Fraserburgh & Peterhead to Aberdeen Strategic Transport Study

Nestrans, Aberdeenshire Council, and Aberdeen City Council

Part 1 Appraisal Report: Appendix

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FRASERBURGH & PETERHEAD TO ABERDEEN STRATEGIC TRANSPORT STUDY: APPENDIX

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FRASERBURGH & PETERHEAD TO ABERDEEN STRATEGIC TRANSPORT STUDY: APPENDIX

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A STAG CRITERIA APPRAISAL

A.1 Option 1

Phased road dualling north of Ellon (A90 and A952), with junction improvements

A diagram of Option 1 is presented in Section 3.2.

A.1.1 Environment

The initial STAG Environment appraisal of Option 1 has considered the environmental implications of dualling single carriageway sections of the primary (A class) and trunk road along the three key routes identified in the option description.

It has been assumed that the road would be widened by constructing a new carriageway generally adjacent to the existing single carriageway road to form a dualled route and that widening may be undertaken asymmetrically in some locations to avoid key constraints, such as designated areas and settlements. Widened or new road bridges would be required over the principal watercourses in the option corridors which are the River Ythan near Ellon (A90 Ellon to Toll of Birness) and the North and South Ugie Water near Mintlaw (A952 Toll of Birness to Fraserburgh). It is also assumed that all construction works for the proposals would be undertaken concurrently. Road dualling would increase capacity of the roads and junctions making them more attractive for road users and it is anticipated that traffic flows would increase as a result of the improvements compared with the situation without dualling.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the three roads and features of the environmental baseline include:

- Settlements and properties adjacent to the road corridors in particular:
  - A90(T) Ellon to Toll of Birness: Ellon
  - A952/A90(T) Toll of Birness to Fraserburgh: Mintlaw, New Leeds, Rathen, and Fraserburgh
  - A90(T) Toll of Birness to Peterhead: Hatton, Boddam and Peterhead
- Key watercourses of the River Ythan and the South and North Ugie Water including some areas of flood risk along their corridors. These watercourses are predominantly of moderate water quality but the Ythan is sensitive to nitrate pollution and has designated areas of nature conservation (as follows) associated with its estuarial waters.
- Prime agricultural land14 which is prevalent throughout each of the road corridors.
- Bullers of Buchan Coast Geological Site of Special Scientific Interest (SSSI15) and Geological Conservation Review (GCR16) site, which is located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam.

[14] *Prime agricultural land is defined by land within agricultural land capability classes 1, 2 and 3.1*
[15] *Sites of Special Scientific Interest (SSSIs) are areas that have been notifies as being of special interest due to their flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act 2004*
[16] *Geological Conservation Review Sites (GCRs) provide a public record of the features of interest and importance at localities already notified or being considered for notification as geological Sites of Special Scientific Interest (SSSIs)*

- The Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA)/Ythan Estuary and Meikle Loch Ramsar Site, which is located at its closest point within 1km of the A90 at Ellon where the route crosses the estuary of the River Ythan.
- The Sands of Forvie and Ythan Estuary Site of Special Scientific Interest (SSSI)[17] which is located at its closest point to the roads within 1.5km of the A90 at Ellon.
- The Buchan Ness to Collieston Coast SPA[18] located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam (and within 2km of the A90 for a 7km long stretch of this road south of Peterhead).
- The Buchan Ness to Collieston Special Area of Conservation (SAC[19]) which lies within 100m to the east of the route of the A90 for a 1.5km long section south of Boddam.
- A number of locally designated nature conservation sites within 1km of the road dualling proposals, in particular between Ellon and Fraserburgh (A952/A90), the Cortes Reedbed Local Nature Conservation Site (LNCS) which is designated for its standing water, reed, and fen habitat and (at the north end of the A90) Fraserburgh Bay LNCS (designated for coastal habitats).
- A Garden and Designed Landscape (GDL[20]) at Crimonmogate approximately 3km east of the A952 between New Leeds and Rathen.
- A Conservation Area[21] at Boddam village (between Toll of Birness and Peterhead on the A90) located within 500m of the trunk road and Conservation Areas at Mintlaw and Fraserburgh are within 2km of the option proposals.

Potential impacts of the proposals on the environment are:

- Increased traffic flows on the dualled roads leading to increased roadside noise and increased exposure to local air pollutants from road vehicle emissions for some receptors and communities depending on the final horizontal and vertical geometry of the road improvements.
- Increased carbon emissions from higher levels of traffic.
- changes to hydrological character and drainage from permanent development of the widened roads and associated structures (particularly large watercourse crossings).
- Permanent loss of habitats and agricultural land from road widening and associated effects on farm units from loss of land and severance/fragmentation of fields.
- Changes in landscape character from permanent change in land cover, loss of vegetation, earthworks and visual intrusion impacts from the widened roads and traffic using them.
- Direct and indirect effects associated with land take from areas with natural heritage designations including sites of European nature conservation (SPAs and SACs), SSSIs, and locally designated sites of importance for biodiversity.

[17] *Much of this area also falls within the designation of the Forvie National Nature Reserve (NNR)*
[18] *Special Protection Areas (SPAs) are strictly protected sites classified for rare and vulnerable bird species (as listed on Annex I of the European Commission's Birds Directive)*
[19] *Special Areas of Conservation (SACs) are protected sites designated under the EC Habitats Directive (92/43/EEC)*
[20] *Gardens and Designed Landscapes (GDLs) of national importance are recorded by Historic Scotland in the Inventory of Designed Landscapes in Scotland*
[21] *Conservation Areas are designated by local authorities to recognise areas of special architectural or historic interest, usually in urban areas*

- Permanent loss of other habitats from construction and development of the proposals and associated impacts on species (including protected species).
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance from permanent development and operation of the widened road.

Where the route passes close to residential areas it is assumed that noise mitigation measures such as false bunds and/or noise fences would be incorporated in the design to reduce traffic noise increases at adjacent receptors. It is also assumed that scheme design would incorporate measures to allow for wildlife permeability of the route (e.g. mammal underpasses), new areas of native woodland planting to mitigate loss of woodland habitats and that the routes would be designed to fit the topography and landscape as far as possible through sensitive design which reflects local landforms. New infrastructure would be screened as far as possible from sensitive visual receptors through design and/or planting proposals.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Use of sustainable drainage systems (SuDS) in the design of new roads to attenuate road run-off flows and aquatic pollutants.
- Sensitive design of new structures for river crossings to avoid in-river works and to reduce effects on riparian habitats and flood plains
- Appropriate landscaping and measures to enhance local biodiversity

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- It is predicted that with mitigation significant traffic noise impacts on properties adjacent to the dualled road would generally be avoided.
- There would be no predicted impacts on existing Candidate Noise Management Areas (CNMAs[22]) designated in Aberdeen City as road traffic flows and compositions north of Ellon are not predicted to change significantly in these city centre areas.
- Construction works for road dualling have the potential for some temporary and short term significant noise impacts on receptors close to the road corridor. With mitigation these are predicted to be limited to short periods.
- Overall impacts on noise are predicted to range from **minor to moderate negative impact**.

[22] *CNMAs are designated in areas within which people are most likely to be annoyed by noise, and are identified in Noise Action Plans prepared by local authorities and Transport Scotland*

Global and Local Air Quality

- Carbon emissions from changes in traffic associated with operation of the upgraded roads would depend on the scale of traffic flow changes and vehicle composition. Overall it is predicted there would be a **minor negative impact** on global air quality from increased traffic using the upgraded roads.
- Increased road traffic on the dualled routes is predicted to have minor, but not significant, increases in roadside concentrations of local air pollutants. There is some potential for reduction in emissions where current congestion is relieved.
- There would be no significant impacts on existing Air Quality Management Areas (AQMAs[23]) in Aberdeen City as road traffic flows and compositions are not predicted to change significantly in these areas.
- Construction works for road dualling have the potential for some temporary significant local air quality impacts on receptors close to the road primarily from dust deposition. Implementation of good construction practices would prevent significant impacts.
- Overall local air pollutant impacts are predicted to be **minor negative impact.**

Water Quality, Drainage, and Flood Defence

- With the adoption of sustainable drainage in road designs it is not predicted that significant impacts on hydrology and drainage would occur from permanent development of the dualled roads.
- Widened or new road bridges over the principal watercourses at the River Ythan and the North and South Ugie Water have the potential for adverse impacts on hydrology and morphology of the watercourses but are not predicted to be significant taking account of mitigation and provided the design took account of local conditions.
- New (or upgraded) river crossing structures would also need to span areas at risk of fluvial flooding adjacent to the watercourses. There is a potential for significant impacts on flooding (or as a result of flooding on the road structures) and this would require more detailed assessment at later design stages. Strategic flood risk assessments may be needed at later design stages to confirm any impacts on flooding.
- Pollutants in run-off from the dualled roads would be attenuated through sustainable drainage systems which would be required to meet requirements of the Scottish Environment Protection Agency (SEPA) and significant impacts on water quality are not predicted from road run-off.
- It is assumed that construction works would follow good site practices to avoid pollution of the water environment and be detailed to take account of areas, such as the River Ugie catchment, which is a drinking water protection area.
- Overall impacts on water quality, drainage and flood defence are predicted to be **minor negative** assuming any significant flooding issues were mitigated.

[23] Under section 83(1) of the Environment Act 1995, Local Authorities have a duty to designate any relevant areas where the air quality objectives are not (or are unlikely to be) being met as Air Quality Management Areas (AQMAs)

Geology, Soils, and Agriculture

- Construction and permanent development of the upgraded roads is not predicted to affect any designated geological sites and no significant impacts on geology are predicted. This would need to be confirmed at later stages of design and assessment when more specific alignment information was available,
- The road upgrading works would affect agriculture through loss of farm land (much of it is prime quality land Class 3.1) and (for link roads, junctions, etc.) from fragmentation of fields with associated potential impacts on farm unit viability. The magnitude of this impact would vary for each land holding crossed and would depend on final alignments and opportunities to mitigate impacts through design such as farm accommodation works,
- Construction works for road dualling and junctions have the potential to permanently affect soils from earthworks, excavations and compression of soils as well as loss of soil resources,
- There is some (minor) potential for construction to affect areas of potentially contaminated land which may be associated with former industrial areas, e.g. at the edges of built up areas and this would require more detailed investigation, assessment and, if appropriate, remediation at later design stages.
- Overall impacts on geology and soils are predicted to be **minor negative** and impacts on agriculture are predicted to be **minor to moderate negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by permanent development of the road widening and related junction works. Widening of the A952 between Mintlaw and Fraserburgh would be located within 3km of the Garden and Designed Landscape (GDL) at Crimonmogate and within 2km of Aden Country Park near Mintlaw however significant landscape and visual impacts on these areas are considered unlikely due to their distance from the road and the potential for successful mitigation to be implemented.
- Some small areas of urban greenspace are located adjacent or close to the route of the A90 on the southern approaches to Fraserburgh and Peterhead. Significant impacts are not predicted on these areas assuming that asymmetrical widening could be adopted to avoid them.
- The option would change landscape character as a result of clearance of vegetation and construction of new infrastructure but this would generally be limited to areas within the vicinity of the existing A90 and A952 road corridors where works are proposed with some significant impacts on local landscape character predicted.
- Road dualling proposals and associated junction improvements, and traffic using these routes, would increase the visual impacts of the road for some existing and currently unaffected sensitive receptors and locations with key views of the development.
- Construction works for road dualling and junction works are predicted to have the potential for significant localised landscape and visual impacts however they would be temporary for the duration of the works and mitigated through adoption of good construction practices.
- Overall impacts on landscape and visual amenity are predicted to be **moderate negative impact,** but reducing to **minor negative impacts** as the mitigation planting for the new works matures**.**

Biodiversity and Habitats

- Mitigation measures would need to be employed to ensure that disturbance works (and impacts such as habitat loss from permanent development of the works) did not adversely affect the conservation objectives of Natura sites within 2km of the road, and measures were taken to avoid affecting the water quality of the Ythan Estuary. Depending on the potential for likely significant effects, Habitats Regulations Appraisal (HRA) would be required.
- The section of A90 between Ellon and Peterhead lies within 100m of the Buchan Ness to Collieston Special Area of Conservation (SAC[24]) which is designated for its vegetated sea cliffs. Mitigation measures, such as asymmetric road widening in this location, would be required to help avoid any likely significant effects on the SAC.
- It is not predicted that permanent development of the road dualling would significantly affect designated nature conservation sites (LNCS) at Cortes Reedbed and Fraserburgh Bay which are located within 1km of the road.
- Habitats such as ancient, semi-natural and native woodland would constrain the widening proposals in some locations and there is potential for significant impacts on woodland habitats and species from the construction and permanent development of the proposals where woodland could not be avoided.
- The proposed road widening and junction works would result in an extensive area of habitat loss and fragmentation which would range from relatively low ecological sensitivity agricultural land to areas of woodland and riparian habitats. The proposals have the potential for significant biodiversity impacts from loss of these habitats and dependent on which species they support. Surveys would be required to determine the specific importance and sensitivity of the affected areas and to inform route strategies and required mitigation.
- The permanent development of the proposals would also potentially affect a range of species as a result of habitat loss/fragmentation and displacement including protected species such as badger, red squirrel, otter and bats. Further protected species surveys would need to be undertaken to inform a more specific appraisal of potential impacts.
- Overall impacts on biodiversity and habitats are predicted to be **moderate negative impact.**

[24] *SACs are protected sites designated under the EC Habitats Directive (92/43/EEC)*

Cultural Heritage

- The permanent development of the widened trunk roads is not predicted to directly impact on any nationally designated archaeological or cultural heritage site.
- There is a small number of Category A Listed Buildings and Scheduled Monuments within 1km of the trunk road alignments and road widening and related junction works could affect the setting of these sites depending on the final design and dualling alignment.
- Significant impacts on the setting of Crimonmogate GDL are not predicted due to distance between the road and the site and opportunities for mitigation.
- A Conservation Area at Boddam village is located within 500m of the trunk road although this site its setting are not predicted to be significantly affected by dualling works as it is separated from the road by an area of urban development limiting views into and out of the historic core of the settlement.
- No significant impacts are predicted on the setting of Conservation Areas at Fraserburgh and Mintlaw located between 1km and 2km of the road alignment
- Construction works for road dualling and junction works are predicted to have the potential to encounter as yet unrealised archaeology and it is assumed that mitigation measures, such as watching briefs and appropriate trial trenching works would be undertaken in key areas, without significant adverse impacts.
- Overall impacts on cultural heritage are predicted to be **minor to moderate negative impact**

Physical Fitness

- The complementary measures to enhance active travel may have slight beneficial impacts on health and physical fitness, however, the road improvement proposals do not offer particular opportunities for active travel and overall the effect on physical fitness is predicted to be **neutral.**

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 1 has been awarded a score of **-2,** and the outcome is expected to bring **Moderate Negative Impact.**

A.1.2 Safety

Accident data from 2009 – 2013 highlights:

- The entire A90(T) route between Aberdeen and Fraserburgh as having a higher proportion of serious accidents than would be expected on a road of similar nature
- Three locations as having a higher proportion of fatal accidents than would be expected on a road of similar nature; to the south of Fraserburgh; to the south of Peterhead; and between Blackdog and the Bridge of Don
- The southern section of the A952 between Mintlaw and the Toll of Birness as having a higher proportion of fatal accidents than would be expected on a road of similar nature
- Four accidents classed as 'serious' within 100m of the Toll of Birness junction

Feedback from the study's engagement programme highlighted perceptions that accidents are caused by; the mix of both strategic and local traffic; slow moving agricultural and heavy goods vehicles; and the number of farm and side road access points onto the A90(T) with a lack of dedicated right hand turn lanes. All of these factors can cause delay to traffic leading to driver frustration and dangerous overtaking manoeuvres. In particular, difficulties at the Toll of Birness for southbound traffic turning right from the A952 onto the A90(T) southbound carriageway were noted.

Phased road dualling with junction improvements, would bring benefits including:

- Reducing delay on the trunk road network and in turn reducing driver frustration at delay
- Reducing driver frustration at a lack of overtaking opportunity
- Providing safe overtaking opportunities
- Reducing accident potential at the Toll of Birness junction both for exiting traffic from the A952 and for traffic on the A90(T) trunk road
- Reducing the accident potential on the A90(T) south of Fraserburgh and south of Peterhead where higher than expected proportions of serious accidents are occurring
- Reducing the economic and social costs of accidents, including: loss of output due to injury; ambulance costs, and costs of hospital treatment; the human cost of casualties including the grief and suffering to the casualty, relatives, and friends; intrinsic loss of enjoyment of life in the case of fatalities; damage to vehicle and property; and police and insurance administration costs

Overall, a reduction in accidents on both the A90(T) and A952(T) routes would reduce unpredictable delays on the road network and:

- Provide efficiency benefits to businesses using the routes, particularly with respect to the key fishing and oil & gas industries in the area for whom the movement of goods is often time critical.
- Provide more predictable and reliable journey times for public transport between the study area and the Aberdeen conurbation, encouraging greater uptake in more sustainable travel modes and reduce the use of the private car

Phased road dualling with junction improvements, could create negative impacts including:

- Increasing speeds on the A90(T) and A952(T) routes leading to a greater severity of accidents
- Dissuading cyclists from using the route due to increased road speeds and reduced feeling of security, however, if dedicated cycle lanes were provided as part of the set of active travel measures alongside the dualling this would provide new cycling opportunities and could entice greater uptake in cycling.
- Creating severance for pedestrians crossing the widened carriageways leading to potentially dangerous pedestrian and vehicle conflicts

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 1 has been awarded a score of **3,** and the outcome is expected to bring **Major Positive Benefit.**

A.1.3 Economy

The Balmedie to Tipperty dualling will bring benefits to the A90(T) trunk road between Aberdeen and Ellon. The dualling proposed in this scheme targets the road routes north of this, where future predicted 2033 journey time data from ASAM predicts future traffic volume and journey time increases.

Phased road dualling with junction improvements, would bring benefits including:

- Improvement in journey times for all user groups including commuters, leisure, and recreation users, bus users, and freight carriers.
- Estimated journey times, with the scheme in place, compared against available 2012 data (observed Tom-Tom journey time data from north of the Bridge of Don and modelled S-Paramics journey time data from Bridge of Don into Aberdeen City centre), and predicted journey time data for 2023 (from the Aberdeen Sub Area Model (ASAM) for north of the Bridge of Don and S-Paramics models from Bridge of Don into Aberdeen City centre) have been compared (see Table A.1 and Table A.2). Comparison of the scheme journey time in 2023 allows for an understanding of the potential benefits when the AWPR is also operational.

  The estimated journey times with the scheme in place assumes a constant traffic speed of 70mph on the new dualled roads and junction improvements such that traffic flow is unimpeded, however, it is appreciated that HGVs, whose top speed on a dual carriageway is 60mph, would not be able to achieve this 70mph assumed speed. Traffic data for 2012 and 2023 is not split by vehicle type and, as such, no comparison has been possible for light and heavy vehicles separately. The analysis does, however, give at least an indication of the potential journey time savings if the dualling were in place, and shows:

Northbound:

- For the full route between Aberdeen and Peterhead:
  - Journey time savings of over 10min in the AM and over 3mins in the PM period compared to the existing (2012) journey times
  - Journey time savings of 5min in the AM period, and 8 minutes in the PM period when compared to the predicted 2023 journey times
- For the full route between Aberdeen and Fraserburgh:
  - Journey time savings of over 15min in the AM and over 6min in the PM period compared to the existing (2012) journey times
  - Journey time savings of 6 minutes in the AM period, and 10 and a half minutes in the PM period when compared to the predicted 2023 journey times
- Between Ellon and the Toll of Birness:
  - Journey time savings of over 1min compared to the existing (2012) journey time in both the AM and PM periods
  - Journey time savings of 1 and a half minutes in the AM period, and 3 and a half minutes in the PM period when compared to the predicted 2023 journey times
- Between Toll of Birness and Peterhead:
  - Journey time savings of over 4min compared to the existing (2012) journey time in both the AM and PM periods
  - Journey time savings of 3 and a half minutes in the AM period, and 4min in the PM period when compared to the predicted 2023 journey times
- Between Toll of Birness and Fraserburgh:
  - Journey time savings of over 9min in the AM period and over 7min in the PM period compared to the existing (2012) journey times
  - Journey time savings of over 4min in the AM period, and 7min in the PM period when compared to the predicted 2023 journey times

Southbound:

- For the full route between Peterhead and Aberdeen:
  - Journey time savings of over 9min in the AM and 17min in the PM period compared to the existing (2012) journey times
  - Journey time savings of 7min in the AM period, and 5min in the PM period when compared to the predicted 2023 journey times
- For the full route between Fraserburgh and Aberdeen
  - Journey time savings of over 14min in the AM and over 22min in the PM period compared to the existing (2012) journey times
  - Journey time savings of over 8min in the AM period, and over 6min in the PM period when compared to the predicted 2023 journey times
- Between Fraserburgh and the Toll of Birness:
  - Journey time savings of over 8min compared to the existing (2012) journey time in both the AM and PM periods
  - Journey time savings of 5 and a half minutes in the AM period, and 4 and a half minutes in the PM period when compared to the predicted 2023 journey times
- Between Peterhead and the Toll of Birness:
  - Journey time savings of over 4min in the AM period and 3min 30s in the PM period compared to the existing (2012) journey times and to the predicted 2023 journey times
- Between Toll of Birness and Ellon:
  - Journey time savings of 1 and a half minutes in the AM period and 1min in the PM period when compared to the existing (2012) journey times
  - Journey time savings of 2 and a half minutes in the AM period, and 1 and a half minutes in the PM period when compared to the predicted 2023 journey times

- Journey time savings are particularly important for the business community located within the study area who noted the time critical nature of many of the products transported. For example, the fishing industry noted that its produce is more dependent upon how quickly it can be transported to its destination as it will be fresher and available on supermarket shelves for a longer period. The Oil and Gas industry and, in particular, its supply chain also operate on a time critical basis, where vessels only have limited time at berth in the harbours. 'Slack' must be built into freight movements, leading to inefficiencies and higher costs. Oil & gas related goods shipped through Peterhead to offshore installations tend to be supplied from industrial estates on the west and south of Aberdeen. Information gained through engagement suggests a typical articulated goods vehicle costs £30 an hour and quayside personnel around £350 an hour, highlighting the not insignificant cost of delays and late arrival at the quayside. Improving the reliability of travel would clearly benefit businesses, helping to reduce costly economic inefficiencies and limit product value depreciation.
- Improvements to road capacity which is currently constrained between Ellon and the Toll of Birness, allowing more efficient flow and hence, improved reliability for all modes.

