Airport. These would be alleviated via individual and collective proposed transport and accessibility improvements. This would comprise Haudagain, a Third Don Crossing and the Aberdeen Western Peripheral Route, etc. These major improvements would assist in the full realisation of the City's development potential, with the prospect of economic growth and opportunities as a direct result.

It is concluded from consultations, the EALI survey findings and analysis that there is a general level of favour and agreement amongst stakeholders and the business community for the individual transportation network improvement options outlined in this report. Consultees were generally welcoming and supportive of the need for improvements and potential these may create to achieve City regeneration.

The majority of businesses responding to the survey agreed with the transportation network improvement options being proposed. There was no single option where the majority of businesses were not in favour of implementation.

It was generally considered that upgrading of Haudagain junction would help sustain business performance, reduce costs, improve margins and increase output. The impact on costs associated with journey time reliability, late deliveries, and the cost of outwards goods were perceived as being of high benefit. Labour market impacts and the reduction in journey times for staff travelling to and from work were considered to be the areas to receive the greatest benefit.

Key points to note are the extent to which the local businesses thought that the individual options would have a positive impact on turnover, output and overall levels of employment.

In respect to output:

- 35% of businesses surveyed expected **Option 5** to have a major or moderate impact
- 46% of businesses expected **Option 11** to have a major or moderate impact
- 48% of businesses expected **Option 12** to have a major or moderate impact

In respect to employment:

- 30% of businesses expected **Option 5** to have a major or moderate impact
- 28% of businesses expected **Option 11** to have a major or moderate impact
- 30% of businesses expected **Option 12** to have a major or moderate impact

Although there is currently a draft Middlefield Regeneration Masterplan, little has been done in terms of 'market' testing to assess the viability of potential commercial development and how the junction improvements link to development opportunities. Transport infrastructure improvements have the potential to create new and improved facilities (and possibly new employment) in the Middlefield area, as well as acting as a attraction factor for the generation of capital investment.

Middlefield and Logie are amongst the most deprived areas in Scotland and although the improvements to the junction will potentially positively impact the economies of Aberdeen City and Aberdeenshire, without an integrated regeneration framework there is no guarantee that the proposals will directly benefit these neighbourhoods. To maximise benefits to the local area, and the wider economy, an integrated economic development framework is needed. This should integrate proposals for Haudagain junction into a wider regeneration framework.

4.6 Integration

4.6.1 General

The three sub-objectives to the Part 2 appraisal of the Integration Objective are:

- Transport Integration – the degree to which an option fits with other transport infrastructure and services
- Transport and Land-Use Integration – the fit between an option and established land-use plans and land-use/transport planning guidance
- Policy Integration – the appropriateness of an option in light of wider policies of both central and local Government

4.6.2 Integration Summary

A summary of the integration objective assessment is described in the Table below. Further detailed public transport data, integration with other infrastructure proposals and land-use data on the context of the regeneration project adjacent to Haudagain is contained in Appendix E.

Table 4.3 : Integration Summary

Sub Objective	Do-Minimum	Option 5	Option 11	Option 12
Transport Integration: Services & Ticketing	Negative effect - buses would have more unreliable journey times	Positive effect – buses to gain more reliable journey times benefiting connections on most routes	Positive effect – buses to gain more reliable journey times benefiting connections on all routes	Positive effect – buses more reliable for making connections on some routes but not the majority that use Auchmill Road
Land-Use Integration: Existing & Planned land use developments	Negative effect - planned commercial activity in the regeneration area may not be permitted.	Positive effect - existing land uses will be easier to access and planned commercial activity in the regeneration area may be permitted.	Positive effect - existing land uses will be easier to access and planned commercial activity in the regeneration area may be permitted.	No effect - planned commercial activity in the regeneration area may be significantly restricted.
Policy Integration: Disability legislation, Health and social inclusion issues	No effect	Social inclusion integration with regeneration masterplan in the Haudagain corner area.	Social inclusion integration with regeneration masterplan in the Haudagain corner area.	Social inclusion detriment due to impact on local shopping amenities.

4.7 Accessibility and Social Inclusion

4.7.1 Introduction

The sub-objectives for accessibility and social inclusion are:

- Community Accessibility – comprising of a review of public transport network coverage and local accessibility by means of walking or cycling to services or facilities, including severance arising from proposed changes.
- Comparative Accessibility – considers the distribution of impacts by people group and geographic location

Comment has also been made on the elements of a potential Equality Impact Assessment. This is a legal requirement for transport projects and policies under the public sector equality duties for disability, race and gender.

4.7.2 Community Accessibility

Public Transport Network Coverage – The rail network is not affected by the proposals. The local and regional bus network coverage will not be affected, network coverage is not expected to be extended as the result of Haudagain improvements.

Local Accessibility - The number of points at which pedestrians and cyclists are required to cross roads is a deterrent for walkers and cyclists. The degree of difficulty in crossing is the main issue. Speed of traffic along roads adjacent to paths is a significant deterrent with reductions in speed resulting in less accidents or at least improving the perception of safety. Walking distances have been reviewed for each option.

Relevant definitions of disbenefits are as follows (*DMRB*):

- Slight – In General the current journey pattern is likely to be maintained, but there will probably be some hindrance to movement.
- Moderate – Some resident, particularly children and elderly people, are likely to be dissuaded from making trips.
- Severe – People are likely to be deterred from making trips to an extent sufficient to induce a re-organisation of their habits. This would lead to a change in the location of centres of activity or in some cases to a permanent loss to a particular community.

Classification was made into slight, moderate and severe using comparisons with base distances. The threshold distances were up to 250m, 250-500m and over 500m.