- Journey time reliability will be significantly improved by providing additional vehicle lanes, allowing faster traffic to pass slower moving agricultural and freight vehicles. Evidence shows that freight vehicles can account for up to 17% of all vehicles on certain sections of the A90 (T). The impact of slow, unreliable and unpredictable journey times was identified by 95% of respondents to the study's Public Survey as impacting on their everyday activities with nearly 90% of respondents saying they started journeys earlier or later to avoid delay, and nearly 60% citing road delay in making them late for work or education purposes.
- As journey times and reliability are improved, the area would become more attractive to businesses considering investment. Option 1 will help to both attract new businesses and retain existing businesses, ensuring both job creation and retention. Consultation with the business community revealed its clear preference, in terms of transport improvements, would be the dualling of the A90 (T).
- Associated with the above point, is the location of the Energetica corridor within the study area. Through discussions, the Energetica development team explained that improved transport connections and infrastructure are critically important in attracting investment to the area. The Energetica team believes that infrastructure needs to be provided first if the attractiveness of the area is to be maximised.
- Transport infrastructure can also play a key role in regeneration. An improved road network through dualling, resulting in both improved journey times and journey time reliability, can act as a catalyst for economic regeneration as the area becomes a more attractive place to live, work and invest.
- Improvements to the route through this option enhance access to employment opportunities. This encourages more people to enter the workforce and a better matching of skills with employers' needs as commuting costs decline[25].
- This option supports residential and industrial development identified in development plans, particularly at Ellon, Peterhead, Mintlaw, and Fraserburgh. It could also encourage further development in the area.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 1 has been awarded a score of **3** and the outcome is expected to bring **Major Positive Impact.**

[25] *Commuting costs are measured here as a combination of time and travel costs*

Table A.1 : Option 1 Estimated Journey time savings Northbound

Northbound			**AM**	**PM**
Aberdeen City Centre to A90(T)/ Parkway	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:12:00	00:25:30
		2023 (Future)[3]	00:11:30	00:30:00
		2023 (Future) with Option[1]	00:11:30	00:30:00
	Difference with scheme[1]	**Compared to 2012**	**-00:00:30**	**00:04:30**
		Compared to 2023	**00:00:00**	**00:00:00**
A90(T)/ Parkway to Ellon	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:16:30	00:17:30
		2023 (Future)[3]	00:12:30	00:15:00
		2023 (Future) with Option[1]	00:12:30	00:15:00
	Difference with scheme[1]	**Compared to 2012**	**-00:04:00**	**-00:02:30**
		Compared to 2023	**00:00:00**	**00:00:00**
Ellon to Toll of Birness	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:04:00	00:03:30
		2023 (Future)[3]	00:04:00	00:06:00
		2023 (Future) with Option[1]	00:02:30	00:02:30
	Difference with scheme[1]	**Compared to 2012**	**-00:01:30**	**-00:01:00**
		Compared to 2023	**-00:01:30**	**-00:03:30**
Toll of Birness to Peterhead	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:14:00	00:13:30
		2023 (Future)[3]	00:13:00	00:13:30
		2023 (Future) with Option[1]	00:09:30	00:09:30
	Difference with scheme[1]	**Compared to 2012**	**-00:04:30**	**-00:04:00**
		Compared to 2023	**-00:03:30**	**-00:04:00**
Toll of Birness to Fraserburgh	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:27:00	00:25:00
		2023 (Future)[3]	00:21:30	00:24:30
		2023 (Future) with Option[1]	00:17:30	00:17:30
	Difference with scheme[1]	**Compared to 2012**	**-00:09:30**	**-00:07:30**
		Compared to 2023	**-00:04:30**	**-00:07:00**
Full routes				
Aberdeen to Peterhead	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:46:00	01:00:30
		2023 (Future)[3]	00:41:00	01:05:00
		2023 (Future) with Option[1]	00:35:30	00:57:00
	Difference with scheme[1]	**Compared to 2012**	**-00:10:30**	**-00:03:30**
		Compared to 2023	**-00:05:00**	**-00:08:00**
Aberdeen to Fraserburgh	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:59:00	01:12:00
		2023 (Future)[3]	00:49:30	01:16:00
		2023 (Future) with Option[1]	00:43:30	01:05:00
	Difference with scheme[1]	**Compared to 2012**	**-00:15:30**	**-00:06:30**
		Compared to 2023	**-00:06:00**	**-00:10:30**

[1] Assuming 70mph speed limit on dual carriageway & junction improvements which reduce the need to slow down at junction. [2] Average travel time by car for 2012 based on observed Tom-Tom data from north of Bridge of Don and modelled 2012 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models. [3] Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from north of Bridge of Don, and modelled 2023 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models

Table A.2 : Option 1 Estimated Journey time savings Southbound

Southbound			AM	PM
Fraserburgh to Toll of Birness	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:26:00	00:26:00
		2023 (Future)[3]	00:23:00	00:22:00
		2023 (Future) with Option[1]	00:17:30	00:17:30
	Difference with scheme[1]	**Compared to 2012**	**-00:08:30**	**-00:08:30**
		Compared to 2023	**-00:05:30**	**-00:04:30**
Peterhead to Toll of Birness	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:13:30	00:13:00
		2023 (Future)[3]	00:13:30	00:13:00
		2023 (Future) with Option[1]	00:09:30	00:09:30
	Difference with scheme[1]	**Compared to 2012**	**-00:04:00**	**-00:03:30**
		Compared to 2023	**-00:04:00**	**-00:03:30**
Toll of Birness to Ellon	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:04:00	00:03:30
		2023 (Future)[3]	00:05:30	00:04:00
		2023 (Future) with Option[1]	00:02:30	00:02:30
	Difference with scheme[1]	**Compared to 2012**	**-00:01:30**	**-00:01:00**
		Compared to 2023	**-00:02:30**	**-00:01:30**
Ellon to A90(T)/ Parkway	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:19:30	00:15:30
		2023 (Future)[3]	00:18:30	00:13:30
		2023 (Future) with Option[1]	00:18:30	00:13:30
	Difference with scheme[1]	**Compared to 2012**	**-00:01:00**	**-00:02:00**
		Compared to 2023	**00:00:00**	**00:00:00**
A90(T)/ Parkway to Aberdeen City Centre	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:16:30	00:22:00
		2023 (Future)[3]	00:13:00	00:11:30
		2023 (Future) with Option[1]	00:13:00	00:11:30
	Difference with scheme[1]	**Compared to 2012**	**-00:03:30**	**-00:10:30**
		Compared to 2023	**00:00:00**	**00:00:00**
Full route				
Peterhead to Aberdeen	Average Journey Time (mm:ss)	2012 (Existing)[2]	00:53:30	00:54:00
		2023 (Future)[3]	00:50:30	00:42:00
		2023 (Future) with Option[1]	00:43:30	00:37:00
	Difference with scheme[1]	**Compared to 2012**	**-00:09:30**	**-00:17:00**
		Compared to 2023	**-00:07:00**	**-00:05:00**
Fraserburgh to Aberdeen	Average Journey Time (mm:ss)	2012 (Existing)[2]	01:06:00	01:07:30
		2023 (Future)[3]	01:00:00	00:51:30
		2023 (Future) with Option[1]	00:51:30	00:45:00
	Difference with scheme[1]	**Compared to 2012**	**-00:14:00**	**-00:22:30**
		Compared to 2023	**-00:08:30**	**-00:06:00**

[1] Assuming 70mph speed limit on dual carriageway & junction improvements which reduce the need to slow down at junction. [2] Average travel time by car for 2012 based on observed Tom-Tom data from north of Bridge of Don and modelled 2012 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models. [3] Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from north of Bridge of Don, and modelled 2023 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models

A.1.4 Integration

Transport Integration

Option 1 essentially provides phased developments of dual carriageway on the A90(T) and A952. Considered in isolation, there will be no direct benefits in terms of transport integration as limited integration between modes would be achieved given the likely use of the car for whole trip journeys.

In considering the package of high level active travel measures, while they will be integrated as part of planned developments, they will not directly support or complement the dualling option, however, the infrastructure improvements could include a segregated walk/cycle way along the extent of the A90(T) and A952 routes as part of the route design.

Transport and Land Use Integration

A full review of transport and land use policies has been undertaken and can be found within the Baseline Report. Transport and Land Use issues which are of relevance to Option 1 are summarised as follows:

- **Aberdeen City and Shire Strategic Development Plan** contains four strategic growth areas. A broad corridor around the A90(T) from Blackdog to Peterhead is one of these strategic growth areas. The Strategic Development Plan proposes 6,000 housing units and 88 hectares of employment land within this strategic growth area including a large housing allocation at Peterhead. Option 1 will support these developments. The Strategic Development Plan also classes Fraserburgh and Peterhead, and the coastal region between them as a priority area for regeneration. Dual carriageway routes between Peterhead, Fraserburgh, and Aberdeen will clearly provide economic benefits and make the area more attractive to investment, thus supporting the Strategic Development Plan regeneration priority.
- The **Aberdeenshire Local Development Plan**, outwith the strategic growth area between Blackdog and Peterhead, includes large allocations for housing in Mintlaw and Fraserburgh which will put additional pressure on the strategic road network, in particular the A90(T) and A952. Option 1 will provide additional capacity and support this planned growth through the introduction of dual carriageway on the A952 and A90(T), the key links between the sites and the regional centre at Aberdeen.
- Aberdeen City & Shire Economic Future's **Energetica** funded by Aberdeen City, Aberdeenshire Council and Scottish Enterprise aims to create a low carbon sustainable development corridor that will attract energy organisations and individuals to the area and strengthen the regions position as a global energy hub. The project aims to attract high value investment and people to the region and includes development of residential, leisure, and business parks across the Energetica area which stretches from Bridge of Don to Peterhead (and includes Ellon).

Through discussions, the Energetica project team have made it clear that in order to attract and retain businesses, transport infrastructure has to be improved. Through engagement, businesses noted that providing dual carriageway would be of critical importance to the economy of the region.

Policy Integration

A full review of the relevant overarching policy documents has been undertaken and can be found within the study's Baseline Report. The policies which are of relevance to Option 1 are summarised as follows:

- Scotland's National Transport Strategy focuses on three key outcomes:
  - Improved journey times and connections
  - Reduced emissions
  - Improved quality, accessibility, and affordability of public transport.

    Considering this, providing dual carriageway on the A90(T) and A952 will significantly improve journey times and connections across the study area. Speeds significantly below posted speed limits and unreliable journey times caused in part by slow freight and agricultural vehicles travelling on single carriageway routes are a key issue on these strategic routes. Provision of dual carriageway will improve capacity and provide overtaking options, improving journey times for all users including public transport users.
- 'Online Trunk Road improvements on the A90(T) north of Aberdeen' was one of 136 interventions examined during the **Strategic Transport Projects Review** Review's Initial Appraisal stage. The justification for the intervention was on safety grounds (and the fatal accident rate between Aberdeen and Fraserburgh being significantly higher than the national rate was noted). The intervention was retained in the final Summary of Draft Interventions, as part of Intervention 5 "Route Management on other Road Corridors", which covers "a series of initiatives to implement road-based improvements with a combination of network optimisation through route management and targeted investment in relatively local interventions". This option to provide dual carriageway on the A90(T) will improve safety by providing safe overtaking opportunity and reducing driver frustration, which was highlighted by Police Scotland to be an important factor behind the large number of accidents on the route.
- **Nestrans Regional Transport Strategy** presents a series of key transport proposals. Of relevance to Option 1 is the commitment to improve the A90(T) between Ellon and Peterhead in terms of capacity and journey time improvements. Proposals to provide dual carriageway support this RTS proposal.
- The **Scottish Government's Infrastructure Investment Plan** sets out plans for infrastructure investment. A key target is to have transport networks well maintained with capacity optimised and a clear investment plan for improvements. Balmedie to Tipperty dualling on the A90(T) is included within the infrastructure investment plan. Option 1 of this study will build on this improvement by furthering dual carriageway on the route.

- **Nestrans Regional Transport Strategy** sets out four key objectives, two of which are directly relevant to this proposal:
  - Economy
  - Accessibility, Safety, and social inclusion

    Provision of dual carriageway will provide faster and more reliable journey times for all road users including commuters, and importantly for freight. Improvements to journey times will be a key support to the local, regional and national economy given the importance of the oil and gas sector. Improvements to journey times will also be felt by public transport users resulting in improved accessibility. Safety will also be improved through the introduction of dual carriageway providing safe overtaking opportunity.
- **Aberdeenshire's Local Transport Strategy** sets out five key objectives, all of which are directly relevant to this proposal:
  - Promote sustainable economic growth
  - Promote Social Inclusion and Accessibility
  - Protect the Environment
  - Improve safety
  - Improve integration

    Economy, accessibility and safety benefits were noted in the previous paragraph in relation to the Regional Transport Strategy. There may also be environmental impacts due to more efficient driving conditions, but any environmental benefits could be negated by increased numbers of vehicles on the network.
- **Aberdeen City's Local Transport Strategy** does not cover Option 1 in terms of geography, as all dualling will be outwith the Aberdeen City boundary, however, a key objective of the study is increased modal share for public transport and active travel. Option 1 will significantly improve journey times and journey time reliability which will be felt by all modes including public transport. This could encourage modal shift to public transport which will then reduce the numbers of people driving into Aberdeen supporting the objectives of the Aberdeen Local Transport Strategy for *increased modal share for public transport; reducing the need to travel and dependence on the private car; and improved air quality.*
- The **Scottish Governments Economic Strategy** contains a priority to promote inclusive growth and create opportunity through a fair and inclusive jobs market and regional cohesion. Option 1 will support this priority by providing infrastructure which is a catalyst for growth ensuring transport connections are in place to provide both improved business operating conditions and efficiency benefits as well as providing people with increased accessibility to a wider jobs market.

- The **Aberdeenshire Economic Development Strategy** notes key transport priorities which include:
  - Delivering an integrated and efficient transport system

    Option 1 will help improve the efficiency of the transport network by providing faster and more reliable journeys.
- The **Aberdeen City and Shire Tourism Strategy** notes a key priority is to improve road infrastructure. Clearly, upgrading the A90 (T) and A952 to dual carriageways supports this policy.

Summary

Given the three sub-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.3.

Table A.3 : Option 1 Integration sub-criteria scores

Option 1: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	0	Unlikely to provide any impacts in terms of transport integration
Transport and Land-use Integration	2	Moderate positive benefit relating to directly supporting development north of Aberdeen and providing support to business community.
Policy Integration	2	Moderate positive benefit in terms of improving journey times and creating an efficient transport network. Supports national, regional and local policies
Overall	**2**	**Moderate benefit likely to be realised through general consistency with policy documents. Impact on transport integration is expected to be neutral.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 1 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.1.5 Accessibility and Social Inclusion

One of the key benefits of the phased dualling of the A90(T) and A952 between Ellon, Peterhead, and Fraserburgh with junction improvements would be improved journey times on the routes. The following benefits and impacts are noted in terms of community and comparative accessibility:

Community Accessibility:

Public Transport Network Coverage

- While the option does not include any direct improvements to public transport network coverage, reduced journey times, and reduced journey time unreliability and unpredictability on the A90(T) and A952 routes would benefit bus services operating on the 'Buchan Link' routes between Aberdeen, Ellon, Peterhead, and Fraserburgh with:
  - More reliable and quicker bus journey times widening the range of destinations accessible for people's considered maximum travel time (e.g. for commuting purposes)
  - Potential reductions to the bus vehicle stock required to service routes at their current frequency, which could enable vehicles to be 'freed-up' to increase frequency of service and as such provide increased accessibility by public transport in the study area.

Access to Local Services

- The option is unlikely to provide any increase in access to local services by walking and cycling.

Comparative Accessibility:

Distribution of Impacts by People Group

The potential increased accessibility by bus brought about through reduced journey times, as discussed, would positively impact:

- Those in the towns without access to a car. Car ownership in Fraserburgh and Peterhead is lower than the regional average.
- Young people and the elderly for whom driving is not an option
- Those currently unemployed, for whom employment opportunities may be enhanced. Within the study area unemployment is notably higher in the northern sections including Peterhead and Fraserburgh compared to the areas closer to Aberdeen and the recently announced job losses in Fraserburgh will potentially place an even greater reliance on the need to travel further for work by those affected.

Distribution of Impacts by Location

Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan and pockets of deprivation are noted in both towns in the Scottish Index of Multiple Deprivation.

- The dualling is likely to have a more positive benefit to those within the study area who live furthest away from Aberdeen, and north of Ellon where the dualling will begin. The benefit will increase the further the distance away from Aberdeen due to the increased length of the dualled road section utilised.
- The business community in Ellon, Peterhead, and Fraserburgh as well as in smaller villages within the study area will benefit from a potential widening of the labour catchment market due to reduced journey times and the ability of the workforce to commute a further distance in the same time.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 1 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.1.6 Option 1 Summary

Table A.4 shows the scores awarded for the appraisal of Option 1 against the STAG criteria.

Table A.4 : Option 1 STAG Criteria Appraisal Scores

Option 1: Phased road dualling north of Ellon (A90 and A952), with junction improvements					
	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-2	3	3	2	1

A.2 Option 2

Overtaking lanes and junction improvements on the A90(T) and A952(T)

A diagram of Option is presented in Section 3.3

A.2.1 Environment

The initial STAG Environment appraisal of Option 2 has considered the environmental implications of the proposals to upgrade some sections of the single carriageway road along the two key routes identified in the option description.

It has been assumed that the road would be widened by constructing sections of new overtaking lanes adjacent to the existing single carriageway road to form a widened route and that widening would be undertaken to avoid key constraints such as designated areas and settlements. It is assumed that works for widening would not be undertaken in locations where significant upgrades or new structures such as bridges over larger watercourses would be required. It is also assumed that construction works for the proposals would be undertaken concurrently. Road improvements would slightly increase capacity of the roads and junctions making them more attractive for road users and it is anticipated that there could be some traffic flow increases as a result of the improvements compared with the situation without new works. It is assumed that the works at Toll of Birness and Cortes Junctions would be planned to take account of any local environmental constraints (for example the LNCS at Cortes Reedbed) and to avoid or mitigate impacts on these if required.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the two routes and features of the environmental baseline include:

- Settlements and properties adjacent to the road corridors in particular:
  - A952/A90 Toll of Birness to Fraserburgh: Mintlaw, New Leeds, Rathen, and Fraserburgh
  - A90 Ellon to Peterhead: Ellon, Hatton, Boddam and Peterhead
- Key watercourses of the River Ythan and the South and North Ugie Water including some areas of flood risk along their corridors. These watercourses are predominantly of moderate water quality but the Ythan is sensitive to nitrate pollution and has designated areas of nature conservation (as follows) associated with its estuarial waters.
- Prime agricultural land which is prevalent throughout the road corridors.
- Bullers of Buchan Coast Geological Site of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) site which is located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam.
- The Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA)/Ythan Estuary and Meikle Loch Ramsar Site, which is located at its closest point to the roads within 1km of the A90 at Ellon where the route crosses the estuary of the River Ythan.
- The Sands of Forvie and Ythan Estuary Site of Special Scientific Interest (SSSI) which is located at its closest point to the roads within 1.5km of the A90 at Ellon.

- The Buchan Ness to Collieston Coast SPA (and Bullers of Buchan Coast SSSI) located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam (and within 2km of the A90 for a 7km long stretch of this road south of Peterhead).
- The Buchan Ness to Collieston Special Area of Conservation (SAC) which lies within 100m to the east of the route of the A90 for a 1.5km long section south of Boddam.
- Locally designated nature conservation sites within 1km of the road corridor, in particular between Ellon and Fraserburgh (A952/A90), the Cortes Reedbed Local Nature Conservation Site (LNCS) which is designated for its standing water, reed and fen habitat and (at the north end of the A90) Fraserburgh Bay LNCS (designated for coastal habitats).
- A Garden and Designed Landscape (GDL) at Crimonmogate approximately 3km east of the A952 between New Leeds and Rathen.
- A Conservation Area at Boddam village (between Toll of Birness and Peterhead on the A90) is located within 500m of the trunk road and Conservation Areas at Mintlaw and Fraserburgh are within 2km of the option proposals.

Potential impacts of the proposals on the environment are:

- Potential to slightly increase traffic flows on the improved roads leading to increases in roadside noise and increased exposure to local air pollutants from road vehicle emissions for some receptors and communities depending on the final horizontal and vertical geometry of the road improvements
- Increased carbon emissions from higher levels of traffic
- Changes to hydrological character and drainage from permanent development of the widened road sections and from junction works
- Permanent loss of habitats and agricultural land from road upgrades and associated effects on farm units from loss of land and severance/fragmentation of fields
- Changes in landscape character from permanent change in land cover, loss of vegetation, earthworks and visual intrusion impacts from the widened roads and traffic using them
- Direct and indirect effects associated with land take from areas with natural heritage designations including sites of European nature conservation (SPAs and SACs), SSSIs, and locally designated sites of importance for biodiversity
- Permanent loss of other habitats from construction and development of the proposals and associated impacts on species (including protected species)
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance from permanent development and operation of the widened road

Where the route passes close to residential areas it is assumed that noise mitigation measures, such as false bunds and/or noise fences, would be incorporated in the design to reduce traffic noise increases for adjacent receptors. It is also assumed that scheme design would incorporate measures to allow for wildlife permeability of the route (e.g. mammal underpasses), new areas of native woodland planting to mitigate loss of woodland habitats and that the routes would be designed to fit the topography and landscape as far as possible through sensitive design which reflects local landforms. New infrastructure would be screened as far as possible from sensitive visual receptors through design and/or planting proposals.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Use of sustainable drainage systems (SuDS) in the design of new roads to attenuate road run-off flows and aquatic pollutants
- Appropriate landscaping and measures to enhance local biodiversity

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- It is predicted that with mitigation significant traffic noise impacts on properties adjacent to the improved roads would generally be avoided.
- There would be no predicted impacts on existing Candidate Noise Management Areas (CNMAs) designated in Aberdeen City as road traffic flows and compositions north of Ellon are not predicted to change significantly in these city centre areas.
- Construction works for road improvements have the potential for some temporary and short term significant noise impacts on receptors close to the road corridor. With mitigation these are predicted to be limited to short periods.
- Overall noise impacts are predicted to be **minor negative impact**

Global and Local Air Quality

- Carbon emissions from changes in traffic associated with operation of the upgraded roads would depend upon the scale of traffic flow changes and vehicle composition. Overall it is predicted there would be a **neutral to minor negative impact** on global air quality.
- Increased road traffic on the improved routes is predicted to have minor but not significant increases in roadside concentrations of local air pollutants. There is some potential for minor benefits from reductions in congestion.
- There would be no significant impacts on existing Air Quality Management Areas (AQMAs) in Aberdeen City as road traffic flows and compositions are not predicted to change significantly in these areas.
- Construction works for road improvements have the potential for some temporary significant local air quality impacts on receptors close to the road works primarily from dust deposition. Implementation of good construction practices would prevent significant impacts.

- Overall local air pollutant impacts are predicted to range from **neutral to minor negative impact.**

Water Quality, Drainage, and Flood Defence

- Permanent development of the widened roads and junctions has the potential to locally change hydrological character and drainage however with the adoption of sustainable drainage in road designs it is not predicted that significant impacts would occur.
- It is assumed that overtaking lanes and junction improvements would not be undertaken in the vicinity of significant watercourse crossings and would generally avoid locations where there is significant risk of flooding. Strategic flood risk assessments may be needed at later design stages to confirm any effects on flooding.
- Pollutants in run-off from the widened sections of the roads would be attenuated through sustainable drainage systems which would be required to meet requirements of the Scottish Environment Protection Agency (SEPA) and significant impacts on water quality from road run-off are not predicted.
- It is assumed that construction works would follow good site practices to avoid pollution of the water environment and be detailed to take account of areas such as the River Ugie catchment which is a drinking water protection area.
- Overall effects on water quality, drainage and flood defence are predicted to be **minor negative impact.**

Geology, Soils, and Agriculture

- Construction and permanent development of the overtaking lanes is not predicted to affect any sensitive or designated geological sites and no significant impacts on geology are predicted. This would need to be confirmed at later stages of design and assessment when more specific alignment information was available.
- There is some potential for construction to affect areas of potentially contaminated land associated with former industrial areas near towns and this would require more detailed investigation, assessment and if appropriate remediation at later design stages.
- The road improvement works are predicted to affect agriculture through minor loss of farm land (much of it prime quality land Class 3.1) with associated potential impacts on farm units. The magnitude of this effect would vary for each land holding crossed and would depend on final alignments and opportunities to mitigate impacts through design such as farm accommodation works.
- Construction works for overtaking lanes are not predicted to significantly affect geological resources and soils.
- Overall impacts on geology, soils are predicted to be **minor negative** and impacts on agriculture are predicted to be **minor to moderate negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by permanent development of the new lanes and related junction works. Widening of the A952 between Mintlaw and Fraserburgh would be located within 3km of a Garden and Designed Landscape (GDL) at Crimonmogate and within 2km of Aden Country Park near Mintlaw however significant landscape and visual impacts on these areas are considered unlikely due to their distance from the road and potential for successful mitigation by design and implementation of new planting.
- The option is not predicted to significantly affect areas of greenspace (which are limited to the southern edges of Peterhead and Fraserburgh).
- The option would change landscape character as a result of clearance of vegetation and construction of new infrastructure but this would generally be limited to areas within the vicinity of the existing A90 and A952 road corridors where works are proposed with some significant impacts on local landscape character predicted.
- Road widening proposals and associated junction improvements, and traffic using these routes, would increase the visual impacts of the road for some existing and currently unaffected sensitive receptors and locations with key views of the development.
- Construction works for new lanes and junction works are predicted to have the potential for significant localised landscape and visual impacts however they would be temporary for the duration of the works and mitigated through adoption of good construction practice.
- Overall impacts on landscape and visual amenity are predicted to range from **minor to moderate negative impact.**

Biodiversity and Habitats

- Mitigation measures would need to be employed to ensure that disturbance works (and impacts such as habitat loss from permanent development of the works) did not adversely affect the conservation objectives of Natura sites within 2km of the road, and measures were taken to avoid affecting the water quality of the Ythan Estuary. Depending on the potential for likely significant effects, Habitats Regulations Appraisal (HRA) would be required.
- The section of A90 between Ellon and Peterhead lies within 100m of the Buchan Ness to Collieston Special Area of Conservation (SAC) which is designated for its vegetated sea cliffs. Mitigation measures such as asymmetric road improvements in this location would be required to help avoid any likely significant effects on the SAC.
- It is not predicted that permanent development of the road works would significantly affect designated nature conservation sites (LNCS) at Cortes Reedbed and Fraserburgh Bay which are located within 1km of the road.
- Habitats such as ancient, semi-natural and native woodland would constrain the road upgrade proposals in some locations and there is potential for significant impacts on woodland habitats and species from the construction and permanent development of the proposals where woodland could not be avoided.
- The proposed road works would result in some habitat loss and fragmentation which would range from relatively low ecological sensitivity agricultural land to areas of woodland and riparian habitats. The proposals have the potential for some significant biodiversity impacts from loss of these habitats and dependent on which species they support. Surveys would be required to determine the specific importance and sensitivity of the affected areas and to inform route strategies and required mitigation.
- The permanent development of the proposals would also potentially affect a range of species as a result of habitat loss/fragmentation and displacement including protected species such as badger, red squirrel, otter, and bats. Further protected species surveys would need to be undertaken to inform a more specific appraisal of potential impacts.
- Overall impacts on biodiversity and habitats are predicted to be a **minor to moderate negative impact.**

Cultural Heritage

- The permanent development of the upgraded trunk roads is not predicted to directly impact on any nationally designated archaeological or cultural heritage site
- There is a small number of Category A Listed Buildings and Scheduled Monuments within 1km of the trunk road alignments and road upgrading and related junction works could affect the setting of these sites depending on the final design and location of infrastructure
- Addition of overtaking lanes on the A952 between Mintlaw and Fraserburgh may be located within 3km of a Garden and Designed Landscape (GDL) at Crimonmogate however significant impacts on the setting of this site is considered unlikely
- A Conservation Area at Boddam village is located within 500m of the trunk road although the site and its setting is not predicted to be significantly affected by any upgrading works as it is separated from the road by an area of urban development limiting views into and out of the historic core of the settlement
- No significant impacts on are predicted on the setting of Conservation Areas at Fraserburgh and Mintlaw located between 1km and 2km of the road alignment
- Construction works for overtaking lanes and junction works are predicted to have the potential to encounter as yet unrealised archaeology and it is assumed that mitigation measures such as watching briefs and appropriate trial trenching works would be undertaken in key areas, without significant adverse impacts
- Overall impacts on cultural heritage are predicted to be **minor negative impact**

Physical Fitness

- The complementary measures to enhance active travel may have slight beneficial impacts on health and physical fitness however the road improvement proposals do not offer particular opportunities for active travel and overall the effect on physical fitness is predicted to be **neutral**

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 2 has been awarded a score of **-1,** and the outcome is expected to bring **Minor Negative Impact.**

A.2.2 Safety

The option will bring safety benefits as per Option 1, but to a lesser extent as overtaking opportunities will not be prevalent along the full length of the route, but with overtaking lanes (such as WS2+ 1) located at appropriate intervals. Some level of driver frustration will therefore still be prevalent on remaining single lane carriageway sections.

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 2 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.2.3 Economy

The Balmedie to Tipperty dualling will bring benefits to the A90(T) trunk road between Aberdeen and Ellon. The measures proposed in this option target the road routes north of this, where future predicted 2023 journey time data from ASAM predicts future traffic volume and journey time increases.

The option will bring economic benefits as per Option 1, but to a lesser extent as overtaking opportunities will not be prevalent along the full length of the route but with overtaking lanes (such as WS2+ 1) located at appropriate intervals.

Similarly to Option 1, estimated journey times, with the over-taking lanes in place, have been calculated and compared against available journey time data from 2012, and predicted journey time data for 2023 from the Aberdeen Sub Area Model (ASAM) and future 2023 S-Paramics models for Aberdeen City (see Table A.5 and Table A.6).

The estimated journey times with the over-taking lanes in place assumes a constant traffic speed of 70 mph on the new over-taking lane sections, reverting to the average observed speed outwith the overtaking sections. Twelve overtaking lanes, of 1km length have been assumed (three sections in each direction between Toll of Birness and Peterhead, one section in each direction between Toll of Birness and Mintlaw, and between Mintlaw and Cortes junctions, and one in each direction between Cortes junction and Fraserburgh).

It is appreciated that HGVs, with a top speed on a dual carriageway of 60mph would not be able to achieve this 70 mph assumed speed. Traffic data for 2012 and 2023 is not split by vehicle type and as such no comparison has been possible for light and heavy vehicles separately.

The analysis does, however, give at least an indication of the potential journey time savings if the over-taking lanes were in place, and shows:

- Journey time savings of around 30s between Peterhead and the Toll of Birness (both northbound and southbound) when compared to the 2023traffic times
- Journey time savings of around 30s between Fraserburgh and the Toll of Birness (both northbound and southbound) when compared to the 2023 traffic times

It should be noted that this analysis does not take account of any downstream journey time benefit for vehicles that will have overtaken slower moving vehicles on the over-taking lane sections, and are subsequently not delayed further by this slower moving traffic.

While journey times and journey reliability will improve compared to the current case, it will not however improve to the extent of Option 1. Enhancements to the road network at key locations will be particularly welcomed by the business community, however, businesses noted that full dualling would be the most preferable and beneficial option. There would still be journey time delay and driver frustration on the remaining single lane carriageway sections.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 2 has been awarded a score of **2** and the outcome is expected to bring **Moderate Positive Impact.**

Table A.5 : Option 2 Estimated Journey time savings Northbound

Northbound			AM	PM
Aberdeen to Toll of Birness	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:32:30	00:47:00
		2012 (Existing) with Option 2[1,2,3]	00:32:30	00:47:00
		2023 (Future)[5]	00:28:00	00:51:30
		2023 (Future) with Option 2[1,2,3]	00:28:00	00:51:30
	Difference with scheme[1,2,3]	**Compared to 2012**	**00:00:00**	**00:00:00**
		Compared to 2023	**00:00:00**	**00:00:00**
Toll of Birness to Peterhead	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:14:00	00:13:30
		2012 (Existing) with Option 2[1,2,3]	00:13:00	00:12:30
		2023 (Future)[5]	00:13:00	00:13:30
		2023 (Future) with Option 2[1,2,3]	00:12:30	00:13:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Toll of Birness to Fraserburgh	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:27:00	00:25:00
		2012 (Existing) with Option 2[1,2,3]	00:26:00	00:24:00
		2023 (Future)[5]	00:21:30	00:24:30
		2023 (Future) with Option 2[1,2,3]	00:21:30	00:24:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Full Routes				
Aberdeen to Peterhead	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:46:00	01:00:30
		2012 (Existing) with Option 2[1,2,3]	00:45:30	00:59:30
		2023 (Future)[5]	00:41:00	01:05:00
		2023 (Future) with Option 2[1,2,3]	00:40:00	01:04:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Aberdeen to Fraserburgh	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:59:00	01:12:00
		2012 (Existing) with Option 2[1,2,3]	00:58:00	01:11:00
		2023 (Future)[5]	00:49:30	01:16:00
		2023 (Future) with Option 2[1,2,3]	00:49:00	01:15:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**

[1] Assumes 70mph speed limit on overtaking sections. [2] Assumes average speed on remaining single lane sections remains as existing i.e. no increase in speed odue to overtaking slow moving vehicles on overtaking sections. [3] Assumes 1km length overtaking sections with; 3 overtaking sections (in each direction) between Toll of Birness and Peterhead on A90(T); 2 overtaking sections (in each direction) between Toll of Birness and Cortes junction and; 1 overtaking section (in each direction) between Cortes junction and Fraserburgh on A90(T). [4] Average travel time by car for 2012 based on observed Tom-Tom data from north of Bridge of Don and modelled data from Aberdeen Access from the North & Aberdeen City Centre S-Paramics models. [5] Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from north of Bridge of Don, and modelled data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models.

Table A.6 : Option 2 Estimated Journey time savings Southbound

Southbound			AM	PM
Fraserburgh to Toll of Birness	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:26:00	00:26:00
		2012 (Existing) with Option 2[1,2,3]	00:25:00	00:25:00
		2023 (Future)[5]	00:23:00	00:22:00
		2023 (Future) with Option 2[1,2,3]	00:22:30	00:21:30
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:01:00**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Peterhead to Toll of Birness	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:13:30	00:13:00
		2012 (Existing) with Option 2[1,2,3]	00:12:30	00:12:00
		2023 (Future)[5]	00:13:30	00:13:00
		2023 (Future) with Option 2[1,2,3]	00:12:30	00:12:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:00:30**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Toll of Birness to Aberdeen	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:40:00	00:41:30
		2012 (Existing) with Option 2[1,2,3]	00:40:00	00:41:30
		2023 (Future)[5]	00:37:00	00:29:30
		2023 (Future) with Option 2[1,2,3]	00:37:00	00:29:30
	Difference with scheme[1,2,3]	**Compared to 2012**	**00:00:00**	**00:00:00**
		Compared to 2023	**00:00:00**	**00:00:00**
Full Routes				
Peterhead to Aberdeen	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	00:53:30	00:54:00
		2012 (Existing) with Option 2[1,2,3]	00:52:30	00:53:30
		2023 (Future)[5]	00:50:30	00:42:00
		2023 (Future) with Option 2[1,2,3]	00:49:30	00:41:30
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:00:30**	**-00:00:30**
		Compared to 2023	**-00:00:30**	**-00:00:30**
Fraserburgh to Aberdeen	Average Journey Time (hh:mm:ss)	2012 (Existing)[4]	01:06:00	01:07:30
		2012 (Existing) with Option 2[1,2,3]	01:05:00	01:06:30
		2023 (Future)[5]	01:00:00	00:51:30
		2023 (Future) with Option 2[1,2,3]	00:59:30	00:51:00
	Difference with scheme[1,2,3]	**Compared to 2012**	**-00:01:00**	**-00:01:00**
		Compared to 2023	**-00:00:30**	**-00:00:30**

[1] Assumes 70mph speed limit on overtaking sections. [2] Assumes average speed on remaining single lane sections remains as existing i.e. no increase in speed odue to overtaking slow moving vehicles on overtaking sections. [3] Assumes 1km length overtaking sections with; 3 overtaking sections (in each direction) between Toll of Birness and Peterhead on A90(T); 2 overtaking sections (in each direction) between Toll of Birness and Cortes junction and; 1 overtaking section (in each direction) between Cortes junction and Fraserburgh on A90(T). [4] Average travel time by car for 2012 based on observed Tom-Tom data from north of Bridge of Don and modelled data from Aberdeen Access from the North & Aberdeen City Centre S-Paramics models. [5] Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from north of Bridge of Don, and modelled data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models.

A.2.4 Integration

Transport Integration

Option 2 provides overtaking lanes and junction improvements on the A90(T) and A952. Considered in isolation, there will be no direct benefits in terms of transport integration with other modes of travel.

While the option measures will not directly affect transport integration, combined with the package of active travel measures, there may be cycle friendly improvements provided as part of junction design enhancements.

Transport and Land Use Integration

A full review of transport and land use policies has been undertaken and can be found within the Baseline Report. The integration of the option with the over-arching policies is similar to that as noted for Option 1, albeit to a lesser extent given the reduced infrastructure changes proposed.

Policy Integration

A full review of the relevant overarching policy documents has been undertaken and can be found within the Baseline Report. Key points noted for Option 1 in terms of policy integration appraisal can also be applied for Option 2.

Summary

Given the three sub-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.7.

Table A.7 : Option 2 Integration sub-criteria scores

Option 2: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	0	Unlikely to provide any impacts in terms of transport integration
Transport and Land-use Integration	1	Positive benefit relating to directly supporting development north of Aberdeen and providing support to business community.
Policy Integration	1	Positive benefit in terms of small improvements to journey times.
Overall	**1**	**Small positive benefit likely to be realised through general consistency with policy documents. Impact on transport integration is expected to be neutral.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 2 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.2.5 Accessibility and Social Inclusion

The option will bring limited accessibility and social inclusion benefits as per Option 1, but to a lesser extent given the more limited nature of the proposed interventions.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 2 has been awarded a score of **0,** and the outcome is expected to bring **no positive benefits or negative impacts.**

A.2.6 Option 2 Summary

Table A.8 shows the scores awarded for the appraisal of Option 2 against the STAG criteria.

Table A.8 : Option 2 STAG Criteria Appraisal Scores

Option 2: Overtaking lanes and junction improvements

	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-1	2	2	1	0

A.3 Option 3

Safety improvements on the A90(T) and A952(T)

A diagram of Option 3 and greater detail regarding the option is presented in Section 3.4.

A.3.1 Environment

The specific locations of safety measures are not known at this stage however the appraisal has assumed that new works would not be undertaken within or immediately adjacent to nationally important designated sites. It is assumed that works for safety measures would not be undertaken in locations where significant works near watercourses would be required. It is also assumed that construction works for the proposals would be undertaken concurrently. Road improvements may slightly improve the attractiveness of the roads as a result of improved safety, however, it is not anticipated that there would material changes in traffic flows as a result of the improvements.

Indicative locations and types of measures include:

- Improvements to the Toll of Birness and Cortes junction
- A bypass of Mintlaw on the A952
- Provision for right hand turning traffic throughout the length of the route
- Targeted accident reduction measures on the A90(T) south of Fraserburgh and south of Peterhead
- Safety improvement measures including road re-alignments, improved signage, road markings, barriers, etc.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the two routes and features of the environmental baseline include those which are listed in the environmental appraisal for Option 2.

Potential impacts of the proposals on the environment are:

- Potential to change the character of traffic flow around Mintlaw with benefits or disbenefits at some properties from decreases or increases in roadside noise and exposure to local air pollutants from traffic on the new bypass
- Changes to hydrological character and drainage from permanent development of new safety improvement works and from junction works
- Permanent loss of habitats and agricultural land from the bypass, road re-alignment, safety and junction upgrades and associated effects on farm units
- Changes in landscape character from permanent change in land cover, loss of vegetation, earthworks and visual intrusion impacts from the improvement works
- Permanent loss of habitat from construction and development of the proposals and associated impacts on species (including protected species)
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance

It is assumed that where any new bypass works are close to properties appropriate mitigation for traffic noise would be implemented. It is assumed that any areas of habitat loss from new works would be mitigated through planting of new areas of native woodland and that the improvements would be designed to fit the topography and landscape as far as possible through sensitive design which reflects local landforms and screens infrastructure as far as possible from sensitive visual receptors. Measures to mitigate impacts on protected species would be included.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Use of sustainable drainage systems (SuDS) in the design of new infrastructure to attenuate road run-off flows and aquatic pollutants
- Appropriate landscaping and measures to enhance local biodiversity

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- Proposals for safety improvements are not predicted to significantly change road traffic noise for receptors and communities along the affected routes
- There would be no predicted impacts on existing Candidate Noise Management Areas designated in (CNMAs) Aberdeen City as road traffic flows and compositions are not predicted to change significantly in these areas
- Construction noise impacts would be predicted to be short term and unlikely to be significant given the scale of the interventions proposed
- Overall noise impacts are predicted to be **neutral (no benefit or impact)**

Global and Local Air Quality

- Proposals for safety improvements are of a scale which are not predicted to significantly change road traffic flows and no material change in carbon emissions or emissions of local air pollutants is predicted.
- There would be increased roadside concentrations of local air pollutants near the new bypass but these are predicted to be minor and not significant. There is some potential for minor benefits from reduced congestion in Mintlaw
- There would be no significant impacts on existing Air Quality Management Areas (AQMAs) in Aberdeen city as road traffic flows and compositions are not predicted to change significantly in these areas.
- There is some potential for dust arising and deposition at nearby receptors during construction but with on-site mitigation these are not predicted to be significant.
- Overall global and local air pollutant impacts are predicted to range from **neutral to minor negative impact.**

Water Quality, Drainage, and Flood Defence

- Proposals for safety improvement works are not predicted to significantly change road surface areas, drainage or pollution potential for aquatic receptors
- It is assumed that safety measures would be small scale in nature and not undertaken in the vicinity of significant watercourse crossings and would generally avoid locations where there is significant risk of flooding
- It is assumed that construction works would follow good site practices to avoid pollution of the water environment and be detailed to take account of areas, such as the River Ugie catchment which is a drinking water protection area
- Overall impacts on water quality, drainage, and flood defence are predicted to have **minor negative impact**

Geology, Soils, and Agriculture

- Construction and permanent development of the new measures is not predicted to affect any sensitive or designated geological sites (which it is assumed would be avoided) and no significant impacts on geology are predicted.
- The road improvement works would result in some loss of farm land with associated impacts on farm units. The magnitude of this effect would vary for each land holding affected and would depend on final designs but is not predicted to be significant taking into account the scale of the proposals.
- Construction works for safety improvements is not predicted to significantly affect geology and soils, provided that best practice measures were implemented.
- There is some (minor) potential for construction to affect areas of potentially contaminated land associated with former industrial areas near towns and this would require more detailed investigation, assessment and if appropriate remediation at later design stages.
- Overall impacts on geology, soils and agriculture are predicted to be **minor negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by permanent development of the option. It is not predicted that measures would significantly affect any other areas with landscape related designations provided appropriate mitigation is implemented. A bypass sited to the west of Mintlaw would be in proximity to Aden Country Park and specific mitigation by design would be required to reduce any significant impact on the Park.
- The option is not predicted to significantly affect any areas of greenspace.
- The option is predicted to result in minor changes to local landscape character, e.g. as a result of loss of vegetation or other landscape features, but this would generally not be predicted to result in significant landscape impacts apart from in the area of the Mintlaw Bypass where careful design would be required to reduce the significance of the landscape impact of the new bypass.
- New road safety measures and associated works would have the potential to slightly increase the visual impacts of the road for existing and currently unaffected sensitive receptors and locations with key views of the development. In most areas significant impacts are not considered to be likely.

- Construction works for safety measures would be temporary for the duration of the works and mitigated through adoption of good construction practice.
- Overall impacts on landscape and visual amenity are predicted to be **minor to moderate negative impact** in the area of the bypass and **minor negative** in other locations.

Biodiversity and Habitats

- There is (slight) potential for the construction works to indirectly affect the qualifying interests of these Natura sites within 1km of the principal roads. Mitigation measures would need to be employed to ensure that disturbance works (and impacts such as habitat loss from permanent development of the works) did not adversely affect the conservation objectives for these Natura sites, and measures were taken to avoid affecting the water quality of the Ythan Estuary. Depending on the potential for likely significant effects Habitats Regulations Appraisal (HRA) may be required.
- The section of A90 between Ellon and Peterhead lies within 100m of the Buchan Ness to Collieston Special Area of Conservation (SAC) which is designated for its vegetated sea cliffs. Taking account of the scale of the safety measures it is not predicted that there would be significant effects on this site.
- It is not predicted that permanent development of the road works would significantly affect designated nature conservation sites (LNCS) at Cortes Reedbed and Fraserburgh Bay which are located within 1km of the road.
- Habitats such as ancient, semi-natural and native woodland may constrain the road proposals in some locations and there is potential for minor impacts on woodland habitats and species from the construction and permanent development of the proposals where woodland could not be avoided.
- The proposed road works may result in some habitat loss and fragmentation and have the potential for some biodiversity impacts dependent on which species they support. Surveys would be required to determine the specific importance and sensitivity of the affected areas and to inform route strategies and required mitigation.
- Overall impacts on biodiversity and habitats are predicted to be a **minor negative impact.**

Cultural Heritage

- The permanent development of the measures is not predicted to directly impact on any nationally designated archaeological or cultural heritage site.
- Road safety measures are not predicted to affect the setting of a small number of Category A Listed Buildings and Scheduled Monuments within 1km of the road alignments provided any bypass at Mintlaw is located to the east of the town. Mintlaw town centre is a Conservation Area within 1.5km west of the A952.
- New safety measures on the A952 between Mintlaw and Fraserburgh may be located within 3km of a Garden and Designed Landscape (GDL) at Crimonmogate, however, significant impacts on the setting of this site are not predicted.
- A Conservation Area at Boddam village is located within 500m of the trunk road although the site and its setting is not predicted to be significantly affected by any new safety works.