It was found that there were no moderate or severe disbenefits n any options from the pedestrian points tested. Points selected related to local amenities on key routes and areas of housing including points on:

- North Anderson Drive
- East Arm Haudagain Roundabout
- Mugiemoss Road/Persley Bridge roundabout
- Auchmill Road Bus Lay-by
- Hutcheon Housing Area
- Clifton Road Housing Area
- Manor Avenue/Manor Terrace Housing Area
- Logie Potential Redevelopment Area

Table 4.4 : Community Accessibility

Sub Objective	Do-Minimum	Option 5	Option 11	Option 12
Public Transport Coverage	No effect	No effect	No effect	No effect
Local Accessibility* – Hutcheon Low Area	No effect	Slight Severance	Slight Benefit	Slight Benefit
Local Accessibility* – Clifton Road Area	No effect	No effect	Slight Benefit	Slight Benefit
Local Accessibility* – Manor Avenue/Manor Terrace Area	No effect	Slight Severance	No effect	Slight Benefit

* Cumulative walk/cycle distance benefits to seven points distributed across the study area.

The slight benefits in Option 11 and Option 12 when compared to Option 5 can be explained by the inclusion of pedestrian and cycle crossing facilities on Mugiemoss Road by the Hutcheon Low area in Option 11 and Option 12. Full details of the assessment are contained in Appendix F with a breakdown of particular routes.

4.7.3 Comparative Accessibility

Comparative accessibility considers issues of people group and geographic location.

Given the localised nature of the options which are essentially a junction improvement it has not been necessary to undertake a major comparative exercise, but differences between public transport and general traffic journey times have been made to represent the effect on non-car owning/using households and car owning/using households. It has been found that there is equity in the effect between both people groups. There is disbenefit in the Do-Minimum to both groups. There is benefit to both groups for each of the options relative to a 2004 base scenario.

The comparative geography impacts of Haudagain options with regard to locality, community impact and comparison with other locations has been established as shown in Table 4.5.

Table 4.5 : Comparative Accessibility

Sub Objective	Do-Minimum	Option 5	Option 11	Option 12
People Group - Non-car owning/using household (Public Transport)	Disbenefit	Benefit	Benefit	Benefit
People Group - Car owning/using household (Private Vehicle)	Disbenefit	Benefit	Benefit	Benefit
Geographic Location	Negative Impact on Middlefield Regeneration and no benefit to other areas of Aberdeen	Potential to complement local Middlefield Regeneration with wider beneficial impacts on North of Aberdeen	Potential to complement local Middlefield Regeneration with wider beneficial impacts on North of Aberdeen	Restricted potential to complement local Middlefield Regeneration but wider beneficial impacts on North of Aberdeen

4.7.4 Equality Impact Assessment

The main function of an Equality Impact Assessment (EIA) is to consider issues of race, disability and gender equality issues under the Public Sector Equality Duties. The local improvement impacts at Haudagain did not warrant a full EIA but an outline review has been made.

During consultation with Stakeholders and the Public no issues of race and gender have been highlighted. This may be because there are no places of worship, connected with the faith of any recognised religion, within the areas impacted by the options. Similarly the neighbouring regeneration project has not highlighted race or gender issues, other than a significant number of single parent families in the area. The regeneration masterplan for Middlefield addresses equality issues by introducing the concept of a shift from residential to commercial accommodation in the Haudagain corner area of Logie, to provide local opportunities for facilities and employment to encouraging social inclusion, while also mitigating against any impacts of Haudagain improvements on the community living in the immediate area.

The needs of people with disability or mobility impairment have been considered as an integral part of the option designs. The needs of vulnerable road users are acknowledged and detailed in planning objectives used to develop options for the appraisal. All options incorporate at-grade pedestrian crossings, connected footways. Where there are new bus stops provided Disability Discrimination Act (DDA) compliant boarding facilities would be provided subject to detailed design.

4.8 Cost To Government

4.8.1 Introduction

The aim of the ‘cost to government’ section of a STAG Part 2 appraisal is to assess the net cost of an option from a public spending perspective. The costs can then be compared with the total benefits of the option in terms of the Government’s objectives for transport. This allows an overall value of money assessment to be made.

Cost to government refers to all costs incurred by the public sector as a whole, net of any revenues. The total net costs consist of investment costs, operating and maintenance costs, grant/subsidy payments, revenues, and taxation impacts. All investment costs should be adjusted for optimism bias. A full assessment of this for each option is contained in the economic assessment contained in Appendix D.

4.8.2 Investment Costs

The cost estimate for options includes Construction Costs (including Utility Diversions), Design Costs, Site Supervision Land and Property Acquisition and Demolition. These estimates assume that the land

and properties have to be purchased with associated demolition as required. The land costs were obtained from the District Valuer as agreed with Transport Scotland. Full breakdowns of costs are available in Appendix G.

All costs are assumed to be Central Government Funding. The construction cost estimates at May 2007 prices (net of optimism bias) are:

- OPTION 5 £ 11,617,500
- OPTION 11 £ 22,479,480
- OPTION 12 £ 19,196,200

Total investment costs, those required to establish levels of funding requirements, with a factor for optimism bias are shown in Section 4.9.

4.8.3 Indirect Tax Revenues

A loss in revenue to HM Revenue & Customs, due to a saving in fuel costs for drivers (e.g. due to road improvement) is included in the overall assessment of costs to UK wide government.

The impact of indirect taxation can be mitigated by the definition of an additional measure – the Cost to Benefit Ratio to funding agency. This can be reported as one of the final indicators for a project.

In this study the Funding Authority is assumed to be Transport Scotland. The benefit is greater to Transport Scotland than the UK government, because Transport Scotland does not receive direct tax revenue from fuel sales.

4.8.4 Analysis of Monetised Costs and Benefits

The overall financial impacts are shown in Table 4.6. The Net Present Value (NPV) of a project is the discounted sum of all future benefits less the discounted sum of all future costs over the appraisal period. In a world with no constraints on investment funds, there would be a strong case for taking forward all projects with a positive NPV.

The Benefit to Cost Ratio (BCR) is defined as an estimate of the value of the benefit for every £1 of public expenditure on a project and therefore is a strong indication of the value for money to the public sector. A BCR greater than 1 represents value for money to the public sector.

Table 4.6 : Overall Financial Impact

Overall Impact	Do-Minimum	Option 5	Option 11	Option 12
Net Present Value (NPV)	Not Applicable	£223.39million	£191.83million	£216.38million
Benefit to Cost Ratio To Government (BCRGOVT)	Not Applicable	14.63	8.55	9.66
Benefit to Cost Ratio To Funding Authority (BCRFA)	Not Applicable	21.76	10.21	13.16

Note. UK Government (GOVT), Funding Authority (FA)

4.9 Risk and Uncertainty

4.9.1 Risks

STAG identifies that in appraisal there is always some difference between what is expected and what eventually happens, because of biases, risks and uncertainties that materialise. As a result, it is important to identify and mitigate risks and make allowance for optimism bias.

4.9.2 Risk Management

Guidance on risk management suggests that risk management should be appropriate to the scale of individual transport projects. The Haudagain STAG has not required a formal risk management strategy, but risk has been taken into account with regard to option costing and sensitivity testing where appropriate.

4.9.3 Optimism Bias

Optimism bias of option costs has been applied at a rate of 25%. This is lower than normal due to the significantly detailed costing and inclusion of contingency in Aberdeen City Council's estimates. With optimism bias included the option investment costs would be as follows:

- OPTION 5 £ 14,521,875
- OPTION 11 £ 28,099,350
- OPTION 12 £ 23,995,250

These costing are then discounted back to 2002 for economic assessment based upon the Retail Price Index (RPI) which was 207.3 in May 2007.

4.9.4 Elements of Risk & Uncertainty

There are number of risks associated with the options:

- Utility mapping could be incorrect as the Haudagain area is a congested area for utility pipelines
- Ground conditions could fluctuate
- Land values can change particularly where businesses are present
- Difficulties with Network Rail could increase construction time
- Difficulty achieving demolition rates to allow construction

Mitigation measures should include:

- Detailed site investigations during the DMRB process
- Early dialogue with Network Rail, should this be required for the selected option
- Early dialogue with the Regeneration project, should this be required for the selected option

Other wider project risks and uncertainties effecting achievement of objectives include:

- Achieving funding from Government to implement options
- AWPR is not taken forward
- Third Don Crossing is not taken forward
- Over rebalancing of traffic demand may reduce journey time benefits at Haudagain
- Middlefield Social Inclusion Partnership (SIP) area not to have regeneration project delivered

4.9.5 Sensitivity Testing

Operational, economic and environmental testing was undertaken and completed to a draft level on the three options by August 2007 in preparation for public consultation. Further to the Government Reporters decision on the Aberdeen City Local Plan, SIAS was requested to put on hold the public consultation and

check the **sensitivity** of modelling work undertaken, with regard to the inclusion of the Third Don Crossing, in the Aberdeen Sub Area Model (ASAM3b) matrices supplied to SIAS by MVA.

A series of operational tests were then undertaken to ascertain the sensitivity of options developed for:

- a 2027 scenario without the Third Don Crossing with the options available
- a 2027 scenario with improvements at Haudagain tested in the wide area model to identify the effects of traffic redistribution from complementary routes in a scenario without the Third Don
- a 2027 scenario with improvements at Haudagain tested in the wide area model to identify the effects of traffic redistribution from complementary routes in a scenario with the Third Don

Results from the operational testing showed that without a Third Don Crossing, widening of Persley Bridge to four lanes on the A90(T) Parkway would be required, at the very least, to enable the options provided to meet with long term journey time objectives by 2027. This test did not include the effect the possible Haudagain improvement would have on the balance of traffic crossing the river from the wide area model caused by the improvement at Haudagain itself.

A sensitivity test on the effects of traffic rebalancing from complementary routes in a scenario without the Third Don Crossing showed that by improving Haudagain without a Third Don crossing, the balance of traffic crossing the River Don would switch to the improved Haudagain, such that an at-grade solution could not be designed to operate effectively by 2027. The at-grade options had incorporated features to tie into the planning objectives of the study.

A sensitivity test on the effects of the traffic rebalancing from complementary routes, in a scenario with the Third Don Crossing, showed that by improving Haudagain there would be less traffic in the Haudagain area than in a scenario without a Third Don Crossing. Less traffic would enable the at-grade options to operate more effectively in 2027.

The sensitivity tests were the basis of confirming that the linkage between the improvements at these two locations has been established. The provision of the improvements at Haudagain with the Third Don Crossing enables a balanced approach to traffic crossing the River Don. The inclusion of the Third Don Crossing is supported by the Aberdeen City Council LTS, Nestrans RTS and the forthcoming Structure Plan.

When an option for Haudagain has been established by decision makers then further testing will be required to establish the phasing of proposals affecting the north of Aberdeen in the short to medium term.

Given the results of sensitivity testing and instruction from Aberdeen City Council, it was then possible to engage in further public consultation in May 2008.

4.10 Public Consultation

4.10.1 Format of Public Consultation– May 2008

A public consultation was undertaken on the 12 - 30 May 2008 to present information on the STAG Part 2 options. The consultation was promoted via a range of mediums and included a questionnaire to gather feedback. A number of formats were used to reach as many people as possible during the consultation period: press releases, Aberdeen City Council web pages, leaflet drops to homes in the immediate area of Haudagain and letters to stakeholders were used. Public exhibitions were held at a variety of venues in Middlefield, Woodside and in the centre of Aberdeen. There was local press and radio coverage of the consultation.

Information provided stated that the options presented had been developed with the proposals for the AWPR and Third Don Crossing as part of the solution in meeting objectives.

4.10.2 Results of Public & Stakeholder Consultation

There was a good response and interest shown in the May 2008 public consultation. Over 100 questionnaire responses were received, double the amount when compared to the STAG Part 1 consultation held in 2006. There were over 900 external hits to the Council web site explaining the consultation, this was around half that in 2006.