- A Conservation Area in the northern part of Fraserburgh near the harbour is located within 1km of the trunk road alignment although safety works would not affect its setting.
- Construction works for (larger scale) safety improvements may have some potential to encounter as yet unrealised archaeology and it is assumed that mitigation measures, such as watching briefs and appropriate trial trenching works, would be undertaken in key areas.
- Overall impacts on cultural heritage are predicted to be **minor negative impact.**

Physical Fitness

- The complementary measures to enhance active travel may have slight beneficial impacts on health and physical fitness, however, the road safety measures do not offer particular opportunities for active travel and overall the effect on physical fitness is predicted to be **neutral**

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 3 has been awarded a score of **-1,** and the outcome is expected to bring **no positive benefits or negative impacts.**

A.3.2 Safety

The option assumes the implementation of less whole scale safety improvements to the A90(T) and A952 routes but includes more targeted minor safety interventions such as improvements to the Toll of Birness junction, provision for right hand turners throughout the length of the routes, targeted accident reduction measures on the A90(T) south of Fraserburgh and south of Peterhead, potential road re-alignments and a bypass of Mintlaw, as well as minor safety improvement measures such as improved signage, road markings, barriers, etc.

The interventions are unlikely to significantly reduce driver frustration or provide increased overtaking opportunities, however, the option will bring safety benefits, including:

- Reducing accident potential at the Toll of Birness junction both for exiting traffic from the A952 and for traffic on the A90(T) trunk road
- Reducing the accident potential on the A90(T) south of Fraserburgh and south of Peterhead where higher than expected proportions of serious accidents are occurring
- Enabling safer vehicle turning from the trunk road into side road accesses and allowing mainline traffic to safety pass
- Reducing the economic and social costs of accidents, including: loss of output due to injury; ambulance costs, and costs of hospital treatment; the human cost of casualties including the grief and suffering to the casualty, relatives, and friends; intrinsic loss of enjoyment of life in the case of fatalities; damage to vehicle and property; and police and insurance administration costs.

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 3 has been awarded a score of **3,** and the outcome is expected to bring **Major Positive Benefit.**

A.3.3 Economy

Targeted safety improvements, would bring benefits including:

- Reductions in accidents across all modes which will result in significant monetary savings through the costs of accidents. It is important to note that the higher than average accident rate on the route is a key contributor to the poor predictability of journey times. Reductions in accident rates will therefore help to improve journey time reliability and predictability.
- Provisions for right turners will improve both average journey times across the route and journey time reliability as the flow of traffic is less disrupted.
- A bypass of Mintlaw, has the potential to provide future journey time benefit on the A952, removing delay due to stopping at local junctions within the town, especially given the future predicted increases in traffic on the route if housing and employment allocations are built out in full (Mintlaw has a housing allocation that would significantly increase size of the town).
- As journey time reliability is improved, the route will become more attractive to those seeking employment opportunities along the route or in Aberdeen. It should be noted that this benefit in terms of access will not be as great as that observed with Options 1 and 2.

There would not any noticeable economic disbenefits associated with providing safety improvements.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 3 has been awarded a score of **1,** and the outcome is expected to bring **limited positive benefits.**

A.3.4 Integration

Transport Integration

While the proposed safety improvements will not directly affect transport integration, combined with the package of active travel measures, there will be key integration benefits as the improved safety measures will ensure active travel is a more attractive option. Specifically in relation to proposals for this option, the following benefits could be observed:

- Cycle friendly improvements provided as part of junction design enhancements
- Accident reduction measures on the A90(T) can make the route safer and more attractive for cycling

Transport and Land Use Integration

New safety measures which provide improved and more effective infrastructure will help support the study area economically through reducing delay on the road network due to fewer accidents. This can make the area more attractive to investment and support the Strategic and Local Development plans for the area as detailed in the Option 1 integration appraisal in Section A.1.4.

Policy Integration

A full review of the relevant overarching policy documents has been undertaken and can be found within the Baseline Report. Key points noted for the Option 1 policy integration appraisal can also be applied to Option 3, in terms of supporting economic and safety policy for the region, albeit to a lesser extent given the more minor interventions included within this option compared to the dualling proposed for Option 1.

Summary

Given the three sub-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.9.

Table A.9 : Option 3 Integration sub-criteria scores

Option 3: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	0	Unlikely to provide any impacts in terms of transport integration
Transport and Land-use Integration	1	Positive benefit relating to directly supporting development north of Aberdeen and providing support to business community.
Policy Integration	1	Positive benefit in terms of improvements to road safety.
Overall	**1**	**Small positive benefit likely to be realised through general consistency with policy documents. Impact on transport integration is expected to be neutral.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 3 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.3.5 Accessibility and Social Inclusion

It is unlikely that the option would have any positive benefits or negative impacts in relation to accessibility and social inclusion.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 3 has been awarded a score of **0,** and the outcome is expected to bring **no positive benefit or negative impact.**

A.3.6 Option 3 Summary

Table A.10 shows the scores awarded for the appraisal of Option 3 against the STAG criteria.

Table A.10 : Option 3 STAG Criteria Appraisal Scores

Option 3: Safety improvements on A90(T) and A952

	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-1	3	1	1	0

A.4 Option 4

Bus service improvements including new direct and increased express services between the study and key employment, health and social facilities in the Aberdeen conurbation

A diagram of Option 4 is presented in Section 3.5.

A.4.1 Environment

The initial STAG Environment appraisal of Option 4 has considered the proposals to add new direct bus services and increased express bus services using existing road infrastructure. The appraisal assumes that the new services would be operated using modern bus vehicles which meet current emissions standards. No new permanent works are assumed to be required for this option.

Appendix B presents the environmental designations and constraints for the study area. Since no infrastructure measures are proposed for this option, geographically specific baseline environmental features have not been presented here. Bus services would be expected to operate on existing principal roads in the study area including the A90 and A952 between Fraserburgh, Peterhead, Ellon, and Aberdeen. The environmental baseline review (see Appendix B) has not generally identified specific environmental sensitivities in the vicinity of these road corridors although traffic related local air pollutant emissions in some parts of Aberdeen (the city centre and Anderson Drive areas in particular) has given rise to the designation of Air Quality Management Areas (AQMAs) by the Council.

Potential impacts of the proposals on the environment are:

- Potential to slightly increase traffic flows on key roads leading to minor increases in roadside noise and increased exposure to local air pollutants from road (bus) vehicle emissions for some roadside receptors.
- Increased carbon emissions from higher frequencies of bus operations.
- Potential for the bus service enhancements to combine with the complementary active travel measures to help generate some modest shift from car commuting trips to those undertaken by bus or by a combination of walk/cycle with bus (via interchange). These effects could contribute to reductions in emissions of global and local air pollutants from road traffic.

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- Proposals for new bus services and increased frequency of other services has slight potential to increase associated noise levels for roadside receptors (dependent on vehicle type), although it is anticipated that these impacts would be offset by some modest levels of transfer of car users to bus which has the potential to slightly reduce overall road traffic flows on the key affected routes
- There would be no predicted impacts on existing Candidate Noise Management Areas (CNMAs) in Aberdeen City as road traffic flows and compositions are not predicted to change significantly in these areas and improved bus capacity could contribute to reductions in noise levels if modal shift on key routes was achieved
- Overall noise impacts are predicted to range from **minor benefit to neutral (no benefit or impact)**

Global and Local Air Quality

- Proposals for new bus services and increased frequency of other services has the potential to increase carbon emissions and emissions of local air pollutant levels (dependent on vehicle type) for roadside receptors from bus operations although it is anticipated that these impacts would be offset by some modest levels of transfer of car users to bus which has the potential to slightly reduce overall road traffic emissions on the key affected routes
- There would be no significant predicted impacts on existing Air Quality Management Areas (AQMAs) designated in Aberdeen City although slight changes (beneficial or adverse) may occur depending on the concentration of bus services and terminus points
- Overall global and local air pollutant impacts are predicted to range from **minor benefit** to **minor negative impact**

Water Quality, Drainage, and Flood Defence

- Improved bus services and additional bus provision is not predicted to affect water quality and drainage from the network of existing roads used by the services
- The option has the potential to effect small changes in use of other modes (e.g. reduced use of private car) with very small impacts on run-off quality from existing roads and urban areas where traffic reduction may occur
- Overall impacts on water quality, drainage and flood defence are predicted to be **neutral**

Geology, Soils, and Agriculture

- Improved bus services and additional bus provision is not predicted to affect geology, soils and agriculture as no new ground breaking works are anticipated
- Overall impacts on geology, soils and agriculture are predicted to be **neutral**

Landscape and Visual Amenity

- Bus service improvements are predicted to result in a slightly greater number of bus vehicles using the principal roads in the study area, however, no significant landscape and visual impacts are predicted from this change
- Overall impacts on landscape and visual amenity are predicted to be **neutral**

Biodiversity and Habitats

- Bus service improvements are predicted to result in an increase in express and other bus services on key roads in the study area with a very slight potential to increase collision with wildlife (but with potential car traffic reduction), which is not predicted to be significant overall
- Overall impacts on biodiversity and habitats are predicted to be **neutral**

Cultural Heritage

- Bus service improvements are predicted to result in an increase in express and other services on key roads in the study area however no significant cultural heritage impacts are predicted from this change
- Overall impacts on cultural heritage are predicted to be **neutral**

Physical Fitness

- The complementary measures to enhance active travel are predicted to have **neutral to minor beneficial** impacts on health and physical fitness through their integration with improved bus services to encourage walking and cycling as part of journeys

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 4 has been awarded a score of **0,** and the outcome is expected to bring **No Positive Benefit or Negative Impact.**

A.4.2 Safety

Discussion with both Police Scotland and Scotland Fire and Rescue during the study's engagement programme suggests that accidents in the area are caused by a number of factors including:

- Driver frustration at lack of over-taking opportunity
- Young and inexperienced drivers
- Older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives that suit their needs

The interventions forming this option would specifically target the second and third causes noted, with new direct and express bus services enabling greater public transport accessibility for younger and older drivers. Providing this accessibility, and encouraging those with a high propensity for accidents onto the bus network would reduce the overall accident potential on the road network within the study area.

In addition, the options may bring further safety benefits including:

- An overall shift towards bus travel from the private car, potentially reducing the volume of traffic on the road network and hence the accident potential, leading to:
- Increased safety on roads within the study area for cyclists and pedestrians
- A reduction in unpredictable delays on the road network leading to lessening of the impact of unpredictability on business as noted in the Option 1 Safety Appraisal in Section A.1.2.

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 4 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.4.3 Economy

Bus Service Improvements including new direct and express services, would capitalise on committed transport improvements, specifically the Balmedie to Tipperty dualling and would bring benefits including:

- Improved access to employment by public transport. At present, bus journey times in the study area average 90min between Fraserburgh and Aberdeen, and 75min between Peterhead and Aberdeen. This equates to average travel speeds of around 30mph or less. These journey times cannot compete with equivalent travel times by car of just over an hour from Fraserburgh, and just under an hour from Peterhead, meaning those reliant on public transport have significantly reduced mobility to key regional services and job opportunities. Reducing journey times will improve this accessibility, in particular, to those most in need.

  To highlight the potential journey time savings that might be achieved if direct services were introduced an estimation of the bus journey time between Fraserburgh, Peterhead and Dyce on a direct service has been compared against the existing bus journey time, which required interchange in Aberdeen.

  The average assumed bus speed for the journey has been estimated using current travel times to Aberdeen as shown in Table A.11.

Table A.11 : Average estimated bus speeds

	Distance (km)	Average Time	Average Speed (kph)
Ellon to Aberdeen	26	00:42:00	37
Peterhead to Aberdeen	51	01:15:00	41
Fraserburgh to Aberdeen	66	01:30:00	44

Estimated bus journey times have been compared against the current car travel times and are shown in Table A.12. (Note that data on future predicted 2033 travel times by car from ASAM between Peterhead, Fraserburgh, and Dyce has not been requested at this stage and as such comparisons have not been made between the estimated direct bus services and future year travel times by car.)

Table A.12 shows a significant journey time saving on a direct bus route of around 50min between Ellon, Peterhead, Fraserburgh, and Dyce.

Table A.12 : Average estimated bus speeds

Overall Journey Time (by Bus)	Distance (km)	Average existing journey time by bus[3]	Assumed average speed[1] (kph)	Potential bus journey time on direct route	Potential bus journey time saving	Journey time compared to same journey by car[2] (Bus minus car journey time)
Dyce to Ellon	25	01:33:00	37	00:39:00	00:54:00	00:09:00
Dyce to Peterhead	49	02:00:00	41	01:12:00	00:48:00	00:23:00
Dyce to Fraserburgh	64	02:18:00	44	01:28:00	00:50:00	00:31:00

[1] *Assumes speed based on average speed of existing buses from Ellon, Peterhead and Fraserburgh to Aberdeen City Centre*

[2] *Compared against existing travel time by car as presented in the Baseline Report*

[3] *Journey time is aveage of AM, midday and evening journey times*

- Encourage modal shift away from the private car which will reduce traffic and result in improved journey times and efficiency savings on the network. The Public Survey highlighted 62% of non-bus users identified long journey times to be a key reason for not using the bus, with 70% of current bus users citing long journey times as the most significant issue facing bus users. In addition, the Barriers to Bus Use study showed that 74% of non-bus users would be likely or extremely likely to use the bus if an express service was available. Also, 78% would be more likely if more direct routes were available.
- Improved access to essential services including education and healthcare. Access to public transport services is a key issue for those wishing to access educational facilities. This is especially the case in rural areas, and particularly for young people. Comments made during public consultation and engagement suggested that a major barrier to enticing people to move to Fraserburgh and Peterhead was the lack of access to education facilities. Additionally, comments made by North-East College highlighted its current provision of dedicated bus services for students providing access to the campus in the morning and placing a significant drain on college resources, which may increase further as a consequence of the college's £23million expansion plans. It should also be noted that with an ageing population, there is an ever increasing reliance on public transport to access local and regional facilities, including those required for health care.

Direct bus services may lead to a small level of disbenefits through connecting the local labour market with more attractive jobs further afield. This may result in a strain on the local labour market in the north of the study area.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 4 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.4.4 Integration

Transport Integration

Option 4 will provide improved bus services including new direct and express services between key areas across the study area. Improvements of this nature represent an important step change in transport provision through faster, higher frequency additions to the transport network which will encourage increased usage.

When considering the package of high level active travel measures, it is important to note the following benefits will be accrued:

- Active travel measures will be integrated with existing public transport to provide an attractive alternative to car use for longer journeys.
- New and improved cycle links and routes will allow safer access by foot and bike to public transport stops and stations, encouraging 'whole trip' sustainable transport with modal shift away from the car. This is particularly important when considering that this option provides greater levels of public transport services, so providing active travel measures and links to connect with bus stops and stations will provide key integration benefits.
- Providing infrastructure such as cycle racks and safe crossing locations ensures that walking and cycling are a key part of a truly integrated transport network and connected to public transport.
- Allowing for more cycles on buses will further encourage integration of cycle and bus modes of travel.

Transport and Land Use Integration

A full review of transport and land use policies has been undertaken and can be found within the Baseline Report. Transport and land use policy which are of relevance to Option 4 are summarised as follows:

- The aspirations of the **Aberdeen City and Shire Strategic Development Plan and Aberdeenshire and Aberdeen Local Development Plans** are discussed in Section A.1.4. Providing direct and increased express services between the study area and key employment, health and social facilities in the Aberdeen conurbation will support the development plan by providing public transport for the allocated and planned new housing and development land ensuring that sustainable transport is available from the outset to reduce the number of vehicles on the road and 'lock in' travel behaviour.
- As discussed in Section A.1.4, through discussions with the Energetica project team, it is clear that in order to attract and retain businesses, transport infrastructure has to be improved. Provision of improved bus services across the study area, linking areas of population and employment is critical to support the objectives of the Energetica project, ensuring that business can be effectively supplied by the labour market.
- The **Aberdeen City Centre Master Plan** includes proposals to reduce private vehicle access to the City centre which will require a step change in accessibility to the centre and a likely higher reliance on public transport for access. The Option 4 proposals support this through an increase in capacity in the public transport network with measures to make public transport more attractive.

Policy Integration

A full review of relevant overarching policy has been undertaken and can be found within the Baseline Report. Policies which are of relevance to Option 4 are summarised as follows:

- **Scotland's National Transport Strategy** focuses on three key outcomes:
  - Improved journey times and connections
  - Reduced emissions
  - Improved quality, accessibility, and affordability of public transport

Considering this, providing new, direct and express services across the region will improve public transport journey times and connections across the study area.

The introduction of new direct services should encourage modal shift from the private car to the bus which will help reduce numbers of vehicles on the roads, thereby helping to reduce vehicular emissions.

Direct and express bus services will directly improve the accessibility of the study area to key employment areas and regional services and facilities. New direct and express services could be 'flagship' services provided by higher quality vehicles.

- **Nestrans Regional Transport Strategy Internal Connection Strategy** aims to encourage modal shift, reduce emissions and improve the quality and reliability of bus services. Providing new direct and increased express services between the study area and key employment, health and social facilities in the Aberdeen conurbation, will greatly support these aims.
- A number of Action Plans support the RTS. The **Active Travel Action Plan** notes key development priorities including linking active travel networks with transport interchange hubs such as bus and rail stations and Park & Ride sites across the region. Providing improved bus services, combined with proposals for a package of active travel measures will support the RTS Active Travel Action Plan.
- The **Aberdeenshire Local Transport Strategy** sets out five key objectives, all of which are directly relevant to this proposal:
  - Promote sustainable economic growth
  - Promote Social Inclusion and Accessibility
  - Protect the Environment
  - Improve safety
  - Improve integration

Provision of new direct and express services between the study area and key employment, health and social facilities within the Aberdeen conurbation will provide faster and more reliable public transport journey times for public transport users. Improvements to journey times will support the promotion of a *sustainable* local, regional and national economy. Improving public transport service will increase accessibility and can provide key links for those without alternative means of travel. If mode shift is achieved there will be environmental and safety benefits as public transport is a cleaner, more efficient and safer mode of travel than the private car. Integration will also improve as new services are linked with the existing public transport network, and complemented by proposals for active travel measures.

- The **Aberdeenshire City Local Transport Strategy** has a number of key objectives. Those which have relevance to this option include:
  - Increased modal share for public transport and active travel
  - Improved journey time reliability for all modes
  - Improved road safety
  - Improved air quality and the environment
  - Improved accessibility to transport for all

  The points noted above for the Aberdeenshire Local Transport Strategy can be applied in relation to the Aberdeen City Local Transport Strategy.
- The **Scottish Government's Economic Strategy** contains a priority to promote inclusive growth and create opportunity through a fair and inclusive jobs market and regional cohesion. Option 4 will support this priority by providing transport connections that allow those without access to a car to access a wider range of employment opportunities.
- **Aberdeenshire Economic Development Strategy** notes key transport priorities which include:
  - Delivering an integrated and efficient transport system

    Option 4 will help improve the efficiency of the transport network by providing integration between bus and active travel modes.
- **Aberdeen City and Shire Tourism Strategy** notes a key strategy action plan to improve access within the area, working with transport operators to achieve fully integrated transport options. Providing new bus services which provide *direct* access to key destinations in the study area will improve the accessibility of the area to tourists who currently predominantly rely on the private car for access.

Summary

Given the three sun-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.13.

Table A.13 : Option 4 Integration sub-criteria scores

Option 4: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	2	Moderate benefits in terms of transport integration, providing increased frequency of public transport services and improved journey times. Active travel measures will also link with key services across the region.
Transport and Land-use Integration	2	Positive benefit relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment.
Policy Integration	2	Positive benefit in terms of improvements to public transport journey times, road safety, integration, inclusion and emmissions reductions.
Overall	**2**	**Moderate positive benefit likely to be realised through supporting development plans, general consistency with policy documents. There should also be transport integration benefits as significant improvements and links to the public transport network will be observed.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 4 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.4.5 Accessibility and Social Inclusion

The following benefits and impacts are noted for the option in terms of community and comparative accessibility:

Community Accessibility:

Public Transport Network Coverage

- The option will increase direct and express bus service coverage, improving accessibility by bus between the study area and key employment, health, and social facilities in the Aberdeen conurbation, with reduced journey times and reduced need to interchange to reach required destinations.

Access to Local Services

- The option is unlikely to provide any increase in access to local services by walking and cycling, other than links to key bus stops and Park & Ride sites as part of the package of active travel measures assumed with the option

Comparative Accessibility:

Distribution of Impacts by People Group

The potential increased accessibility by bus brought about thorough increased direct and express services would positively impact:

- Those in the study area towns and villages without access to a car. Car ownership in Fraserburgh and Peterhead is lower than the regional average indicating a greater reliance on public transport.
- Young people and the elderly for whom driving is not an option
- Those currently unemployed, for whom employment opportunities may be widened with increased accessibility. Within the study area unemployment is notably higher in the northern sections including in the towns of Peterhead and Fraserburgh compared to the areas closer to Aberdeen. The recently announced job losses in Fraserburgh will potentially place an even greater reliance on the need to travel further for work by those effected.

Distribution of Impacts by Location

Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan and pockets of deprivation are noted in both towns in the Scottish Index of Multiple Deprivation:

- Those resident in the towns of Peterhead and Fraserburgh as well as in other smaller conurbations in the northern section of the study area will benefit greatly from reduced travel time by bus and express services which are currently limited.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 4 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.4.6 Option 4 Summary

Table A.14 shows the scores awarded for the appraisal of Option 4 against the STAG criteria.

Table A.14 : Option 4 STAG Criteria Appraisal Scores

Option 4: Bus service improvements					
	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	1	1	1	2	2

A.5 Option 5

Bus service improvements (as Option 4) accompanied by priority infrastructure and Park & Ride improvements (new sections of dedicated bus lanes, extended operating hours, development of Park & Ride Strategy)

A diagram of Option is presented in Section 3.6.

A.5.1 Environment

The initial STAG Environment appraisal has taken account of the proposals to add new direct bus services and increased express bus services using a combination of existing road infrastructure (e.g. for bus lanes) and new/expanded Park & Ride sites. The appraisal assumes that the new services would be operated using modern bus vehicles which meet relevant emissions standards.

Park & Ride sites have been assumed in the following locations:

- Bridge of Don and Ellon (expansion of current Park & Ride sites)
- Toll of Birness, Peterhead, Fraserburgh (new site within vicinity of the towns and main road routes)

The specific locations of the new Park & Ride sites and any new bus lanes/bus priority are not known at this stage however the appraisal has assumed that new works would not be undertaken within or immediately adjacent to nationally important designated sites, key watercourses or residential receptors and that bus lanes would be developed on existing sections of road carriageway through reallocation of road space rather than by widening routes. It is also assumed that construction works for the Park & Ride sites would be undertaken concurrently.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the two routes and features of the environmental baseline include:

- Settlements and properties adjacent to the new and expanded Park & Ride sites associated with the existing urban fringe of Bridge of Don, Ellon, Peterhead, and Fraserburgh
- The South Ugie Water which is located within 1km of Mintlaw and the River Ythan which is located within 1km of Ellon
- Prime agricultural land which is located in the vicinity of potential Park & Ride sites in all locations except Bridge of Don
- Aden Country Park, which is located within 2km of Mintlaw
- Designated sites of nature conservation which are located within 1km of:
    - **Ellon Park & Ride Expansion**
      The Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA)/Ythan Estuary and Meikle Loch Ramsar Site (designated for breeding and passage sea birds), and the Sands of Forvie and Ythan Estuary Site of Special Scientific Interest (SSSI)) which is designated for breeding and non-breeding birds
    - **Peterhead Park & Ride**:
      The Buchan Ness to Collieston Coast SPA (designated for breeding seabirds)

- Locally designated nature conservation sites potentially within 1km of two of the proposed Park & Ride sites:
  - **Bridge of Don Park & Ride Expansion**:
    Balgownie/Blackdog Links Local Nature Conservation Site (LNCS) (dune system) and the River Don Corridor LNCS (woodland and marginal vegetation)
  - **Fraserburgh Park & Ride**:
    Fraserburgh Bay LNCS (coastal habitats)
- Conservation Areas at Bridge of Don and Fraserburgh lie within 1 – 2km of potential Park & Ride sites in these locations.

Potential impacts of the proposals on the environment are:

- Potential to slightly increase traffic flows on local roads close to new/expanded Park & Ride sites leading to slight increases in roadside noise and increased exposure to local air pollutants from road vehicle emissions for some receptors and communities.
- Increased carbon emissions from higher levels of traffic and increased bus operations.
- Potential for the bus service enhancements and Park & Ride measures to combine with the complementary active travel measures to help generate some modest shift from car commuting trips to those undertaken by bus or by a combination of walk/cycle with bus (via interchange). These effects could contribute to reductions in emissions of global and local air pollutants from road traffic and reduced traffic noise on key roads.
- Changes to hydrological character and drainage from permanent development of the Park & Ride sites.
- Permanent loss of (very small areas of) habitats and agricultural land from new and upgraded Park & Ride sites and associated effects on farm units.
- Changes in landscape character from permanent change in land cover, loss of vegetation, and visual intrusion impacts from the Park & Ride sites and traffic using them.
- Permanent loss of small areas of habitats from construction and development of the proposals and associated impacts on species (including protected species).
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance from permanent development and operation of the Park & Ride sites.

Where Park & Ride sites are developed close to residential areas it is assumed that noise mitigation measures, such as noise barriers, would be incorporated in the design to reduce traffic and bus operational noise increases for adjacent receptors. It is also assumed that the Park & Ride sites would be designed to be sympathetic with the architecture or landscape of their vicinity. New buildings would be screened as far as possible from sensitive visual receptors through design and/or planting proposals.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Use of sustainable drainage systems (SuDS) in the design of new sites to attenuate road run-off flows and aquatic pollutants
- Appropriate landscaping and measures to enhance local biodiversity.

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- Proposals for new bus services and increased frequency of other services is predicted to increase noise levels for roadside receptors (dependent on vehicle type) although it is anticipated that these impacts would be offset by some modest levels of transfer of car users to bus which has the potential to slightly reduce overall road traffic flows on the key affected routes.
- Proposals for new and expanded Park & Ride sites (e.g. at Toll of Birness, Peterhead, Mintlaw, Fraserburgh, Ellon and Bridge of Don) are predicted to increase noise levels for nearby sensitive receptors as a result of bus arrivals/departures and associated terminal activity, depending on the final selection of the proposed sites.
- There is some potential for local changes in road traffic movements (car) particularly in peak hours in the vicinity of new/upgraded Park & Ride sites once these become operational although these are not predicted to result in significant changes in roadside noise levels.
- There would be no predicted significant adverse impacts on existing Candidate Noise Management Areas (CNMAs) in Aberdeen City and improved bus capacity and operation could contribute to reductions in noise levels if modal shift on key routes was achieved which could reduce roadside noise levels for the CNMA designated at King Street/Don Street.
- Construction noise impacts for new/expanded Park & Ride sites would be predicted to be short term and unlikely to be significant given the scale of the interventions proposed.
- Overall noise impacts are predicted to range from **minor benefit to minor negative impact.**

Global and Local Air Quality

- Proposals for new bus services and increased frequency of other services have the potential to increase carbon emissions and emissions of local air pollutant levels for roadside receptors (dependent on vehicle type), although it is anticipated that these impacts would be offset by some modest levels of transfer of car users to bus which has the potential to slightly reduce overall road traffic emissions on the key affected routes
- There is some potential for local changes in road traffic movements (car and bus) in the vicinity of new/upgraded Park & Ride sites once these become operational although these are not predicted to result in significant changes in global or local air pollutant emissions

- There would be no significant predicted impacts on existing Air Quality Management Areas (AQMAs) designated in Aberdeen city although slight changes in local air pollutant emissions (beneficial or adverse) may occur depending on the concentration of bus services and terminus points
- There is some potential for dust arisings and deposition at nearby receptors during Park & Ride site construction but with on-site mitigation these are not predicted to be significant
- Overall global and local air pollutant impacts are predicted to range from **minor benefit** to **minor negative impact**

Water Quality, Drainage, and Flood Defence

- Permanent development of the Park & Ride sites/extensions has the potential to locally change hydrological character and drainage, however, with the adoption of sustainable drainage in the infrastructure designs it is not predicted that significant impacts would occur.
- It is assumed that bus Park & Ride improvements would not be undertaken in the vicinity of significant watercourse crossings and would generally avoid locations where there is significant risk of flooding. Strategic flood risk assessments may be needed at later design stages to confirm any impacts on flooding.
- Pollutants in run-off from hard surfaced areas would be attenuated through sustainable drainage systems which would be required to meet the requirements of the Scottish Environment Protection Agency (SEPA) and significant impacts on water quality are not predicted.
- It is assumed that construction works would follow good site practices to avoid pollution of the water environment and no significant effects would be predicted.
- Overall impacts on water quality, drainage and flood defence are predicted to be **minor negative impact.**

Geology, Soils, and Agriculture

- Construction and permanent development of the new bus infrastructure is not predicted to affect any sensitive or designated geological sites (which it is assumed would be avoided in detailed site selection) and no significant impacts on geology are predicted. This would need to be confirmed when more specific design and location information was available.
- The development of Park & Ride sites would have some potential impacts on agriculture through loss of farm land and severance and fragmentation impacts on farm units. The magnitude of these impacts would vary for each land holding affected and would depend on locations for new Park & Ride areas but it is anticipated that significant impacts would be avoided.
- Construction works for Park & Ride sites are not predicted to significantly affect geological resources and soils.
- There is a potential for construction to affect areas of potentially contaminated land associated with former industrial areas near towns and this would require more detailed investigation, assessment and if appropriate remediation at later design stages.
- Overall impacts on geology, soils and agriculture are predicted to range from **minor to moderate negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by permanent development of the new Park & Ride sites. Proposals for a Park & Ride site at Mintlaw would be located within 2km of the nearby Aden Country Park, however, significant landscape and visual impacts on this site is considered unlikely
- With careful site selection and appropriate mitigation it is predicted at this stage that significant landscape and visual impacts on greenspace around Bridge of Don, Peterhead, Fraserburgh, and Ellon could be avoided
- The option would have the potential to locally change landscape and townscape character, e.g. from loss of vegetation or removal of other landscape features/buildings to develop new Park & Ride sites dependent on the local landscape character and sensitivity of each locality and the potential to mitigate any impacts
- New Park & Ride sites, bus lanes, and traffic using these facilities are predicted to have minor visual impacts for nearby sensitive receptors and locations with key views of the developments
- Construction works for new Park & Ride sites are predicted to have the potential for significant localised landscape and visual impacts however they would be temporary for the duration of the works and mitigated through adoption of good construction practice
- Overall impacts on landscape and visual amenity are predicted to be **minor to moderate negative impact**

Biodiversity and Habitats

- There is potential for the construction works for Ellon and Peterhead Park & Ride sites to indirectly affect the qualifying interests of Natura sites within 1km. Mitigation measures would need to be employed to ensure that disturbance works (and impacts such as minor habitat loss from permanent development of the works) did not adversely affect these Natura sites, and measures were taken to avoid affecting the water quality of the Ythan Estuary (for Ellon Park & Ride expansion only) and depending on the potential for significant effects Habitats Regulations Appraisal (HRA) would be required.
- It is not predicted that the proposals would have significant impacts on these local nature conservation sites within 1km assuming that no direct loss of habitat from these areas would be required.
- There are some areas of ancient, semi-natural and native woodland in the vicinity of the proposed locations for Park & Ride sites. These habitats may constrain the selection of sites and there is some potential for significant impacts on woodland habitats and species from the construction and permanent development of the proposals, depending on the final locations of required Park & Ride sites.
- The Park & Ride site developments would result in some habitat loss and fragmentation and for effects dependent on which species they support. Surveys would be required to determine the specific importance and sensitivity of the affected areas and to inform route strategies and required mitigation. It is not predicted that impacts would be significant at this stage.
- Overall impacts on biodiversity and habitats are predicted to be a **minor to moderate negative impact.**

Cultural Heritage

- The permanent development of the Park & Ride sites is not predicted to directly impact on any nationally designated archaeological or cultural heritage site, although this would need to be confirmed when finalised locations were known.
- There are no Category A Listed Buildings or Scheduled Monuments in the vicinity of the existing Park & Ride sites at Bridge of Don and Ellon and very few of these designated areas in the vicinity of the potential Park & Ride sites at Toll of Birness, Mintlaw, Peterhead and Fraserburgh. There is some potential for impacts on setting of designated sites dependent upon final locations for new Park & Ride sites and any associated infrastructure.
- No significant impacts on the setting of any Garden and Designed Landscape (GDL) is predicted from the new Park & Ride sites or increased levels of bus operations.
- Park & Ride sites (and upgraded existing sites) may be located within 1-2km of Conservation Areas at Bridge of Don, Fraserburgh, and Mintlaw and new works have potential for minor impacts on their setting, dependent on final locations, design, and the potential to mitigate the sites.
- Construction works for Park & Ride sites are not predicted to have significant impacts on, as yet, unrealised archaeology provided that mitigation measures, such as watching briefs and appropriate trial trenching works, were undertaken in key areas.
- Overall impacts on cultural heritage are predicted to be **minor negative impact.**

Physical Fitness

- The complementary measures to enhance active travel are predicted to have **minor beneficial** impacts on health and physical fitness (and associated economic benefits to the workforce through reduced absenteeism for example) through their integration with improved bus services and new Park & Ride facilities to encourage walking and cycling as part of journeys.

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 5 has been awarded a score of **-1,** and the outcome is expected to bring **Minor Negative Impact.**

A.5.2 Safety

As Option 5 builds on Option 4, all the safety benefits noted for Option 4 (in Section A.4.2) should also be assumed for Option 5. In addition, Option 5 includes further bus services improvements likely to encourage greater use of the bus network and create a shift from private car use to public transport. This reduction in traffic on the road network would:

- Further reduce the overall accident potential on the road network for all users including cyclists and pedestrians
- Further reduce unpredictable delays on the road network due to accidents, providing increased efficiency benefits to businesses using the routes, particularly with respect to the key fishing and oil & gas industries in the area for whom the movement of goods is often time critical.

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 5 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.5.3 Economy

The option will bring economic benefits as per Option 4, but to a further enhanced level as sections of dedicated bus lanes will be added, along with the further development of Park & Ride sites. Benefits include:

- Increasing dedicated priority infrastructure will further reduce public transport journey times and public transport reliability in those sections of the route, making the bus a more attractive option and providing key opportunities for people to access jobs, education, health care, and other facilities. Similarly to Option 4, the potential journey time savings from new direct and express services to Dyce, as presented in A.4.3, could provide savings of nearly 50min from Peterhead and Fraserburgh to Dyce. This journey time saving would be likely to increase if bus priority measures were also implemented.
- Further development of the Park & Ride facility will encourage modal shift. Again, this should have an effect of reducing journey times on key routes and improving journey time reliability as people are moved more efficiently on the bus, rather than in their private vehicles.

Consistent with Option 4, direct bus services accompanied with priority infrastructure and Park & Ride improvements may lead to disbenefits through connecting the local labour market with more attractive jobs further afield. It is likely this would be felt to a greater extent with this option than Option 4 as bus journey times improve and more facilities are in place to encourage modal shift.

It is also important to note that while the expectation is for current bus lane operating periods to be extended on the A90(T) route, the introduction of new, or extended current bus lanes, would involve re-allocation of road space. This reallocation would effectively reduce available capacity on sections of the road which could have the effect of increasing journey times for all vehicles that are not permitted access to bus lanes, essentially private cars and HGVs.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 5 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Impact.**

A.5.4 Integration

Transport Integration

Option 5, while similar in nature to Option 4, will provide considerably greater benefits in terms of transport integration. While Option 4 provides improved public transport services, Option 5 is designed around these enhanced services, but supplemented with significant facilities and measures which promote public transport use and facilitate access, and includes:

- Provision of new dedicated bus lanes, in addition to the extension of existing bus lane operating hours allowing faster, and more reliable journey times enabling users to better plan their journeys, as improved service frequency and reliability helps to ensure connections can be made with onward services. This is particularly important within the study area where employment locations are spread across Aberdeen city, which often results in the requirement for people to interchange in order to access their final destination.

- Park & Ride facilities. A properly planned Park & Ride site can provide convenient, accessible services which are integrated into the public and active travel networks, reducing the requirement for end to end private vehicle journeys. Aberdeenshire currently has a number of Park & Ride sites in operation and have developed an understanding of the specifics required to ensure these operate efficiently. It has been assumed that further sites will be developed at the Toll of Birness, Peterhead, and Fraserburgh using best practice and be consistent in terms of layouts, operation, and aesthetics.
- Park & Ride sites would be designed with appropriate safety and convenience facilities which further encourage the use of services. Sites would also be designed to current DDA standards ensuring accessibility for all.
- Park & Ride sites would also provide the ability for ticket purchase for onward and connecting journeys, maximising integration. Aberdeen City and Aberdeenshire Council in co-operation with bus operators have developed the 'Grasshopper' ticket, which can be used on all services across the study area, ensuring ease of journey transfers.

When considering the package of high level active travel measures also to be implemented as part of this option, it is important to note the following integration benefits will be accrued:

- Active travel measures will be integrated with existing public transport to provide an attractive alternative to car use to enable end-to-end *sustainable* journeys
- New and improved cycle links and routes will allow safer access by foot and bike to public transport stops and Park & Ride sites, encouraging improved take up of public transport and modal shift away from the car. This is particularly important when considering that this option provides improved levels of public transport services.
- Providing infrastructure such as cycle racks at Park & Ride sites and safe crossing locations on routes to such sites ensures that walking and cycling are a key part of an integrated transport network.
- Allowing for more cycles on buses could further encourage the use of the public transport network.

Transport and Land Use Integration

In terms of transport land-use integration, the integration points noted for Option 4 can be applied but with greater benefit in term of land-use integration given the additional Park & Ride facilities and bus priority associated with the option providing increased attractiveness of public transport, supporting the aim of the **Aberdeen City & Shire Strategic Development Plan** *to make the most efficient use of the transport network, reducing the need for people to travel and making sure that walking, cycling and public transport are attractive choices,* an aim iterated in the Aberdeenshire Local Development Plan.

Policy Integration

In terms of transport land-use integration, the integration points noted for Option 4 can be applied but additionally of relevance is the RTS **Bus Action Plan**. The Bus Action Plan includes proposals to improve capacity at Ellon Park & Ride and the introduction of mini Park & Ride sites as well as the promotion of bus priority measures at key locations in addition to interchange opportunities at Fraserburgh and Peterhead. These proposals are consistent with those considered as part of Option 5.

It should also be noted that unlike Option 4, Option 5 includes providing extended bus lanes. Extending the bus lane on the A90(T) from Bridge of Don to Ellon would reduce the available road space to other vehicles which will impact upon non-bus based modes of travel and in this regard may not support the **Scotland's National Transport Strategy** key outcome for *improved journey times and connections.*

Summary

Given the three sun-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.15.

Table A.15 : Option 5 Integration sub-criteria scores

Option 5: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	2	Moderate benefits in terms of transport integration, providing increased frequency of public transport services and improved journey times. Active travel measures will also link with key services across the region.
Transport and Land-use Integration	2	Positive benefit relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment.
Policy Integration	1	Positive benefit in terms of improvements to public transport journey times, road safety, integration, inclusion and emmissions reductions. Should be noted that due to reductions in road space, there will be impacts upon journey times for non public transport vehicles.
Overall	**2**	**Moderate positive benefit likely to be realised through supporting development plans, general consistency with policy documents. There should also be transport integration benefits as significant improvements and links to the public transport network will be observed.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 5 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.5.5 Accessibility and Social Inclusion

The option will bring accessibility and social inclusion benefits as per Option 4, but to a further enhanced level as sections of dedicated bus lanes will be added, along with the further development of Park & Ride sites. Benefits include:

- Further reduced public transport journey times and public transport reliability on those sections of the route where bus priority is provided, making the bus a more attractive option and increasing opportunities for people to access jobs, education, health care, and other facilities directly.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 5 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.5.6 Option 5 Summary

Table A.16 shows the scores awarded for the appraisal of Option 5 against the STAG criteria.

Table A.16 : Option 5 STAG Criteria Appraisal Scores

Option 5: Bus service improvements (as Option 4) accompanied by priority infrastructure and Park and Ride improvements					
	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-1	1	1	2	2

A.6 Option 6

Phased reinstatement on existing railway alignments, via Dyce, including examining options for light rail or tram (Dyce to Ellon, Ellon to Maud/Peterhead, Maud to Fraserburgh)

A diagram of Option 6 is presented in Section 3.7.

A.6.1 Environment

The initial STAG Environment appraisal of Option 6 has considered the environmental implications of the proposals to reinstate and operate a new railway following the corridor of the former rail route identified in the option description and drawing on key environmental designations and constraints data prepared for Pre-Appraisal.

New railway stations would be required where the railway route passes through (or terminates at) the towns of Newmachar, Ellon, Maud, Mintlaw, Strichen, Fraserburgh, and Peterhead. It is assumed that stations would be developed within the urban areas and where possible close to the former station sites. Re-instatement of the railway and associated infrastructure, such as rail freight facilities, is not expected to require permanent development on significant new areas of agricultural land.

It is also assumed that construction works for the proposals would be undertaken concurrently. The rail proposals may result in some localised changes in road traffic (e.g. to access new stations) but overall railway operations are anticipated to contribute to modal shift from road to rail, particularly in combination with the proposed active travel complementary measures.

The appraisal assumes that modern low emissions rail vehicles would be used on the route and that best use would be made of existing railway structures (e.g. key bridges) and that new facilities such as stations or freight sidings would be sited and designed sensitively with respect to surrounding land uses, landscapes/townscapes, and environmental constraints.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the railway routes and features of the environmental baseline include:

- Settlements and properties adjacent to the road corridors in particular:
  - Dyce to Ellon: Dyce, Newmachar, and Ellon
  - Ellon to Peterhead: Ellon, Maud, Mintlaw, Longside, and Peterhead
  - Maud to Fraserburgh: Maud, Strichen, and Fraserburgh
- Key watercourses of the River Don, River Ythan (in Ellon), the South Ugie Water (in Maud, Mintlaw, and Longside), the North Ugie Water (Strichen) including some areas of flood risk along their corridors. These watercourses are predominantly of moderate water quality but the Ythan is sensitive to nitrate pollution and has designated areas of nature conservation (as follows) associated with its estuarial waters.
- An extensive low lying area to the south of Fraserburgh is located within high risk flood zone (and other flood risk areas in the flood plains of principal watercourses)
- Prime agricultural land which is prevalent throughout the former rail corridor

- Sites designated for geological interest at:
  - The boundary of Philorth Valley Geological Site of Special Scientific Interest (SSSI) which is contiguous with the line of the former railway approximately 2km south of Fraserburgh and designated for its Quarternary geology and geomorphology.
  - Towie Wood LNCS, between Ellon and Maud, which is designated for its rock exposures and through which the line of the former railway passes. These exposures are assumed to have been created as a result of original railway cutting works.
  - Areas with landscapes predominantly characterised by agriculture associated with the Agricultural Heartlands and Coastal Farmland Landscape Character Areas (LCAs) and areas with more urban landscape/townscape character on the periphery of Dyce and Peterhead.
  - Railway reinstatement between Dyce and Ellon would be located within 1km of a Garden and Designed Landscape (GDL) at Straloch near Newmachar. The route is also located within 2km of GDLs at Cairness and Crimonmogate (to the south of Peterhead) and follows the northern edge of Aden Country Park near Mintlaw.
  - Natura sites at Buchan Ness to Collieston Coast SPA which is located approximately 3km from the centre of Peterhead (where the railway would be expected to terminate) and the Ythan Estuary, Sands of Forvie and Meikle Loch SPA, which lies approximately 3km east of the line near Ellon.
  - The northern terminus of the line at Fraserburgh is located within 1km of the Roseharty to Fraserburgh Coast Site of Special Scientific Interest (SSSI), which is designated for passage and wintering wader birds.
- Designated sites for biodiversity within 1km of the railway line:
  - Fraserburgh Bay Local Nature Conservation Site (LNCS), designated for coastal habitats including dune systems, on the south eastern edge of Fraserburgh where the line of the former railway passes through approximately 0.5km of the site at its extreme western edge
  - Pitfour Lake LNCS (designated for aquatic vegetation) at Mintlaw where the former railway route is contiguous with the boundary of this local site
- A number of Category A Listed Buildings and Scheduled Monuments within 1km of the former railway alignment.
- Conservation Areas at Fraserburgh, Crimonmogate, Strichen, Mintlaw, Peterhead and Kingseat Hospital (near Newmachar) are located between 0.5km and 2km of the rail corridor (or potential station sites).
- Use of the former railway as a recreational and commuting route for walkers, cyclists, and equestrians.

Potential impacts of the proposals on the environment are:

- Potential for railway operations to generate noise and local air pollutants (for diesel trains only) for some receptors and communities in the former rail corridors including where the railway runs through settlements for stations
- Increased carbon emissions from railway operations (passenger and freight train movements)

- Changes to hydrological character and drainage from permanent re-development of the railway corridor and associated facilities such as stations and freight areas
- Permanent loss of habitats and agricultural land from railway re-development/ development of new freight facilities with associated effects on farm units from loss of land and severance/fragmentation of fields
- Changes in landscape (and for stations townscape) character from permanent changes in land cover, loss of vegetation, earthworks and visual intrusion impacts from the railways, stations and from train operations
- Changes in use of the former railway which is currently a walking and cycling route and which is extensively used for farm access
- Direct and indirect effects associated with land take from areas with natural heritage designations including SSSIs and locally designated sites of importance for biodiversity
- Permanent loss of other habitats from construction and development of the proposals and associated impacts on species (including protected species)
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance from permanent development and operation of the railways

Where the rail routes pass close to residential areas it is assumed that noise mitigation measures (such as noise bunds, fences, or cuttings) would be incorporated in the design to reduce noise increases for adjacent receptors. It is also assumed that scheme design would incorporate measures to allow for wildlife permeability of the route (e.g. mammal underpasses), new areas of native woodland planting to mitigate loss of woodland habitats and that the routes would be designed to fit the topography and landscape as far as possible through sensitive design which reflects local landforms (within the constraints of following the former railway solum). New infrastructure would be screened as far as possible from sensitive visual receptors through design and/or planting proposals.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Appropriate landscaping and measures to enhance local biodiversity
- Use of sustainable drainage systems (SuDS) in the redevelopment of the railway to attenuate run-off flows and aquatic pollutants
- Construction works would follow good site practices to avoid pollution of the water environment and be detailed to take account of areas such as the River Ugie catchment which is a drinking water protection area
- Provision or alternative walking and cycling routes

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- Proposals for railway reinstatement and operation are predicted to result in exposure to operational railway noise which may be significant for some receptors and communities close to the route depending on the effectiveness of mitigation measures such as track side noise barriers.
- Beneficial noise impacts are predicted where the rail reinstatement results in modal shift and reduced road traffic and associated noise levels from roadside locations on key roads in the study area.
- There would be no predicted impacts on existing Candidate Noise Management Areas (for rail) as none is located within the study area, however, there is minor potential for indirect impacts on CNMAs outwith the study area if the new line resulted in material changes to the frequency of rail services on routes between Aberdeen and Inverurie/Stonehaven (this would need to be confirmed in later work).
- Construction works for rail reinstatement are predicted to have temporary and short term significant noise impacts on receptors close to the railway. Good construction practices are predicted to reduce these impacts to limited periods of the noisiest activity.
- Overall noise impacts are predicted to range from **minor benefit to moderate negative impact**.