Distribution of respondents: There was a good distribution of responses from the public and the local community were well represented with 37% of replies from within half a mile of the junction. 39% of replies where from the rest of Aberdeen and 10% from outside Aberdeen. A number of respondents, 14%, did not give their location.

Distribution of Modes: There was a good distribution of responses from people and organisations that use a range of modes to travel through Haudagain. The results were as follows: Car (personal) 39%, Car (business) 7%, Public Transport 24%, HGV 4%, Cycling 8%, Walking 13%, All modes 6%.

Issues Priority: The public's responses to the issues priority are shown in Figure 4.6. High priority issues include; improving safety, journey times savings, impact on local community and benefiting the economy. Organisation and Stakeholder responses are shown in Figure 4.7, High priority issues for them are; improving safety, journey times savings, benefiting the economy and minimising disruption during construction.

Support or Opposition to Options: The results of public opinion on the options are shown in Figure 4.8. Organisation and Stakeholder responses are shown in Figure 4.9. There were 80 public responses, 23 Stakeholder responses and 2 other organisation questionnaire responses. The results from support of particular options were inconclusive as there was only a marginal difference in those 'in favour' or 'against' any particular options and a significant who had no opinion.

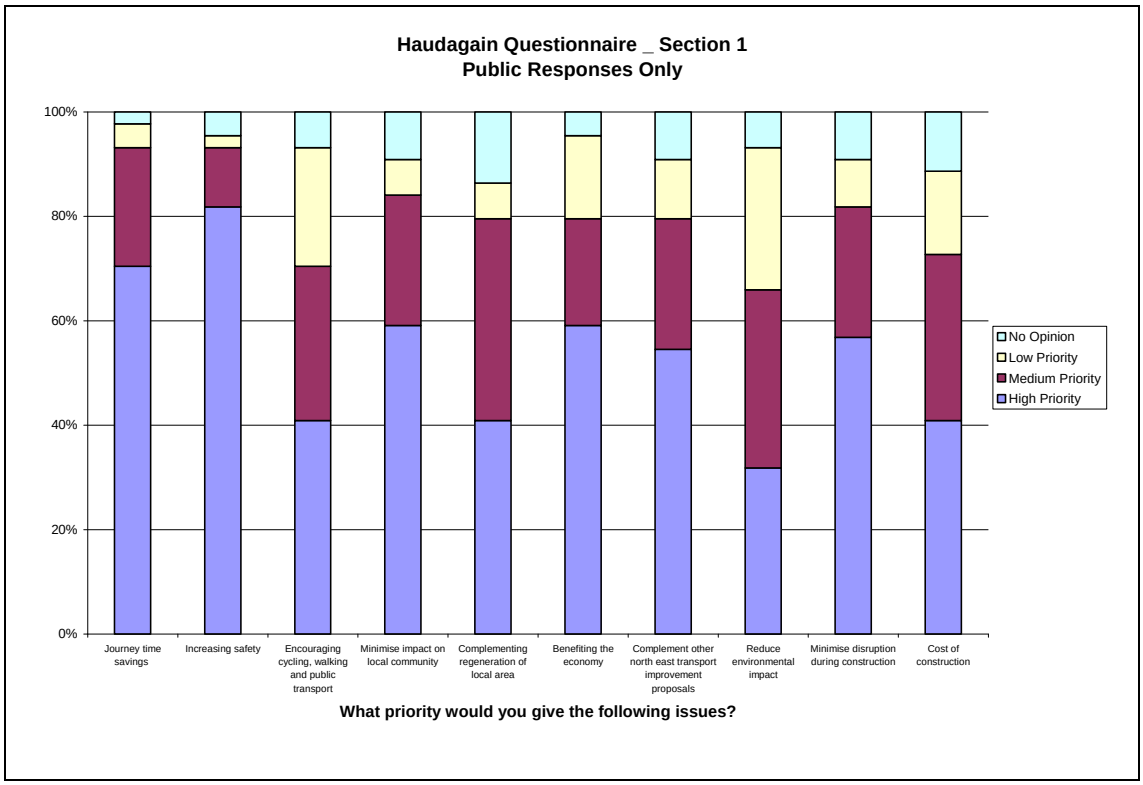

Figure 4.8 : Public's View on Priority of Issues

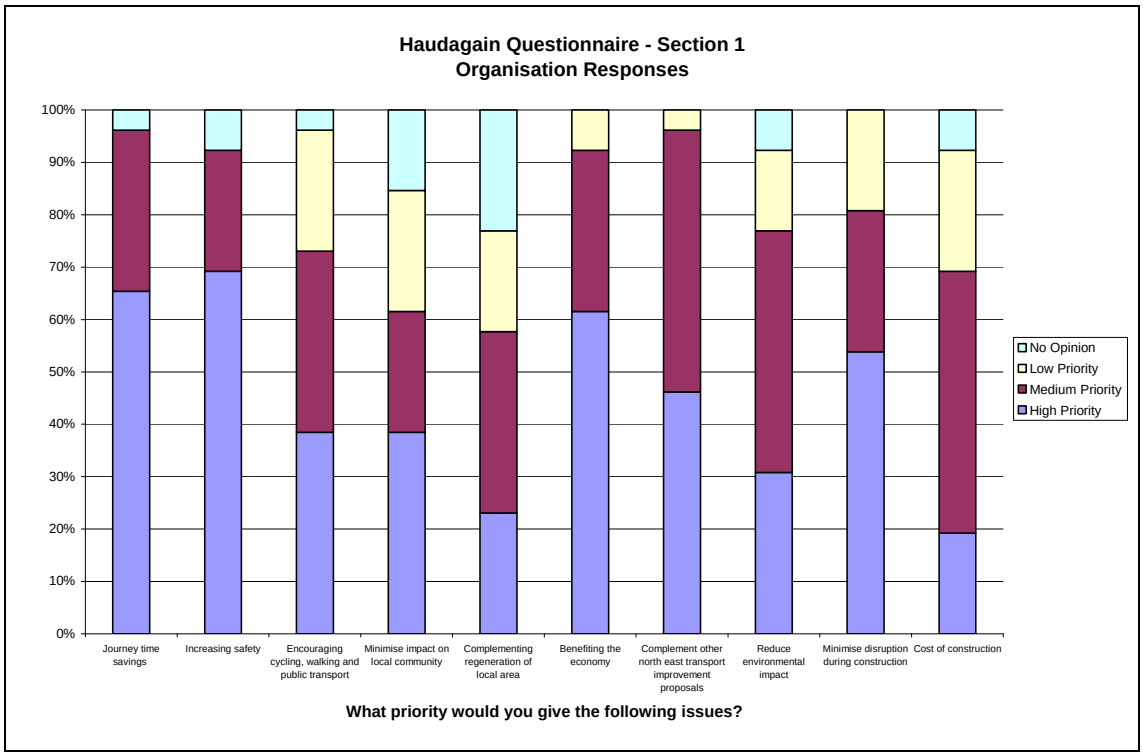

Figure 4.9 : Organisation and Stakeholders View on Priority of Issues

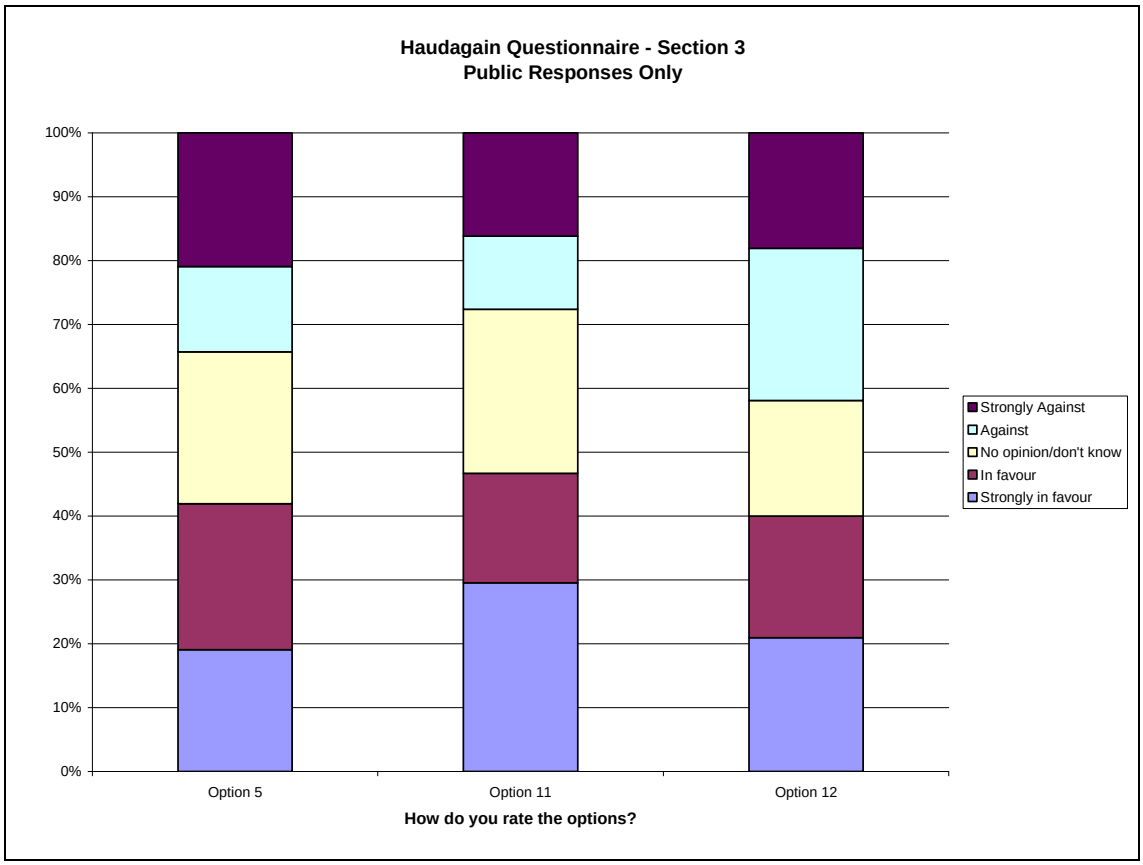

Figure 4.10 : Public's Views on Options

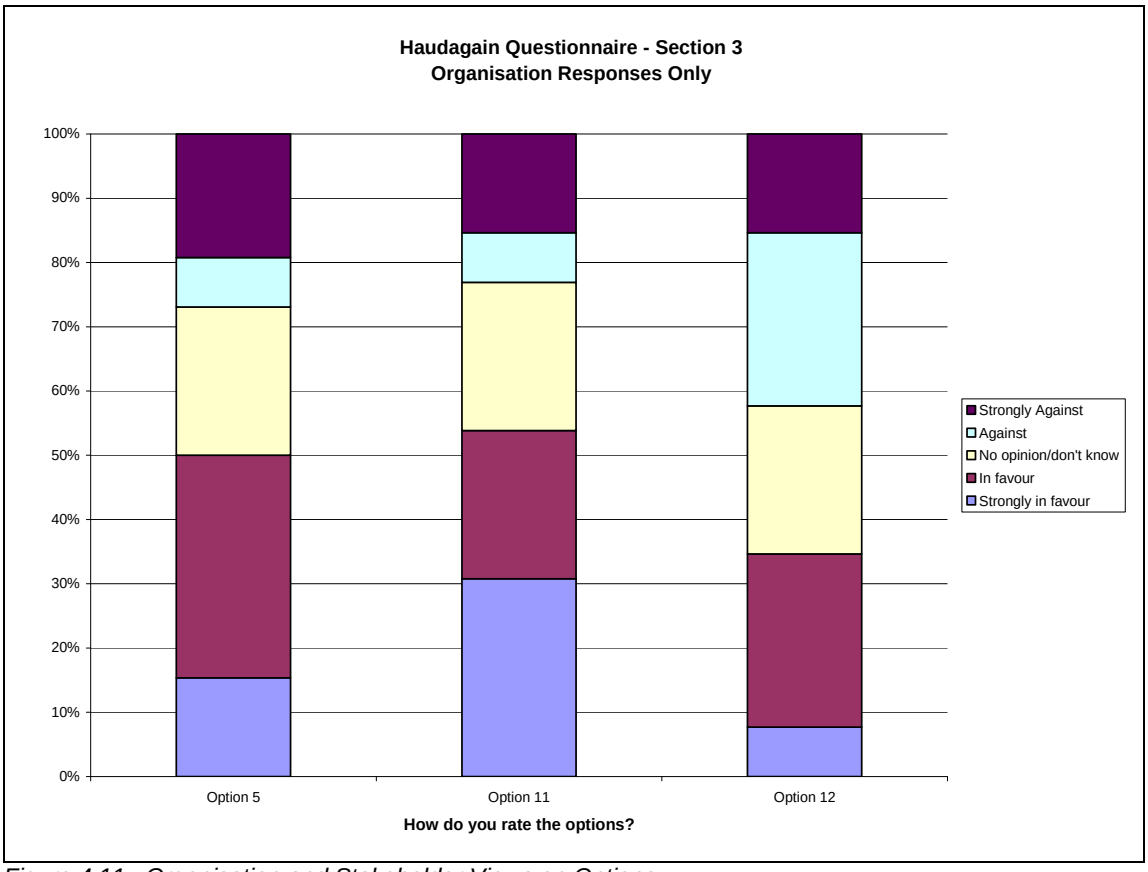

Figure 4.11 : Organisation and Stakeholder Views on Options

Table 4.7 : Public Acceptability