Global and Local Air Quality

- Carbon emissions from operation of the reinstated railway would depend upon the type of rail vehicles operated and the frequency of timetabling. With the deployment of electric trains/trams no significant impacts on carbon emissions are predicted.
- Beneficial global emissions impacts are predicted where operation of the reinstated railway generates modal shift (freight and passengers) from road to rail which results in a reduction in overall emissions from road traffic.
- Overall it is predicted there would be a **minor benefit** on global air quality from railway reinstatement
- Railway operation is predicted to increase exposure to local air pollutants from (diesel) rail vehicle emissions, but significant impacts are not considered likely. Where electric railway locomotives are deployed (particularly for tram and light rail) no impacts on local air quality would be predicted.
- Beneficial local air pollutants are predicted where operation of the railway generates modal shift (freight and passengers) from road to rail which results in a reduction in overall emissions from road traffic.
- A minor beneficial impact is predicted for receptors in the Air Quality Management Areas (AQMAs) designated in Aberdeen city centre and Anderson Drive where rail operations reduce road traffic flows on key roads.
- Implementation of good construction practices during construction would be predicted to prevent significant impacts from dust deposition on receptors close to the line.
- Overall local air pollutant impacts are predicted to be at least of **minor benefit.**

Water Quality, Drainage, and Flood Defence

- Reinstatement works for the railway formation, bridges over watercourses and associated facilities such as stations are predicted to locally change hydrology, however, impacts are assumed to be mitigated through measures such as sustainable drainage of the permanent design and would not be significant.
- Operational impacts from track drainage and leaks/spills from trains would be predicted from train movements, dependent on the frequency of railway operations, but are not predicted to be significant.
- It is predicted that with mitigation measures in place the permanent development and reinstatement of the railway and its operation would not have significant impacts on water quality and drainage.
- There is a potential for significant impacts on flooding in areas where the route crosses high flood risk zones (or as a result of flooding on the railway) and this would require more detailed assessment at later design stages. Strategic flood risk assessments may be needed at later design stages to confirm any impacts on flooding.
- Overall impacts on water quality, drainage and flood defence are predicted to be **minor negative impact** assuming any significant flooding issues were mitigated.

Geology, Soils, and Agriculture

- The route of the former railway passes through the Philorth Valley SSSI, but it is not predicted that reinstatement of the railway would significantly affect the integrity of this site provided works remain within the original railway formation.
- The former rail route also passes directly through Towie Wood LNCS which is designated for its rock exposures. These exposures are assumed to have been created by the original railway cutting works and it is not predicted that railway reinstatement would significantly affect the scientific interest of the site.
- The former railway is extensively used by farmers to provide access to farm land therefore accommodation works and mitigation measures to maintain access to farm land would be required to avoid significant impacts on agricultural operations.
- Reinstatement construction works for the railway formation and associated facilities such as stations are not predicted to significantly affect geological and soil resources given the existing presence of the (former) railway route and its engineered structure.
- Overall impacts on geology, soils, and agriculture are predicted to range from **minor to moderate negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by reinstatement of the former railway route. Railway reinstatement between Dyce and Ellon would be located within 1km of Straloch GDL and within 2km of GDLs at Cairness and Crimonmogate and follows the northern edge of Aden Country Park near Mintlaw. No significant landscape impacts on these areas are predicted as the railway is an established linear feature within the landscape.
- The option is not predicted to significantly affect areas of greenspace associated with the edges of Dyce, Ellon, Peterhead, and Fraserburgh; although the change of use from an existing walkway/cycleway to operational railway would be predicted to significantly affect the landscape and visual perception of the route for existing users.
- The option would locally change landscape character as a result of the change from non-motorised user route to an operational railway with associated works, such as stations or freight sidings, and is predicted to have some significant permanent impacts on landscape and townscape.
- Reinstatement of the former railway, associated facilities, and rail traffic using the line, would have the potential for significant visual impacts for nearby sensitive receptors and locations with key views of the proposals and for walkers, etc. on any alternative path provision.
- Reinstatement construction works for the railway formation and associated facilities such as stations are not predicted to have significant landscape and visual impacts as they would be temporary for the duration of the works and mitigated through adoption of good construction practices.
- Overall impacts on landscape and visual amenity are predicted to be a **moderate negative impact** with potential to reduce to **minor negative** in the longer term.

Biodiversity and Habitats

- The proposed railway reinstatement is not predicted to have any likely significant effects on any designated sites of European nature conservation importance (Natura 2000 sites) or SSSI sites due to the nature of the proposals and their distance from designated areas.
- It is not predicted that the proposals would have significant impacts on LNCS sites assuming that no direct loss of habitat from these areas would be required beyond the existing solum of the railway and works were undertaken sensitively in these areas.
- Railway reinstatement is not predicted to affect large areas of undisturbed habitat but would impact significantly on the existing wildlife corridor. Permanent redevelopment of the route would involve some loss of scrub and woodland which has established at the edges of the track (e.g. on embankments and cuttings) with predicted moderate biodiversity impacts on habitats and dependent species. Field surveys would be required to determine the specific importance and sensitivity of the affected areas and required mitigation and to inform potential locations for new freight facilities and stations.

- The permanent development of the proposals would also potentially affect a range of species as a result of some habitat loss/fragmentation and displacement including protected species such as badger, red squirrel and otter. Bats may be affected where roosts have been established in former railway bridges and other structures. Further protected species surveys would need to be undertaken to inform a more specific appraisal of potential impacts.
- There is potential for the construction works for the railway reinstatement to indirectly affect habitats and species adjacent to the route including protected species and breeding birds and to affect sensitive watercourses from any required bridge works. With mitigation these effects are not predicted to be significant.
- Overall impacts on biodiversity and habitats are predicted to be a **moderate negative impact.**

Cultural Heritage

- The permanent development of the railway reinstatement is not predicted to directly impact on any nationally designated archaeological or cultural heritage site
- Railway reinstatement and related station and freight facility works could affect the setting of designated sites in the vicinity of the route depending on the final designs but are not predicted to be significant at this stage
- Significant impacts on the setting of GDLs within 2km of the line are not predicted since new works would be generally contained within the existing rail corridor and new mitigation planting would be implemented
- Railway upgrading works including new station buildings and freight facilities are predicted to have some impacts on the setting of Conservation Areas, depending upon final location and mitigation such as design of buildings to fit with vernacular architecture, however, significant impacts are not anticipated at this stage
- Construction works for railway reinstatement are not predicted to significantly affect as, yet unrealised, archaeology since the proposals would follow the line of an existing engineered railway formation
- Overall impacts on cultural heritage are predicted to be **minor to moderate negative impact**

Physical Fitness

- The complementary measures to enhance active travel are predicted to have **neutral to minor beneficial** impacts on health and physical fitness (and associated economic benefits to the workforce through reduced absenteeism for example) through their integration with the reinstated railway and new stations to encourage walking and cycling as part of journeys. The impact would depend on the extent to which the loss of the former railway corridor as a walking and cycling route was mitigated through provision of alternative facilities.

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 6 has been awarded a score of **-2,** and the outcome is expected to bring **Moderate Negative Impact.**

A.6.2 Safety

As discussed in Section A.1.2, discussion with both Police Scotland and Scotland Fire and Rescue during the study's engagement programme suggests that accidents in the area are caused by a number of factors including:

- Driver frustration at lack of over-taking opportunity
- Young and inexperienced drivers
- Older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives that suit their needs

The interventions forming this option would specifically target the second and third causes noted, with the reinstatement of a tram/light railway on existing alignment, namely the Formartine & Buchan Way route enabling greater public transport accessibility for younger and older drivers. Providing this accessibility, and encouraging those with a high propensity for accidents onto the rail network would reduce the overall accident potential on the road network within the study area.

Rail in general is often seen as a more attractive public transport mode than the bus, even when quantitative factors such as time and cost are equal. As such, the implementation of a new rail line in the area may well attract a higher number of users than would potentially be attracted to improved bus services (as per Option 4 and 5).

The option may bring safety benefits including:

- An overall shift towards rail travel from the private car, reducing the volume of traffic on the road network, specifically on the A90(T) and A952 and hence the accident potential, leading to:
  - Increased safety on roads within the study area for all road users including cyclists and pedestrians
  - A reduction in unpredictable delays due to accidents on the road network leading to a lessening of the impact of unpredictability on businesses as noted in the Option 1 Safety Appraisal in Section A.1.2.

Reducing the accident potential on the A90(T) south of Fraserburgh On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 6 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.6.3 Economy

Phased reinstatement of a heavy rail or tram/light rail line on existing alignments would bring economic benefits including:

- Journey time improvements, particularly if heavy rail were introduced, as rail services are expected to be timetabled to operate faster than a number of private car journeys. The level of journey time improvements has not yet been estimated. It is expected that there would be an element of modal shift from private car to heavy rail or tram/light rail travel, allowing the road network to operate more efficiently, albeit the benefits are likely to be small. As discussed in the appraisal against the TPOs in Section 3 of the main report, journey time improvements would be anticipated to be greater if heavy rail were introduced compared to that which may achieved if a tram/light rail option were implemented.

  An estimation of the journey times that could be achieved by rail has been made for the route. The speed of the trains has been based on the average speed on a number of other routes in the Aberdeen and Aberdeenshire area, as shown Table A.17.

Table A.17: Option 6 Estimated Rail Travel Speeds

Station	Distance from Station to Aberdeen (km)	Average Journey time (mm:ss)	Speed (kph)	Assumed Average Speed (kph)
Inverurie	27.2	00:23:00	71.0	**86.7**
Portlethen	16.0	00:10:00	96.0	
Stonehaven	25.6	00:16:00	96.0	
Laurencekirk	49.6	00:30:00	99.2	
Huntly	65.6	00:50:00	78.7	
Keith	84.8	01:04:00	79.5	

The estimated rail journey times are shown in Table A.18, and assume a rail service from the study area to Aberdeen railway station which does not require interchange at Dyce. A ‘stop time’ of 2min is assumed per station and it is assumed that the average speed estimated from other routes encompasses acceleration and deceleration.

The table shows journey times of:

- 28min between Aberdeen and Ellon
- 62min between Aberdeen and Peterhead
- 64min between Aberdeen and Fraserburgh

Table A.18 : Option 6 Estimated Rail Journey Times

Station to Station Journey Time	Distance (km)	Time (mm:ss)	Stop Time (mm:ss)	Total time (hh:mm:ss)
Aberdeen to Dyce	8	05:30	02:00	00:07:30
Dyce to Newmachar	8	05:30	02:00	00:07:30
Newmachar to Ellon	16	11:00	02:00	00:13:00
Ellon to Maud	18	12:30	02:00	00:14:30
Maud to Mintlaw	9	06:00	02:00	00:08:00
Mintlaw to Peterhead	14	09:30	02:00	00:11:30
Maud to Strichen	9	06:00	02:00	00:08:00
Strichen to Fraserburgh	17	11:30	02:00	00:13:30
Overall Journey Time	**Distance (km)**	**Time (mm:ss)**	**Stop Time (mm:ss)**	**Total time (hh:mm:ss)**
Aberdeen to Ellon	**32**	**22:00**	**06:00**	**00:28:00**
Aberdeen to Peterhead	**73**	**50:30**	**12:00**	**01:02:30**
Aberdeen to Fraserburgh	**76**	**52:30**	**12:00**	**01:04:30**

A comparison has also made against both existing 2012 and predicted 2023 journey times by road. It should be noted that the future 2023 predicted journey time points (from the ASAM model) correlate to junctions on the A90(T) close to the towns of Ellon, Peterhead, and Fraserburgh and, as such, are not a true point-to-point comparison against the rail journey times, as rail stations at assumed to be close to the town centres. As such, the 2023 predicted car journey times cover a slightly shorter distance than the rail based journey times.

Table A.19 shows rail journey times compared to existing 2012 and future 2023 travel times by road, both northbound and southbound for the AM and PM periods, and shows:

- Compared to the 2012 road travel times:
  - A comparable rail travel time northbound in the AM between Aberdeen and Ellon
  - Journey times by rail that are slower northbound in the AM between both Aberdeen and Peterhead (over 16min slower by rail) and Aberdeen and Fraserburgh (over 5min slower by rail)
  - A journey time saving southbound in the AM, between Ellon and Aberdeen (8min quicker by rail), and between Fraserburgh and Aberdeen (over 1min quicker by rail)
  - A journey time saving northbound in the PM, between Aberdeen and Ellon (15min quicker by rail), and between Aberdeen and Fraserburgh (over 7min quicker by rail)
  - A journey time saving southbound in the PM, between Ellon and Aberdeen (9 and a half minutes quicker by rail), and between Fraserburgh and Aberdeen that is 3min quicker by rail)

- In both AM and PM periods in both northbound and southbound direction there are slower journey times to/from Peterhead by rail due to the circuitous route required via Maud (16min and 9min slower in the AM northbound and southbound respectively, and 2min and 8min slower in the PM northbound and southbound respectively).

- Compared to the 2023 road car travel times:
  - A journey time saving southbound in the AM between Ellon and Aberdeen (4min quicker by rail)
  - Journey times by rail that are slower southbound in the AM between both Peterhead and Aberdeen (12min slower by rail) and Fraserburgh and Aberdeen (4min slower by rail)
  - A journey time saving by rail northbound in the PM between Aberdeen and Ellon (17min quicker)
  - A journey time saving by rail northbound in the PM between Aberdeen and Peterhead (2 and a half minutes quicker)
  - A journey time saving by rail northbound in the PM between Aberdeen and Fraserburgh (11 and a half minutes quicker)
  - There are generally slower journey times to/from Peterhead by rail due to the circuitous route required via Maud (21min and 12min slower in the AM northbound and southbound respectively, and over 20min slower southbound in the PM)

Table A.19 : Option 6 Estimated Rail Journey Times compared to existing car travel time

Time Period	Direction	Year	From/To	Journey Time (hh:mm:ss)		
				Option 6	Average travel time by car[1,2]	Difference compared to car travel time
AM	Northbound	2012	Aberdeen to Ellon	00:28:00	00:28:30	-00:00:30
			Aberdeen to Peterhead	01:02:30	00:46:00	00:16:30
			Aberdeen to Fraserburgh	01:04:30	00:59:00	00:05:30
		2023	Aberdeen to Ellon	00:28:00	00:23:30	00:04:30
			Aberdeen to Peterhead	01:02:30	00:41:00	00:21:30
			Aberdeen to Fraserburgh	01:04:30	00:49:30	00:15:00
	Southbound	2012	Ellon to Aberdeen	00:28:00	00:36:00	-00:08:00
			Peterhead to Aberdeen	01:02:30	00:53:30	00:09:00
			Fraserburgh to Aberdeen	01:04:30	01:06:00	-00:01:30
		2023	Ellon to Aberdeen	00:28:00	00:32:00	-00:04:00
			Peterhead to Aberdeen	01:02:30	00:50:30	00:12:00
			Fraserburgh to Aberdeen	01:04:30	01:00:00	00:04:30
PM	Northbound	2012	Aberdeen to Ellon	00:28:00	00:43:00	-00:15:00
			Aberdeen to Peterhead	01:02:30	01:00:30	00:02:00
			Aberdeen to Fraserburgh	01:04:30	01:12:00	-00:07:30
		2023	Aberdeen to Ellon	00:28:00	00:45:00	-00:17:00
			Aberdeen to Peterhead	01:02:30	01:05:00	-00:02:30
			Aberdeen to Fraserburgh	01:04:30	01:16:00	-00:11:30
	Southbound	2012	Ellon to Aberdeen	00:28:00	00:37:30	-00:09:30
			Peterhead to Aberdeen	01:02:30	00:54:00	00:08:30
			Fraserburgh to Aberdeen	01:04:30	01:07:30	-00:03:00
		2023	Ellon to Aberdeen	00:28:00	00:25:00	00:03:00
			Peterhead to Aberdeen	01:02:30	00:42:00	00:20:30
			Fraserburgh to Aberdeen	01:04:30	00:51:30	00:13:00

[1] *Average travel time by car for 2012 based on observed Tom-Tom data from Bridge of Don to Peterhead and Fraserburgh and modelled 2012 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models from the Bridge of Don to Aberdeen City centre*

[2] *Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from Bridge of Don to Peterhead and Fraserburgh, and modelled 2023 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models from the Bridge of Don to Aberdeen City centre*

- Heavy rail or tram/light rail reinstatement will likely result in significant improvements in journey time reliability for those who choose to use the service as the service would not be subject to road based delays and would generally operate to timetable, allowing users to robustly predict their travel times. Dependent on the levels of modal shift towards rail, there may be reliability benefits observed on the road network however these will probably be to a small degree.
- It would be anticipated that there would be both an element of modal shift from private car and the bus to heavy rail or tram/light rail services, and an element of newly generated trips i.e. the trips would not be made if the heavy rail or tram/light rail service were not introduced. The public generally view rail services as more attractive than bus and evidence from recent railway line openings in Scotland indicates rail does generate a significant number of new journeys. The number of people attracted to the service would be expected to be greater for the heavy rail option.
- Rail services provide a real opportunity for people to access jobs and services further afield. This benefit will be particularly felt by those without access to a car as the rail line is proposed to extend to areas which are considered deprived (including areas with low levels of car ownership compared to the wider Aberdeenshire area), namely Fraserburgh and Peterhead, as per the Scottish Index of Multiple Deprivation (SIMD). The benefit would likely be greater if heavy rail were introduced, given the greater journey time benefit anticipated.
- Additional transport infrastructure will also make the area more attractive to investment, as potential businesses and employers recognise that there are facilities in place to access local and regional labour markets. The benefit would likely be greater if heavy rail were introduced, given the ability for freight transportation which would not be possible on a tram/light rail service.
- Provision of a heavy rail or tram/light rail services on the existing alignment will also support residential and commercial investment identified in development plans.

While there may be a number of significant local economic benefits which can be realised by introducing heavy rail or tram/light rail services on the existing alignment, there could also be disbenefits. In particular:

- The new heavy rail or tram/light rail line could provide employment options in Aberdeen to those based in the north of the study area, potentially putting a strain on local labour markets in the north.
- There could be an impact on the commercial viability of the current bus network due to a shift from bus to heavy rail or tram/light rail use.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 6 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefits.**

A.6.4 Integration

Transport Integration

Provision of a heavy rail or tram/light rail services will be designed to integrate directly into the public transport network ensuring key connections with bus, and walking/cycling links to stations, providing access to a wide variety of locations.

Consistent with recent tram and railway station openings in Scotland, new stations/stops would be designed to current best practice standards which are fully DDA compliant, maximising use of public transport.

Railway stations would also offer ticket purchase facilities which can include through travel by rail, and multi-modal *plus bus* tickets where available, therefore improving transport integration through ticketing and reducing interchange penalties.

While the reintroduction of heavy rail or tram/light rail services will generally have positive benefits in terms of integration, it is important to remember that there will be some key challenges to overcome. There are currently capacity constraints at certain times at Aberdeen train station which would have to be overcome to effectively link rail services on the reinstated route into the main network.

When considering the package of high level active travel measures, it is important to note the following benefits will be accrued:

- Active travel measures will be integrated with the new light rail or tram route to provide an attractive alternative to car use end-to-end sustainable journeys
- New and improved cycle links and routes will allow safer access by foot and bike to stops/stations, encouraging improved take up of public transport and modal shift away from the car
- Providing infrastructure such as cycle racks at station/stops and safe crossing locations on route to the stations/stops ensures that walking and cycling are key parts of an integrated transport network
- Allowing for cycles on the new light rail/tram service would encourage the use of the network

Transport and Land Use Integration

Option 6 would support the Aberdeen City and Shire Strategic Development Plan, and the Local Development Plans for Aberdeenshire and Aberdeen City Councils by providing important public transport connections between some of the key areas of proposed development (Dyce, Ellon, Mintlaw, Peterhead, and Aberdeen) and the Aberdeen City region.

Engagement with the **Energetica** project team, have made it clear that in order to attract and retain businesses, transport infrastructure has to be improved. Provision of tram or rail services across the area is important to link areas of population and employment is critical to support the objectives of the Energetic project, ensuring that business can be effectively supplied by the labour market.

The alignment of any new heavy rail or tram/light rail service utilising the former Formartine and Buchan Way would not provide any additional public transport route to service some of the large housing and employment land allocations within Aberdeen City and Aberdeenshire's Local Development Plan which are contained within the Energetica Corridor, i.e. Bridge of Don, Blackdog, Balmedie, etc. As such, the alignment of the existing Formartine & Buchan Way route does not optimally support the land-use allocations in the study area.

The **Aberdeen City Centre Master Plan** will require a step change in access to the City centre with a high reliance on public transport. The introduction of a new public transport link from the study area to Aberdeen would support the Masterplan proposals by providing additional capacity in the public transport network to enable movements to and from the city centre without reliance on the private car.

Policy Integration

A full review of transport and wider policies has been undertaken and can be found within the baseline report. Transport and wider policy issues which are of relevance to Option 6 are summarised as follows:

- **Scotland's National Transport Strategy** focuses on three key outcomes:
  - Improved journey times and connections
  - Reduced emissions
  - Improved quality, accessibility, and affordability of public transport

Considering the above, providing new heavy rail or tram/light rail services across the region will improve public transport journey times and connections across the study area.

The introduction of new heavy rail or tram/light rail services should encourage modal shift from the private car to rail/tram which would help reduce the number of vehicles on the roads, thereby helping to reduce vehicular emissions. Evidence from rail openings across Scotland has shown that this can encourage both modal shift away from the private car and new journeys.

- **Nestrans Regional Transport Strategy** refresh contains a commitment to carry out an all modes study of the corridor from Fraserburgh and Peterhead to Aberdeen, including rail options. Consideration of option 6 is part of this commitment.
- **Nestrans Regional Transport Strategy** sets out four key objectives, all of which are directly relevant to this proposal:
  - Economy
  - Accessibility, Safety, and social inclusion
  - Environment
  - Spatial Planning

    Provision of heavy rail or tram/light rail services would provide increased accessibility to jobs and services in the region increasing social inclusion and supporting the economy. In addition, any modal shift from car to public transport would reduce the volume of traffic on the road and in turn lead to reduced accident potential on the key strategic routes. Reduced traffic on the roads would lead to reduced traffic emissions overall, although emissions would be produce by heavy rail at point of use.

    A new public transport choice would support improved connectivity in the region by improving connections between Aberdeen and Aberdeenshire towns and enhancing public transport opportunities, supporting the spatial planning objective.
- A number of Action Plans were developed from the RTS. Of relevance are both the **Rail Action Plan** and the **Active Travel Action Plan.** The Rail Action Plan, while not specifically targeted at new rail lines, includes commitments to upgrade stations to DDA compliance, link stations with the active travel network and provide integrated multi-modal ticketing. It is anticipated that reinstatement of the rail line as per Option 6 will be consistent with the goals of the Rail Action Plan and maximise accessibility for all. It should be noted that the Rail Action Plan seeks to maximise long distance haulage of freight by rail. This would not be supported by a light rail or tram option.
- The **Active Travel Action Plan** notes key development priorities including linking Active Travel networks with transport interchange hubs. Providing rail connections, combined with proposals for a package of active travel measures will support the RTS Active Travel Action Plan.
- It should also be noted that reinstating a public transport route on the Formartine Way & Buchan Way would necessitate the removal of the current strategic active travel route which forms part of the National Cycle Network Route 1, sections of which are currently well used for walking, running, cycling and horse riding, and the southern section between Newmachar and Dyce is well used by commuters. This would not be in line with the Active Travel Action Plan (or the **Health and Transport Action Plan**) which seeks to ensure convenient, safe, comfortable and attractive travel choices for everyday journeys.

- The **Aberdeenshire Local Transport Strategy** sets out five key objectives, as discussed in Section A.1.4, all of which are directly relevant to this proposal.

  There will be environmental and safety benefits as public transport is a cleaner, more efficient and safer mode of travel. Integration will also improve as new services are linked with the existing public transport network, and complemented by proposals for active travel measures. In terms of the economy, provision of new public transport between key employment, health and social facilities in the study area with the Aberdeen conurbation will provide faster and more reliable public transport journey times for public transport users. Improvements to journey times will be a key support to the local, regional and national economy given the importance of the oil and gas sector. Improving public transport journey times also increases accessibility as services are now more appealing to everyone and can provide key links for those without alternative means of travel. All of these support the Local Transport Strategy.

  New rail services will support the goals of the Local Transport Strategy by encouraging modal shift to towards rail and active travel. Journey times will be improved for public transport users while there will be environmental and safety benefits to be observed as rail transport is a cleaner, more efficient and safer mode of travel. Accessibility will also improve as new services are linked with the existing public transport network, and complemented by proposals for active travel measures.

- **Scottish Government's Economic Strategy** contains a priority to promote inclusive growth and create opportunity through a fair and inclusive jobs market and regional cohesion. Option 6 will support this priority by providing transport services to ensure transport connections are in place to allow people to travel to jobs, effectively matching the best people with the most appropriate jobs.
- **Aberdeenshire Economic Development Strategy** notes key transport priorities which include:
  - Delivering an integrated and efficient transport system
  - Encouraging activity tourism by developing long distance walking and cycling routes

    Option 6 will help improve the efficiency of the transport network by providing new public transport options.
- The removal of the current long distance active travel route of the Formartine & Buchan Way would not support the priority for encouraging activity tourism by developing long distance walking and cycling routes.
- **Aberdeen City and Shire Tourism Strategy** notes a key strategy action plan to improve access within the area. Providing heavy rail or tram/light rail services which will be integrated with existing transport options will clearly support the strategy by enabling increased tourist accessibility in the area, particularly given the route of the proposed new service passes through Dyce railway station with existing public transport links to the airport. The required removal of the Formartine & Buchan Way active travel route would, however, take away from the active tourism potential of the area.

Summary

Given the three sub-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.20.

Table A.20 : Option 6 Integration sub-criteria scores

Option 6: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	2	Moderate benefits in terms of transport integration, providing a new mode of public transport increased frequency of public transport services and improved journey times. Active travel measures will also link with key public transport hubs across the region.
Transport and Land-use Integration	2	Positive benefit relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment.
Policy Integration	2	Moderate positive benefit in terms of improvements to public transport journey times, integration, inclusion and emmissions reductions.
Overall	**2**	**Moderate positive benefit likely to be realised through supporting development plans, general consistency with policy documents. There should also be transport integration benefits as significant improvements with introduction of new mode linked directly into the public transport network.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 6 has been awarded a score of **2,** and the outcome is expected to bring **2.**

A.6.5 Accessibility and Social Inclusion

The following benefits and impacts are noted for the option in terms of community and comparative accessibility:

Community Accessibility:

Public Transport Network Coverage

- The three main towns in the study area (Ellon, Peterhead, and Fraserburgh) are amongst the most remote from the rail network in Scotland.
- The introduction of a new heavy rail or tram/rail line in the study area would provide an additional travel mode choice in the study area and increase the overall public transport network coverage.
- The new heavy rail or tram/rail line would provide direct public transport connections between Fraserburgh, Peterhead, Mintlaw, Ellon, and Dyce/Aberdeen, removing the need to interchange in Aberdeen City centre and reducing public transport travel time to Dyce, a key employment hub, which currently requires a travel time of over 2hr from Peterhead and Fraserburgh.
- As the existing alignment of the Formartine and Buchan Way passes through Dyce there line would link into the Aberdeen to Inverness rail corridor, enabling employment opportunities not only in Dyce/Aberdeen, but also in further towns north-west of Dyce, i.e. Kintore, Inverurie to be realised.
- As the proposed route utilises the existing Formartine & Buchan railway line route, it does not provide the most direct link from Aberdeen to either Peterhead or Fraserburgh, although the route is reasonably direct to Ellon. In addition, the route does not provide additional public transport coverage for some of the key existing conurbations towards the south of the study area, i.e. Balmedie, Bridge Don as well as St. Fergus and a number of further settlements in the north of the study area. The settlements in the south of the area (Balmedie, Blackdog, etc.) have large housing allocations in the Aberdeenshire Local Development Plan which would not benefit from the new tram/railway line.
- The introduction of the new heavy rail or tram/rail line which is likely to draw public transport demand away from existing bus services could potentially risk the commercial viability of existing bus services in the study are which may be reduced or removed. This would be a significant disbenefit to those who do not live within easy reach of one of the railway stations associated with the new railway line. The overall public transport accessibility in the area may then reduce.

Access to Local Services

- The proposed route utilises the existing alignment on the Formartine and Buchan Way. The route is currently an active travel route for its entire length and forms part of National Cycle Network Route 1 between Dyce and Newmachar and south of Maud. The reinstatement of the former railway would remove the route for active travel use. This could reduce the accessibility of local services particularly within the towns of Fraserburgh, Peterhead, and Ellon and also on the section of the route between Newmachar and Dyce which is known to be well used by commuters.
- The package of active travel measures associated with the option would provide for active travel access to the railway stations themselves which may increase access to local services within the major towns themselves.

Comparative Accessibility:

Distribution of Impacts by People Group

As discussed for Option 4 in Section A.4.5, the increased public coverage would benefit those with no access to a car, young people and the elderly for whom driving is not an option, and the unemployed who would have improved access to job opportunities in Dyce, Aberdeen, and further afield.

Distribution of Impacts by Location

- Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan and pockets of deprivation are noted in both towns in the Scottish Index of Multiple Deprivation. Those resident in the two towns as well as in other smaller conurbations in the northern section of the study area will benefit most from increased travel choice and accessibility both within the study area and to/from Aberdeen.
- The use of the existing alignment of the Formartine and Buchan Way passes through Dyce railway station, which is close to one of the largest concentrations of employment in the Aberdeen area. As such, the additional direct public transport connectivity from the area to Dyce would provide increased accessibility to employment opportunities. Additionally, the accessibility of the airport, located close to Dyce with regularly operating bus services from Dyce railway station to the airport, would be improved. Currently there is no direct bus service from Fraserburgh to the airport and only one service a day to and from Peterhead.
- The new railway line would increase the public transport accessibility of Ellon, Peterhead, Mintlaw, and Fraserburgh potentially supporting local businesses by attracting employees from a wider work-force base.
- The new heavy rail or tram/light rail service on the existing alignment of the Formartine & Buchan Way would not provide any additional accessibility to the costal areas in the south of the study area and would provide increased accessibility to the Bridge of Don, another key area for employment in Aberdeen.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 6 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.6.6 Option 6 Summary

Table A.21 shows the scores awarded for the appraisal of Option 6 against the STAG criteria.

Table A.21 : Option 6 STAG Criteria Appraisal Scores

Option 6: Phased reinstatement on existing railway alignments, via Dyce, including examining options for light rail or tram					
	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-2	1	2	2	2

A.7 Option 7

Phased implementation of a new railway alignment, via the Bridge of Don, including examining options for light rail or tram.

A diagram of Option 7 is presented in Section 3.8.

A.7.1 Environment

The initial STAG Environment appraisal of Option 7 has considered the environmental implications of the proposals to construct and operate a new railway along the corridors identified in the option description and drawing on key environmental designations and constraints data prepared for Pre-Appraisal.

It has been assumed that the railway routes would broadly follow the corridors of the existing principal roads of the A90 and A952 between Aberdeen, Ellon, Fraserburgh, and Peterhead (with some local routeing into settlements such as Balmedie, Boddam, Mintlaw, St. Fergus, Crimond, etc. where new stations would be required). As the precise alignment of the proposed railway has not been specified at this stage (other than broadly following existing primary road corridors) it has not been possible to be specific in relation to potential impacts on designated areas and other key constraints and the impacts are predicted at a broad level, however, as there would be some flexibility in the final alignment of the railway lines, it has been assumed that the proposals would not be developed directly within key designated areas.

New railway bridges would be required over the principal watercourses in the option corridors which are the River Don, River Ythan near Ellon, and the North and South Ugie Water near Mintlaw and the River Ugie near Peterhead. It is also assumed that construction works for the proposals would be undertaken concurrently. New stations would be constructed in key settlements along the route and these are assumed at Balmedie, Ellon, Mintlaw, Boddam, Peterhead, and Fraserburgh. The rail proposals may result in some localised changes in road traffic (e.g. to access new stations) but overall railway operations are anticipated to contribute to modal shift from road to rail, particularly in combination with the proposed active travel complementary measures.

Appendix B presents the environmental designations and constraints for the study area. Key constraints along the corridors for the railway routes and features of the environmental baseline include:

- Settlements and properties adjacent to the road corridors in particular:
  - Aberdeen to Ellon: Bridge of Don, Balmedie, and Ellon
  - Ellon to Fraserburgh: Mintlaw, New Leeds, Rathen, and Fraserburgh
  - Ellon to Peterhead: Hatton, Boddam, and Peterhead
  - Peterhead to Fraserburgh, St. Fergus, and Crimond
- Key watercourses of the River Don, River Ythan and the South and North Ugie Water including some areas of flood risk along their corridors. These watercourses are predominantly of moderate water quality but the Ythan is sensitive to nitrate pollution and has designated areas of nature conservation (as follows) associated with its estuarial waters.
- Prime agricultural land which is prevalent throughout each of the rail corridors.

- Dependent on final alignments, the proposed new rail works would be potentially located within proximity of the following designated sites:
  - Bullers of Buchan Coast Geological Site of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) site which is located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam
  - Loch of Strathbeg Geological SSSI and GCR site which is located within 1.5km of the A90 between Peterhead and Fraserburgh near Crimond;
  - The Ythan Estuary, Sands of Forvie and Meikle Loch Special Protection Area (SPA)/Ythan Estuary and Meikle Loch Ramsar Site (designated for breeding and passage seabirds), which is located at its closest point to the existing road corridor within 1km of the A90 at Ellon where the route crosses the estuary of the River Ythan
  - The Buchan Ness to Collieston Coast SPA (and Bullers of Buchan Coast SSSI) (designated for breeding seabirds) located within 50m to 200m to the east of the route of the A90 for a 1.5km long section south of Boddam (and within 2km of the A90 for a 7km long stretch of this road corridor south of Peterhead
  - Loch of Strathbeg SPA and SSSI (designated for breeding Sandwich tern and a range of other non-breeding wintering waders and waterfowl) located within 1.5km to the east of the route of the A90 between Peterhead and Fraserburgh, near Crimond
  - The Buchan Ness to Collieston Special Area of Conservation (SAC), designated for its vegetated sea cliffs, which lies within 100m to the east of the route of the A90 corridor for a 1.5km long section south of Boddam
  - The Sands of Forvie and Ythan Estuary Site of Special Scientific Interest (SSSI))26 (breeding and non-breeding birds and waders) which is located at its closest point to the roads within 1.5km of the A90 at Ellon
  - Foveran Links SSSI (sand dunes) which lies within 3km (east) of the A90 corridor between Balmedie and Ellon
- Locally designated nature conservation sites within the corridors of the rail development proposals, in particular:
  - between Aberdeen to Ellon (A90 corridor), Donmouth Local Nature Reserve (LNR) (coastal habitats), the Local Nature Conservation Sites (LNCS) at River Don Corridor LNCS (woodland and marginal vegetation), Balgownie/Blackdog Links LNCS (dune system), Blackdog to Bridge of Don LNCS (coastal habitats), Dubbystyle LNCS (rush pasture and bog), Newburgh to Balmedie LNCS (sandy coastline)
  - between Ellon and Peterhead (A90 corridor), LNCS at Lochlundie Moss (raised bog) and Cruden Bay (coastal habitats)
  - between Ellon and Fraserburgh (A952/A90), Pifour Lake LNCS (aquatic vegetation), Cortes Reedbed LNCS (water, reed and fen) and Fraserburgh Bay LNCS (coastal habitats)
  - between Peterhead and Fraserburgh (A90 corridor), LNCS at Rattray Head to Peterhead Coast (coastal habitats) and Strathbeg to Rattray LNCS (coastal freshwater loch and associated habitat)

[26] Much of this area also falls within the designation of the Forvie National Nature Reserve (NNR)

- Garden and Designed Landscapes (GDLs) at Crimonmogate and Cairness (both near Fraserburgh) within 3km of the principal A952 road corridor (and Crimomogate GDL which also lies adjacent to the A90(T) near Crimond)
- Conservation Areas potentially located within 2km of the proposed railway corridor (and potential stations in towns) at Boddam, Mintlaw, Fraserburgh, Crimomogate,
  and Peterhead

Potential impacts of the proposals on the environment are:

- Potential for railway operations to generate noise and local air pollutants (for diesel trains only) for some receptors and communities in the transport corridors and where the railway routes into settlements for new stations, depending on the final horizontal and vertical geometry of the railways
- Increased carbon emissions from railway operations
- Changes to hydrological character and drainage from permanent development of the railway corridor and associated structures (particularly large watercourse crossings)
- Permanent loss of habitats and agricultural land from railway development and associated effects on farm units from loss of land and severance/fragmentation of fields
- Changes in landscape (and for stations townscape) character from permanent change in land cover, loss of vegetation, earthworks and visual intrusion impacts from the railways, stations and from train operations
- Direct and indirect effects associated with land take from areas with natural heritage designations including sites of European nature conservation (SPAs and SACs), SSSIs, and locally designated sites of importance for biodiversity
- Permanent loss of other habitats from construction and development of the proposals and associated impacts on species (including protected species)
- Loss of archaeological resources from permanent works and indirect impacts on the setting of designated sites of cultural heritage importance from permanent development and operation of the railways.

Where the rail routes pass close to residential areas it is assumed that noise mitigation measures such as false bunds and/or noise fences would be incorporated in the design to reduce noise increases for adjacent receptors. It is also assumed that scheme design would incorporate measures to allow for wildlife permeability of the route (e.g. mammal underpasses), new areas of native woodland planting to mitigate loss of woodland habitats and that the routes would be designed to fit the topography and landscape as far as possible through sensitive design which reflects local landforms. New infrastructure would be screened as far as possible from sensitive visual receptors through design and/or planting proposals.

Key mitigation for the option would also be expected to include:

- Adoption of good practice during scheme construction (e.g. damping down of earthworks, screening noisy plant, prevention of siltation in site run-off, etc.)
- Balancing cut and fill to reduce impacts on soil resources and materials
- Sensitive design of new structures for river crossings to avoid in-river works and to reduce effects on riparian habitats and flood plains

- Use of sustainable drainage systems (SuDS) in the design of new railways to attenuate track run-off flows and aquatic pollutants
- Appropriate landscaping and measures to enhance local biodiversity

The key findings of the environmental appraisal of the proposed option are:

Noise and Vibration

- Proposals for new railway operation are predicted to result in exposure to operational railway noise for some receptors and communities close to the route of the railway depending on the effectiveness of mitigation measures, such as track side noise barriers, and on the existing noise environment from road traffic on nearby parallel routes.
- Key areas where rail noise impacts are predicted are through or close to the main communities of North Aberdeen/Bridge of Don, Balmedie, Ellon, Mintlaw, Fraserburgh, Hatton, and Peterhead, and for smaller settlements and isolated receptors close to the route between these communities.
- Beneficial noise impacts are predicted where the rail development proposals result in modal shift and reduce road traffic (cars and HGVs) and associated traffic noise levels from roadside locations on key roads in the study area.
- There would be no predicted impacts on existing Candidate Noise Management Areas (for rail) as none is located within the study area however there is minor potential for indirect impacts on other rail CNMAs outwith the study area if the new line resulted in material changes to the frequency of rail services on routes between Aberdeen and Inverurie/Stonehaven (this would need to be confirmed in more detailed work).
- Construction works for new rail routes have the potential for some temporary and short term significant noise impacts on receptors close to the road/rail corridors. Good construction practices are predicted to reduce these impacts to limited periods associated with the most noisy activities.
- Overall noise impacts are predicted to range from **minor benefit to major negative impact.**

Global and Local Air Quality

- Carbon emissions from operation of the new railway would depend upon the type of rail vehicles operated and the frequency of timetabling. Electric trains/trams are assumed to offer potential for lower emissions than heavy rail diesel electric locomotives.
- Beneficial global emissions impacts are predicted where operation of the new railway generates modal shift (freight and passengers) from road to rail which results in a reduction in overall emissions from road traffic.
- Overall it is predicted there would be a **minor benefit** on global air quality from operation of the railway. Beneficial impacts would be predicted where railway operation contributes to mode shift from road to rail of passenger and/or freight movements.
- Proposals for operation of the new railway have the potential to increase exposure to local air pollutants from (diesel) rail vehicle emissions for some receptors and communities close to the rail line. Where electric railway locomotives are deployed (particularly for tram and light rail) no impacts on local air quality would be predicted.
- Beneficial impacts on local air pollutant emissions may be predicted where operation of the railway generates modal shift (freight and passengers) from road to rail which results in a reduction in overall emissions from road traffic and may reduce atmospheric concentrations of pollutants along key roads in the study area.
- There is potential for a slight beneficial effect on the Air Quality Management Areas (AQMAs) designated in Aberdeen city centre and Anderson Drive where rail operations result in reduced road traffic flows on roads within these AQMAs.
- Construction works for the railway proposals have the potential for some temporary significant local air quality impacts on receptors close to the rail corridors primarily from dust deposition. Implementation of good construction practices would prevent significant impacts.
- There may be an increase in local air pollutant emissions from road traffic within Aberdeen if road space is required for any light rail/tram alignment, which would cause delay to road traffic.

Overall local air pollutant impacts are predicted to be at least of **minor benefit.**

Water Quality, Drainage, and Flood Defence

- Permanent development of the new railway formation, bridges over watercourses and associated facilities such as stations have the potential to locally change hydrology however impacts are assumed to be mitigated through measures such as sustainable drainage of the permanent design.
- Operational impacts from track drainage and leaks/spills from trains would be predicted from train movements, the impacts of which would be dependent on the frequency of railway operations but are not predicted to be significant.
- It is predicted that with mitigation measures in place the permanent development of the railway and its operation would not have significant impacts on water quality and drainage taking account of assumed design and mitigation.

- There is a potential for significant impacts on flooding in river crossing areas (or as a result of flooding on the railway) and this would require more detailed assessment at later design stages. Strategic flood risk assessments may be needed at later design stages to confirm any impacts on flooding.
- It is assumed that construction works would follow best site practices to avoid pollution of the water environment and significant construction impacts on water quality are not predicted.
- Overall impacts on water quality, drainage and flood defence are predicted to be **minor negative impact** assuming any significant flooding issues were mitigated.

Geology, Soils, and Agriculture

- Construction and permanent development of the new railway is not predicted to affect any sensitive or designated geological sites and no significant impacts on geology are predicted (provided the alignment avoided geological SSSIs at Bullers of Buchan Coast to the south of Peterhead and Philorth Valley to the south of Fraserburgh). This would need to be confirmed at later stages of design and assessment when more specific alignment information was available.
- The new railway development would have potentially significant impacts on agriculture through loss of farm land and from severance and fragmentation of fields with associated impacts on farm units. The magnitude of this impact would vary for each land holding crossed and would depend on final alignments and opportunities to mitigate impacts such as farm accommodation works.
- Construction works for new railway development and associated facilities and stations are not predicted to significantly affect geological resources.
- There is a potential for construction to affect areas of potentially contaminated land associated with former industrial areas at the edges of built up areas and this would require more detailed investigation, assessment and if appropriate remediation at later design stages.
- Overall impacts on geology are predicted to be **minor negative** and impacts on soils and agriculture are predicted to range from **moderate to major negative impact.**

Landscape and Visual Amenity

- No areas with national, regional or local landscape designations would be affected by permanent development of the railway line and related works which would generally follow existing transport routes.
- The new rail line would be located within approximately 50m of a Garden and Designed Landscape (GDL) at Crimonmogate and within approximately 1km of Balmedie Country Park and 2km of Aden Country Park near Mintlaw. Permanent development of the A90 between Peterhead and Fraserburgh is predicted to significantly affect the Crimomogate GDL if it could not be avoided. Significant landscape and visual impacts on the Country Parks are considered unlikely.
- The option has the potential to affect areas of greenspace particularly where the new line is developed through the edges of the built up areas around northern Aberdeen, Ellon, Peterhead, and Fraserburgh. Significant landscape impacts may be predicted in these areas depending on the detailed alignment of the rail line and the potential to mitigate impacts of the new works.