Sub Group	Do-Minimum	Option 5	Option 11	Option 12
Public	Not Applicable	In favour or strongly in favour 42% No opinion 24% Against or strongly against 34%	In favour or strongly in favour 47% No opinion 26% Against or strongly against 27%	In favour or strongly in favour 40% No opinion 18% Against or strongly against 42%
Organisations & Stakeholders	Not Applicable	In favour or strongly in favour 48% No opinion 20% Against or strongly against 32%	In favour or strongly in favour 48% No opinion 28% Against or strongly against 24%	In favour or strongly in favour 44% No opinion 20% Against or strongly against 36%

4.10.3 Questionnaire Responses

Local Community: In general there was concern expressed from the local Middlefield community that Options 5 and 11, which included a link road, would directly impact on their current residential accommodation and environment. Concern was articulated as a desire and need for more detailed information on how the regeneration plans for the area would be carried out and what provision was going to be made for the existing community rather than outright opposition to any of the proposals.

Stakeholders: In general stakeholders and some other organisations highlighted that transport problems at Haudagain were serious and were hampering the development of Aberdeen economy. Some felt that cycling and walking access to public transport was important to be integrated into schemes and others would have preferred to see larger scale schemes with grade separation. Questionnaire responses were received from:

- Aberdeen City Centre Association (ACCA)
- Aberdeen Cycle Forum
- Aberdeen Friends of the Earth
- Airport Taxis
- Ashley Broomhill Community Council
- Ashley Broomhill Community Council
- Castlehill & Pittodrie Community Council
- CTC Right to Ride – cycling organisation
- Dyce & Stoneywood Community Council
- Federation of Small Businesses
- First Group
- Freight Transport Association (FTA)
- Grampian Fire and Rescue Service
- Grampian Police
- Grampian Society for the Blind
- Independent Operators Taxi Association (I.O.T.A.)
- Institute of Directors
- Kincorth Commmunity Council
- Mastric & Sheddocksley Community Council
- Rainbow City Taxis
- Scottish Ambulance Service
- Visit Scotland

A listing of comments given on questionnaires from all parties is given in Appendix H.

4.10.4 Other Letter & Email Responses

There were some responses to the consultation by letter and email. These came from Community Council representatives and Members of the Scottish Parliament (MSPs), as follows:

- Tillydrone Community Council

- Old Aberdeen Community Council
- Aberdeen Civic Forum
- Lewis MacDonald, MSP Aberdeen Central
- Richard Baker, MSP North East Scotland

In summary, these responses focused on concern that the Third Don Crossing had been included as a Transport Strategy commitment of Aberdeen City Council in the STAG study. They believed that this assumption should not have been made because they objected to the Third Don Crossing in principle. They also believed that options could have been developed for the consultation that did not include the Third Don Crossing as a commitment.

Note. Sensitivity testing has shown that an at-grade option, meeting objectives of the study, could not be developed without a Third Don Crossing due to a rebalancing of demand on complementary routes. On this basis the Steering Group determined to continue with the combined strategy for all the options presented at the public consultation, May 2008.

5 POST APPRAISAL

5.1 Monitoring Plan

5.1.1 Introduction

Monitoring is the process of gathering and interpreting information on the performance of a project post-implementation. This process should be ongoing and may take place in conjunction with other information gathering exercises being undertaken by a local authority.

5.1.2 Proposed Monitoring Strategy

At Haudagain, which ever option is chosen, a monitoring strategy will be implemented. This strategy will relate directly to the objectives of the scheme and also could be used to in conjunction to judge the impact of other projects that will act in integration with Haudagain. The objectives to be monitored are:

- Objective 1 – To reduce congestion and unreliability by improving and sustaining base year 2004 journey times for commercial and public transport traffic until 2027 (Journey Time Surveys)
- Objective 2 – Measures must minimise the risk of transport related accidents especially for vulnerable users in the vicinity of the junction to improve on 2001–2004 casualty levels (Accidents Statistics)
- Objective 3 – To make socially–inclusive and healthy transport modes more attractive to use, including cycling, walking and public transport measures to be promoted in all measures (Assess mode change)
- Objective 4 – To minimise traffic induced severance on communities by ensuring measures do not have a significant detrimental impact on 2004 walk time accessibility (Walk time surveys)
- Objective 5 – To contribute to the City Council's regeneration aims by complimenting the development of the Logie/Manor area of Middlefield (Monitor regeneration plans)

5.1.3 Project Monitoring

Project monitoring should include the collection of data to support the later evaluation of objectives. This will include:

- Journey Time Surveys across the Haudagain area
- Automatic Traffic Counter Data
- Accident Records
- Implementation of Crossings, ped/cycle links, bus measures
- Effect on Regeneration
- National Statistics on Congestion delays
- Dates of implementation of other interventions (e.g. Park & Rides, AWPR)

This data should be collated on an annual basis until such time as evaluation in complete.

5.2 Evaluation Plan

Evaluation is a specific post-implementation event designed to identify whether or not a project is performing as originally intended, whether established objectives are being achieved and whether the implemented project continues to represent value for money. An evaluation will use information gathered

for monitoring purposes, but will also involve data gathering, analysis and detailed interpretation that is particular to the evaluation itself.

Evaluation is always undertaken against indicators derived from the objectives of the particular project and involves comparisons of the do-minimum with actual outcomes. It is important that, at the outset, objectives are set in a framework that assists subsequent evaluation.

5.2.1 Proposed Evaluation Strategy

As part of the transport planning and appraisal process an evaluation strategy should be developed to outline how evaluation will be undertaken following implementation. It is expected the evaluation strategy would consider:

- **Process evaluation** – this is conducted at an early stage in the existence of a project and which is primarily concerned with how well the project has been implemented; this is also known as formative evaluation
- **Outcome evaluation** – this is conducted once the project has been in existence for a sufficient period to enable an examination to be undertaken of actual performance against identified targets; this is also known as summative evaluation

5.2.2 Process Evaluation

Process evaluation is concerned with implementation, and it is necessary to establish a usable number of performance indicators and measures relevant to what is expected during implementation. These may be thought of as tests of good implementation practice.

Process evaluation is particularly useful in the early stages of implementation when there is scope for amending a project to make it more efficient or effective. The precise point in time for such an evaluation has to be judged carefully to ensure that initial problems have been addressed and resources are not being used ineffectively where a project is performing poorly.

There can be particular value in the undertaking of process evaluation to highlight issues such as project selection and planning, the application and funding process, the way in which funds are allocated and the management of the project at national and local levels.

5.2.3 Outcome Evaluation

Outcome evaluation should look for clear and measurable outcomes from the project. The timing of an outcome evaluation needs to be carefully programmed. If undertaken too soon, final impacts may not have had time to “work through”, but if undertaken too late resources will be wasted if the project is not efficient or effective.

Outcome evaluations are intended to answer questions such as “What is the extent of the identified outcomes, and what were the costs of achieving this?” and, where comparisons can be made with similar projects, “Do these resources and outcomes together represent value for money?”

The process used in an outcome evaluation may be set out as a series of sequential steps:

- Definition of scope and purpose
- Project rationale
- Aims and objectives
- Measures and indicators
- Base case for comparison
- Analysis and interpretation

- Reporting and recommendations

5.2.4 Participation and Consultation

Stakeholders should be consulted during the development and implementation of the evaluation strategy. Support and buy in to the evaluation strategy is essential to ensure performance can be effectively evaluated against the transport planning objectives and the integrity of the STAG planning and appraisal process is maintained.

6 SUMMARY & OUTCOMES

6.1 Summary

6.1.1 Purpose of Report

SIAS in partnership with WSP Environmental, Roger Tym & Partners and Aberdeen City Council Design Services was commissioned to undertake the Scottish Transport Appraisal Guidance (STAG) of the A96(T)/A90(T) Haudagain Improvement.

The report provides the culmination of the STAG Part 2 appraisal, drawing on the previous STAG Part 1 appraisal to provide a fully comprehensive document with a clear synergy from the start to the end of the process.

It is a requirement that all transport proposals for which Transport Scotland support or for which approval is required, shall be appraised in accordance with STAG. It is intended that the application of STAG will result in the development and implementation of proposals to the satisfaction of all stakeholders, most importantly the public.

Public and Stakeholder consultation has been a key feature of the Haudagain STAG. Two major public and Stakeholder consultations have been undertaken to develop options, gather a range of opinions and utilise feedback in the STAG process.

6.1.2 Background

The Haudagain Roundabout is located in the north-west of Aberdeen at the meeting point of a number of strategic roads in the city. The A96(T) Auchmill Road, A90(T) North Anderson Drive, A90(T) Mugiemoss Road and the A96 Great Northern Road. These major routes all require access through the junction, with the A96(T) and A90(T) Trunk Roads serving as the main access into and around Aberdeen from the north and north-west.

At certain times during the peak periods, the junction has significant queues, the A96(T) experiences traffic queuing nearly 2km long, with associated delays on all approach arms. Journey times are unreliable and public transport is impeded.

In the existing morning and evening peak periods over 130 buses pass through Haudagain roundabout. Bus priority measures are in place on A96(T) Auchmill Road and Great Northern Road but, due to general traffic queues, these bus priority lanes are not easily accessed at peak times by the bus operators.

6.1.3 Pre-Appraisal

The pre-appraisal section of the STAG report aimed to highlight the analysis of problems and opportunities, the objective setting and the option generation, sifting and development that has taken place in this study. These elements make up the fundamental basis for the Haudagain STAG appraisal.

Evidence of the transport problems in the area have been investigated with particular reference to Aberdeen and North East transport trends, supporting evidence on the Haudagain baseline transport conditions in 2004 and national transport delay monitoring. Where available, opportunities have been identified.

Objectives for the study were developed to direct the outcomes of the study. These local objectives are the main focus of the initial assessment with government objectives covering topics on the environment, safety, economy, integration, accessibility and social inclusion being addressed in later stages of the appraisal.

Options were generated through technical development and via public and stakeholder consultation. A list of forty options, including major infrastructure proposals, such as flyovers, clover leaf junctions etc. was

sifted against local objectives and implementability criteria to develop a set of options for initial appraisal. This resulted in four options plus a Core option going forward to the STAG Part 1 appraisal.

6.1.4 Part 1 Initial Appraisal

The STAG Part 1 was an initial appraisal of the Core option of walking, cycling and public transport measures and the other options (5, 5a ,9, 11), that came forward from the sift process. During a review process Option 12 came forward from discussions with Transport Scotland. The STAG Part 1 briefly sets out the key issues arising from the appraisal of the schemes against the planning objectives, feasibility and outline STAG criteria. It sets out the rationale for their retention or rejection as candidate measures for possible Haudagain transport improvements. After initial appraisal, Option 9, a complex gyratory system, was rejected due to its low rating against planning objectives, the environment and safety. It also did not rate highly with regard to public acceptability.

Public consultation and participation in August/July 2006 greatly assisted with confirming support for the objectives, the development of options and input to the public acceptability criteria.

6.1.5 Part 2 Detailed Appraisal

The aim of this STAG Part 2 was to investigate in detail the options that were selected and retained for assessment at the end of Part 1 of the STAG process. Transport planning objectives have been reviewed and a detailed assessment of environmental criteria has been made, safety and security issues have been assessed and economic factors have been evaluated, the integration with modes of transport and wider policy has been made and accessibility and social inclusion appraisal has been undertaken. Public and Stakeholder consultation has been undertaken.

Public consultation and participation in May 2008 greatly assisted with confirming support for objectives and input to the public acceptability criteria.

6.1.6 Post Appraisal

Monitoring is the process of gathering and interpreting information on the performance of a project post-implementation. This monitoring process should be ongoing and may take place in conjunction with other information gathering exercises being undertaken by a local authority.

Evaluation is a specific post-implementation event designed to identify whether or not a project is performing as originally intended, whether established objectives are being achieved and whether the implemented project continues to represent value for money. An evaluation will use information gathered for monitoring purposes but will also involve data gathering, analysis and detailed interpretation that is particular to the evaluation itself.

6.2 Study Outcomes

A detailed and robust STAG process has been carried out to address problems and opportunities at Haudagain junction. This was achieved by setting local planning objectives based on integrated transport strategies, focusing on the key issues through Stakeholder input.

The objective throughout has been to reduce congestion and unreliability by improving and sustaining base year 2004 journey times for commercial and public transport traffic until 2027. In conjunction with this it has been an objective to minimise the risk of transport related accidents, especially for vulnerable users in the vicinity of the junction to improve on 2001-2004 casualty levels.

It was determined to make socially-inclusive and healthy transport modes more attractive to use, including cycling, walking and public transport measures to be promoted in all options. It was desired to minimise traffic induced severance on communities by ensuring measures do not have a significant detrimental impact on 2004 walk time accessibility. It was also an objective to contribute to the City Council's regeneration aims by complimenting the development of the Logie/Manor area of Middlefield.

From a set of forty original options the STAG process has aided the pragmatic, auditable and inclusive narrowing down of interventions via a sifting process, initial appraisal and detailed appraisal to a final three options.

- Option 5
- Option 11
- Option 12

The main features of **Option 5** are the retention of the existing roundabout at Haudagain and a new dual carriageway link road proposed to connect North Anderson Drive (the southern arm of the roundabout) with Auchmill Road (the western arm) at the location of existing junction points. The link road would also provide access to the proposed regeneration area at Middlefield. The junctions for the link road would be traffic signal controlled. Pedestrian, cycle and public transport facilities have been developed as part of this option. There is some risk with this improvement that in the longer term journey times may be sensitive to change, particularly on Mugiemoss Road/The Parkway A90(T), which would require monitoring and evaluation in the post appraisal stage. This option is implementable, but would cause some minor disruption during construction.

The main features of **Option 11** are the alteration of the existing roundabout at Haudagain to form a signalised junction, the rail bridge on Mugiemoss would be widened and a realigned dual carriageway constructed on Mugiemoss Road to the Persley Bridge/Mugiemoss roundabout. A new dual carriageway link road is proposed to connect North Anderson Drive (the southern arm of the roundabout) with Auchmill Road (the western arm). This link road would also provide access to the proposed regeneration area at Middlefield. The junctions for this link road would be traffic signal controlled. Pedestrian, cycle and public transport facilities have been developed as part of this option. This option has a relatively low risk that journey time improvements in the long term would be sensitive to change, although this would require monitoring and evaluation in the post appraisal stage. This option is implementable via a phased approach but would cause some disruption during construction.

The main feature of **Option 12** is a larger relocated roundabout at Haudagain. A new rail bridge would be required and Mugiemoss Road realigned and made dual carriageway to the Persley Bridge/Mugiemoss roundabout. Pedestrian, cycle and public transport facilities have been developed as part of this option. There is some risk with this improvement that in the long term journey times could be sensitive to change, particularly on Auchmill Road A96(T) that would require monitoring and evaluation in the post appraisal stage. This option is implementable but would cause considerable disruption during construction.

The Public and Stakeholders consultation held in May 2008 had a range of feedback responses. These included a range of view points from residents of the local area, other residents of Aberdeen and those from outside the city. Stakeholders and other organisation also put forward points of view. Responses were also received from those using a variety of modes of transport via Haudagain. The highest priorities that came forward from the consultation were safety and journey times. There was only a marginal difference in those ‘in favour’ or ‘against’ any particular options.

Through detailed assessment of the study objectives, government objectives, feasibility criteria and public feedback three main options were reviewed in detail. This information can now be used by decision makers to identify the optimum intervention.