- The new rail lines have are predicted to have some significant impacts on landscape character as a result of clearance of vegetation and construction of new infrastructure which may be reduced in some areas by following the corridors of existing roads, such as the A90 and A952.
- New railway proposals and associated stations and freight facilities, and rail traffic using these routes, are predicted to have some significant visual impacts for nearby sensitive receptors and locations with key views of the proposals.
- Construction works for the new railway alignment and associated works are predicted to have the potential for significant localised landscape and visual impacts, however, they would be temporary for the duration of the works and mitigated through adoption of good construction practice.
- Overall impacts on landscape and visual amenity are predicted to be **moderate to major negative impact.**

Biodiversity and Habitats

- There is potential for the construction works and permanent development of the railway and any associated infrastructure to directly and/or indirectly affect the qualifying interests of a number of Natura and SSSI sites, depending on the proposed route of the line. Mitigation measures would need to be employed to ensure that disturbance works and impacts such as habitat loss from permanent development of the works did not adversely affect these sites and depending on the potential for likely significant effects Habitats Regulations Appraisal (HRA) would be required.
- The potential for significant impacts on a number of locally designated sites from habitat loss, fragmentation and other disturbance would need to be established when more specific railway alignments were known.
- Areas of ancient, semi-natural and native woodland habitats would constrain the development proposals and there is potential for significant impacts on woodland habitats and species from the construction and permanent development of the proposals.
- There is potential for the construction works for the railway to affect a range of habitats and species including protected species and breeding birds and to affect watercourses from bridge works. Mitigation measures would need to be employed to ensure that disturbance works were kept to a minimum and good site construction measures were followed to avoid affecting the water quality of key watercourses including the River Don, River Ythan and the Ugie Water.
- The proposed railway would result in an extensive area of habitat loss and fragmentation along the corridors proposed for the option which would range from relatively low ecological sensitivity agricultural land to areas of woodland and riparian habitats. The proposals are predicted to have significant biodiversity impacts from loss of these habitats and dependent on which species they support. Surveys would be required to determine the specific importance and sensitivity of the affected areas and to inform route strategies and required mitigation strategies.
- The permanent development of the proposals would also potentially affect a range of species as a result of habitat loss/fragmentation and displacement including protected species such as badger, red squirrel, otter and bats. Further protected species surveys would need to be undertaken to inform a more specific appraisal of potential impacts.
- Overall impacts on biodiversity and habitats are predicted to be **moderate to major negative impact.**

Cultural Heritage

- The permanent development of the railway is not predicted to directly impact on any nationally designated archaeological or cultural heritage site, as within the road corridors which form the outline for the route there is considerable scope to avoid such features
- There is a small number of Category A Listed Buildings and Scheduled Monuments within 1km of the road corridor alignments which it is assumed the railway would follow and railway development works could affect the setting of these sites depending on their final design and alignment
- The alignment of the railway between Mintlaw and Fraserburgh (broadly following the A952 corridor) would be potentially located within 2km of Cairness Garden and Designed Landscape (GDL) at (near Fraserburgh) and a railway alignment following the A90 near Crimond would be located within 50m of the GDL at Crimonmogate with the potential for significant impacts on the setting of these sites
- Railway development works including stations and freight facilities have potential for impacts on the setting of Conservation Areas at Boddam, Mintlaw, Fraserburgh, Crimonmogate, and Peterhead, and through part of old Aberdeen/Balgownie, depending upon final location and mitigation such as design of buildings to fit with vernacular architecture
- Construction works for new railway lines and associated works are predicted to have the potential to encounter as yet unrealised archaeology and it is assumed that mitigation measures such as watching briefs and appropriate trial trenching works would be undertaken in key areas
- Overall impacts on cultural heritage are predicted to be a **minor to moderate negative impact**

Physical Fitness

- The complementary measures to enhance active travel are predicted to have **minor beneficial** impacts on health and physical fitness (and associated economic benefits to the workforce through reduced absenteeism for example) through their integration with the new railway and new stations to encourage walking and cycling as part of journeys

On consideration of all the points raised regarding **Environment**, this aspect of the STAG criteria for Option 7 has been awarded a score of -3**,** and the outcome is expected to bring **Major Negative Impact.**

A.7.2 Safety

Option 7 is similar to Option 6 in terms of safety benefits as both introduce a new railway line into the study area, so all the safety benefits noted for Option 6 (in Section A.6.2) should also be assumed for Option 7.

The new railway alignment in Option 7 is assumed to route from Aberdeen to Ellon via the Bridge of Don and then to Peterhead to Fraserburgh roughly following the alignment of the A90(T) with diversions in to towns and villages as appropriate. Given this more direct route serves a greater number of conurbations than Option 6, the railway alignment assumed in Option 7 would provide increased rail accessibility to a greater number of people and destinations and would be assumed to create a larger shift from private car use to public transport. This reduction in traffic on the road network would:

- Further reduce the overall accident potential on the road network, specifically the A90(T) and A52 routes, for all users including cyclists and pedestrians.
- Further reduce unpredictable delays on the road network due to accidents, providing increased efficiency benefits to businesses using the routes, particularly with respect to the key fishing and oil & gas industries in the area for whom the movement of goods is often time critical.

On consideration of all the points raised regarding **Safety**, this aspect of the STAG criteria for Option 7 has been awarded a score of **1,** and the outcome is expected to bring **Minor Positive Benefit.**

A.7.3 Economy

Benefits accruing through the introduction of a heavy rail or tram/light rail route on a new alignment would be anticipated to be similar to Option 6 but with benefits at a greater level given the more direct routeing of the proposed line and the greater number of conurbations served (although it is noted the route does not pass through Dyce). Benefits will be felt through the following:

- Journey time improvements. The alignment as outlined in Option 6 does not provide direct links to the main business and population centres along the route. The more direct route proposed in this option would be routed to provide a more direct line, thus minimising journey times.

  An estimation of the journey times that could be achieved by heavy rail has been made for both the branch and extended continuous route to Fraserburgh via Peterhead. The speed of the trains has been based on the average speed on a number of other routes in the Aberdeen and Aberdeenshire area, as shown in Table A.17.

  The estimated rail journey times are shown in Table A.22. In line with the Option 6 analysis, a 'stop time' of 2min is assumed per station and it is assumed that the average speed estimated from other routes encompasses acceleration and deceleration.

  The tables show journey times for Option 7 of:

  - 25 and a half minutes between Aberdeen and Ellon (2min 30s quicker than Option 6, due to the more direct routeing out of Aberdeen via Bridge of Don)
  - 47min between Aberdeen and Peterhead (15min 30s quicker than Option 6, due the more direct routeing out of Aberdeen via Bridge of Don and additionally the direct routeing from Ellon to Peterhead, not via Maud as per Option 6)
  - 58 and a half minutes between Aberdeen and Fraserburgh (if a branch line from Ellon were implemented). This journey time is 6min quicker than the journey time for Option 6.
  - 70min between Aberdeen and Fraserburgh (if the rail route to Fraserburgh were an extension of the line to Peterhead). This journey time is 5 and a half minutes *slower* than the journey time for Option 6.

Table A.22 : Option 7 Estimated Rail Journey Times

Station to Station Journey Time	Distance (km)	Time (mm:ss)	Stop Time (mm:ss)	Total time (hh:mm:ss)
Aberdeen to Bridge of Don	5	03:30	02:00	00:05:30
Bridge of Don to Blackdog	3	02:00	02:00	00:04:00
Blackdog to Balmedie	4	02:30	02:00	00:04:30
Balmedie to Ellon	13	09:00	02:00	00:11:00
Ellon to Hatton	11	07:30	02:00	00:09:30
Hatton to Peterhead	14	10:00	02:00	00:12:00
Peterhead to St. Fergus	7	05:00	02:00	00:07:00
St. Fergus to Fraserburgh	21	14:30	02:00	00:16:30
Branch line: Ellon to Mintlaw	22	15:00	02:00	00:17:00
Branch line: Mintlaw to Fraserburgh	20	14:00	02:00	00:16:00
Overall Journey Time	**Distance (km)**	**Time (mm:ss)**	**Stop Time (mm:ss)**	**Total time (hh:mm:ss)**
Aberdeen to Ellon	**26**	**17:30**	**08:00**	**00:25:30**
Aberdeen to Peterhead	**50**	**35:00**	**12:00**	**00:47:00**
Aberdeen to Fraserburgh (continuous line from Peterhead)	**78**	**54:00**	**16:00**	**01:10:00**
Aberdeen to Fraserburgh (branch line via Mintlaw from Ellon)	**67**	**46:30**	**12:00**	**00:58:30**

Overall Journey Time	Distance (km)	Time (mm:ss)	Stop Time (mm:ss)	Total time (hh:mm:ss)
Bridge of Don to Ellon	**20**	**14:00**	**06:00**	**00:20:00**
Bridge of Don to Peterhead	**45**	**31:00**	**10:00**	**00:42:30**
Bridge of Don to Fraserburgh (continuous line from Peterhead)	**73**	**50:30**	**14:00**	**01:05:30**
Bridge of Don to Fraserburgh (branch line via Mintlaw from Ellon)	**62**	**43:00**	**10:00**	**00:47:30**

A comparison is also made against existing 2012 and future 2023 journey times by road as discussed for Option 6 in Section A.6.3.

It should be noted that the future 2023 ASAM predicted journey time points correlate to junctions on the A90(T) close to the towns of Ellon, Peterhead, and Fraserburgh and, as such, are not a true point-to-point comparison against the rail journey times, as rail stations at assumed to be close to the town centres. As such, the 2023 predicted car journey times cover a slightly shorter distance than the rail based journey times.

The analysis is shown in Table A.23 (AM period) and Table A.24 (PM period) and, for ease of comparison, the Option 6 rail journey times are also included.

The tables show Option 7 rail journey times:

- In general, rail travel time savings over road, southbound in the morning peak and northbound in the evening peak.
- Compared to the 2012 car travel times:
  - A rail travel time northbound in the AM, between Aberdeen and Ellon that is 3min quicker than by road, and between Aberdeen and Peterhead that is comparable with the road travel time
  - A journey time by rail northbound in the AM, between Aberdeen and Fraserburgh that is comparable with the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is just 11min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time southbound in the AM, between Ellon and Aberdeen that is over 10min quicker than by road, and between Peterhead and Aberdeen that is over 6min quicker than by road
  - A journey time by rail southbound in the AM, between Fraserburgh and Aberdeen over 7min quicker than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is 4min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time northbound in the PM between Aberdeen and Ellon that is 17 and a half minutes quicker than by road, and between Aberdeen and Peterhead that is 13 and a half minutes quicker than by road
  - A journey time by rail northbound in the PM, between Aberdeen and Fraserburgh that is over 13min quicker than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is 2min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time southbound in the PM between Ellon and Aberdeen that is 12min quicker than by road, and between Peterhead and Aberdeen that is 7min quicker than by road
  - A journey time by rail southbound in the PM, between Aberdeen and Fraserburgh 9min quicker than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is 2 and a half minutes *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented.

- Compared to the 2023 car travel times:
  - A rail travel time northbound in the AM, between Aberdeen and Ellon that is 2min slower than by road, and between Aberdeen and Peterhead that is just 6min slower than by road
  - A journey time by rail northbound in the AM, between Aberdeen and Fraserburgh that is 9min slower than by road, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is just over 20min slower by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time southbound in the AM between Ellon and Aberdeen that is over 6min quicker than by road, and between Peterhead and Aberdeen that is around 3 and a half minutes quicker than by road
  - A journey time by rail southbound in the AM, between Fraserburgh and Aberdeen around a and a half minutes quicker than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is 10min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time northbound in the PM, between Aberdeen and Ellon that is 19 and a half minutes quicker than by road, and between Aberdeen and Peterhead that is 18min quicker than by road
  - A journey time by rail northbound in the PM, between Aberdeen and Fraserburgh that is over 17min quicker than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is just 6min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented
  - A rail travel time southbound in the PM, between Ellon and Aberdeen that is comparable with the road travel time, and between Peterhead and Aberdeen that is 5min slower than by road
  - A journey time by rail southbound in the PM, between Fraserburgh and Aberdeen that is 7min slower than the road travel time, if the rail route to Fraserburgh is a branch line from Ellon. The travel time is ove 18min *slower* by rail if an extended rail route to Fraserburgh from Peterhead is implemented.

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Table A.23 : Option 7 Estimated Rail Journey Times compared to existing and future predicted car travel times, AM

			Journey Time (hh:mm:ss)				Journey time difference compared to car (hh:mm:ss)		
AM	**Year**	**From/To**	Option 6	Option 7 Continual Route	Option 7 Branch Lines from Ellon	Average travel time by car[1,2]	Option 6	Option 7 Continual Route	Option 7 Branch Lines from Ellon
Northbound	**2012**	**Aberdeen to Ellon**	00:28:00	00:25:30	00:25:30	00:28:30	-00:00:30	-00:03:00	-00:03:00
		Aberdeen to Peterhead	01:02:30	00:47:00	00:47:00	00:46:00	00:16:30	00:01:00	00:01:00
		Aberdeen to Fraserburgh	01:04:30	01:10:00	00:58:30	00:59:00	00:05:30	00:11:00	-00:00:30
	2023	**Aberdeen to Ellon**	00:28:00	00:25:30	00:25:30	00:23:30	00:04:30	00:02:00	00:02:00
		Aberdeen to Peterhead	01:02:30	00:47:00	00:47:00	00:41:00	00:21:30	00:06:00	00:06:00
		Aberdeen to Fraserburgh	01:04:30	01:10:00	00:58:30	00:49:30	00:15:00	00:20:30	00:09:00
Southbound	**2012**	**Ellon to Aberdeen**	00:28:00	00:25:30	00:25:30	00:36:00	-00:08:00	-00:10:30	-00:10:30
		Peterhead to Aberdeen	01:02:30	00:47:00	00:47:00	00:53:30	00:09:00	-00:06:30	-00:06:30
		Fraserburgh to Aberdeen	01:04:30	01:10:00	00:58:30	01:06:00	-00:01:30	00:04:00	-00:07:30
	2023	**Ellon to Aberdeen**	00:28:00	00:25:30	00:25:30	00:32:00	-00:04:00	-00:06:30	-00:06:30
		Peterhead to Aberdeen	01:02:30	00:47:00	00:47:00	00:50:30	00:12:00	-00:03:30	-00:03:30
		Fraserburgh to Aberdeen	01:04:30	01:10:00	00:58:30	01:00:00	00:04:30	00:10:00	-00:01:30

[1] *Average travel time by car for 2012 based on observed Tom-Tom data from Bridge of Don to Peterhead and Fraserburgh and modelled 2012 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models*

[2] *Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from Bridge of Don to Peterhead and Fraserburgh, and modelled 2023 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models*

Table A.24 : Option 7 Estimated Rail Journey Times compared to existing and future predicted car travel times, PM

			Journey Time (hh:mm:ss)				Journey time difference compared to car (hh:mm:ss)		
PM		**From/To**	Option 6	Option 7 Continual Route	Option 7 Branch Lines from Ellon	Average travel time by car[1,2]	Option 6	Option 7 Continual Route	Option 7 Branch Lines from Ellon
Northbound	**2012**	**Aberdeen to Ellon**	00:28:00	00:25:30	00:25:30	00:43:00	-00:15:00	-00:17:30	-00:17:30
		Aberdeen to Peterhead	01:02:30	00:47:00	00:47:00	01:00:30	00:02:00	-00:13:30	-00:13:30
		Aberdeen to Fraserburgh	01:04:30	01:10:00	00:58:30	01:12:00	-00:07:30	-00:02:00	-00:13:30
	2023	**Aberdeen to Ellon**	00:28:00	00:25:30	00:25:30	00:45:00	-00:17:00	-00:19:30	-00:19:30
		Aberdeen to Peterhead	01:02:30	00:47:00	00:47:00	01:05:00	-00:02:30	-00:18:00	-00:18:00
		Aberdeen to Fraserburgh	01:04:30	01:10:00	00:58:30	01:16:00	-00:11:30	-00:06:00	-00:17:30
Southbound	**2012**	**Ellon to Aberdeen**	00:28:00	00:25:30	00:25:30	00:37:30	-00:09:30	-00:12:00	-00:12:00
		Peterhead to Aberdeen	01:02:30	00:47:00	00:47:00	00:54:00	00:08:30	-00:07:00	-00:07:00
		Fraserburgh to Aberdeen	01:04:30	01:10:00	00:58:30	01:07:30	-00:03:00	00:02:30	-00:09:00
	2023	**Ellon to Aberdeen**	00:28:00	00:25:30	00:25:30	00:25:00	00:03:00	00:00:30	00:00:30
		Peterhead to Aberdeen	01:02:30	00:47:00	00:47:00	00:42:00	00:20:30	00:05:00	00:05:00
		Fraserburgh to Aberdeen	01:04:30	01:10:00	00:58:30	00:51:30	00:13:00	00:18:30	00:07:00

[1] *Average travel time by car for 2012 based on observed Tom-Tom data from Bridge of Don to Peterhead and Fraserburgh and modelled 2012 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models*

[2] *Average travel time by car for 2023 based on modelled 2023 Aberdeen Sub Area Model (ASAM) data from Bridge of Don to Peterhead and Fraserburgh, and modelled 2023 data from Aberdeen Access from the North and Aberdeen City Centre S-Paramics models*

- Journey time reliability would be improved in line with Option 6.
- Modal shift from the private car and bus to heavy rail or tram/light rail would occur, along with newly generated public transport journeys. Anticipated modal shift is likely to be greater with Option 7 when compared to Option 6 due to the more direct route with the route passing through key employment and residential locations, maximising the attractiveness. As discuses for Option 6. The number of people attracted to the service would be expected to be greater for the heavy rail option when compared to a tram/light rail option.
- As with Option 6, the heavy rail or tram/rail line would be key in providing access to jobs and essential services for all, but in particular those from more deprived groups as measured through SIMD. As the route will connect more population areas, a greater number of people would have greater access to the railway network. The benefit would likely be greater if heavy rail were introduced, given the greater journey time benefit anticipated.
- Similarly to Option 6, additional transport infrastructure will make the area more attractive to investment, as the businesses and potential employers recognise there are facilities in place to access the local and regional labour market. The benefit would likely be greater if heavy rail were introduced, given the ability for freight transportation which would not be possible on a tram/light rail service.
- Provision of a heavy rail or tram/rail service on a new alignment will support residential and industrial development identified in Local Development Plans. The more direct alignment (than that of Option 6) would connect key population and employment centres in the study area.

While there may be a number of significant local economic benefits which can be realised by introducing heavy rail or tram/light rail services on the existing alignment, there could also be disbenefits. In particular:

- The new heavy rail or tram/light rail line could provide employment options in Aberdeen to those based in the north of the study area, potentially putting a strain on local labour markets in the north.
- There could be an impact on the commercial viability of the current bus network due to a shift from bus to heavy rail or tram/light rail use.

These disbenefits are likely to be more pronounced through Option 7, than Option 6, due to the more direct heavy rail or tram/light rail alignment connecting residential and employment areas.

On consideration of all the points raised regarding **Economy**, this aspect of the STAG criteria for Option 7 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.7.4 Integration

Transport Integration

The key points relating to transport integration for Option 7 are the same as those discussed for Option 6.

Transport and Land Use Integration

The key points relating to transport and land-use integration for Option 7 are the same as those discussed for Option 6, but with:

- Better support (when compared to Option 6) for the Aberdeen City and Shire Strategic Development Plan, and the Local Development Plan's for Aberdeenshire and Aberdeen City. The option provides key public transport connections between key areas of proposed development at Bridge of Don, Blackdog, Balmedie, Ellon, Mintlaw, Peterhead, Fraserburgh, and Aberdeen City. In addition, the large proposed residential developments in Aberdeen at Grandhome and Stoneywood are in close proximity to the proposed route and could be utilised by residents.

Policy Integration

The key points relating to transport integration for Option 7 are the same as those discussed for Option 6, however, as the new route does not require the removal of the Formartine & Buchan Way, the proposals better support Active Travel policy for the region as well as supporting active tourism.

Summary

Given the three sub-criteria for integration, each has been scored separately and a final score for integration awarded based on the sub-criteria scores, as shown in Table A.25.

Table A.25 : Option 7 Integration sub-criteria scores

Option 7: Integration Summary		
Sub-criteria	**Score**	**Comments**
Transport Integration	2	Moderate benefits in terms of transport integration, providing a new mode of public transport increased frequency of public transport services and improved journey times. Active travel measures will also link with key public transport hubs across the region.
Transport and Land-use Integration	3	Positive benefit relating to directly supporting development north of Aberdeen, calling at major residential development locations, and providing support to business community by providing new access to areas of employment.
Policy Integration	2	Moderate positive benefit in terms of improvements to public transport journey times, integration, inclusion and emmissions reductions.
Overall	**2**	**Moderate positive benefit likely to be realised through supporting development plans, general consistency with policy documents. There should also be transport integration benefits as significant improvements with introduction of new mode linked directly into the public transport network.**

On consideration of all the points raised regarding **Integration**, this aspect of the STAG criteria for Option 7 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.7.5 Accessibility and Social Inclusion

Community Accessibility:

Public Transport Network Coverage

- The three main towns in the study area (Ellon, Peterhead, and Fraserburgh) are amongst the most remote from the rail network in Scotland.
- The introduction of a new tram/railway in the study area would provide an additional travel mode choice in the study area and increase the overall public transport network coverage.
- The railway would provide direct public transport connections between Fraserburgh, Peterhead, Mintlaw, Ellon, the Bridge of Don and Aberdeen. These connections are already served by the existing bus network although the assumption is that the rail line would provide a quicker connection. The introduction of the rail line which is likely to draw public transport demand away from existing bus services could potentially risk the commercial viability of existing bus services in the study area which may be reduced or removed. This would be a significant disbenefit to those who do not live within easy reach of one of the railway stations associated with the new railway line. Overall public transport accessibility in the area may then reduce.

Access to Local Services

- The package of active travel measures associated with the option would provide for active travel access to the railway stations themselves which may increase access to local services within the urban conurbations where a railway station was provided.

Comparative Accessibility:

Distribution of Impacts by People Group

As discussed for Option 4 in Section A.6.5, increased public transport coverage would benefit those with no access to a car, young people and the elderly for whom driving is not an option, and the unemployed who would have increased access with reduced travel time to job opportunities in Bridge of Don, Aberdeen and further afield.

Distribution of Impacts by Location

- The proposed railway line alignment is close to the existing A90(T) trunk road and A952 routes, diverting into urban conurbations as appropriate. The route of the proposed line would therefore provide a direct route between Aberdeen and Blackdog, Balmedie, Ellon, Peterhead, Mintlaw, and Fraserburgh and would provide improved access to these areas which are assumed to have a tram/rail stop/station associated with them.
- The proposed line would not serve the Dyce area where there is a high concentration of employment. The Dyce area would not benefit from any improved public transport accessibility.
- As noted in Option 6, Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan and pockets of deprivation are noted in both towns in the Scottish Index of Multiple Deprivation. Those resident in the two towns as well as in other smaller conurbations in the northern section of the study area will benefit most from increased travel choice and accessibility both within the study area and to/from Aberdeen.
- The new railway line would increase the public transport accessibility of Ellon, Peterhead, Mintlaw and Fraserburgh as well as many of the employment land allocated for the Energetica Corridor and as such could potentially support local businesses by attracting employees from a wider work-force base.

On consideration of all the points raised regarding **Accessibility & Social Inclusion**, this aspect of the STAG criteria for Option 1 has been awarded a score of **2,** and the outcome is expected to bring **Moderate Positive Benefit.**

A.7.6 Option 7 Summary

Table A.26 shows the scores awarded for the appraisal of Option 7 against the STAG criteria.

Table A.26 : Option 7 STAG Criteria Appraisal Scores

Option 7: Phased implementation of a new railway alignment, via the Bridge of Don, including examining options for light rail or tram					
	Environment	Safety	Economy	Integration	Accessibiltiy and Social
Score	-3	1	2	2	2

B ENVIRONMENTAL DESIGNATIONS AND CONSTRAINTS

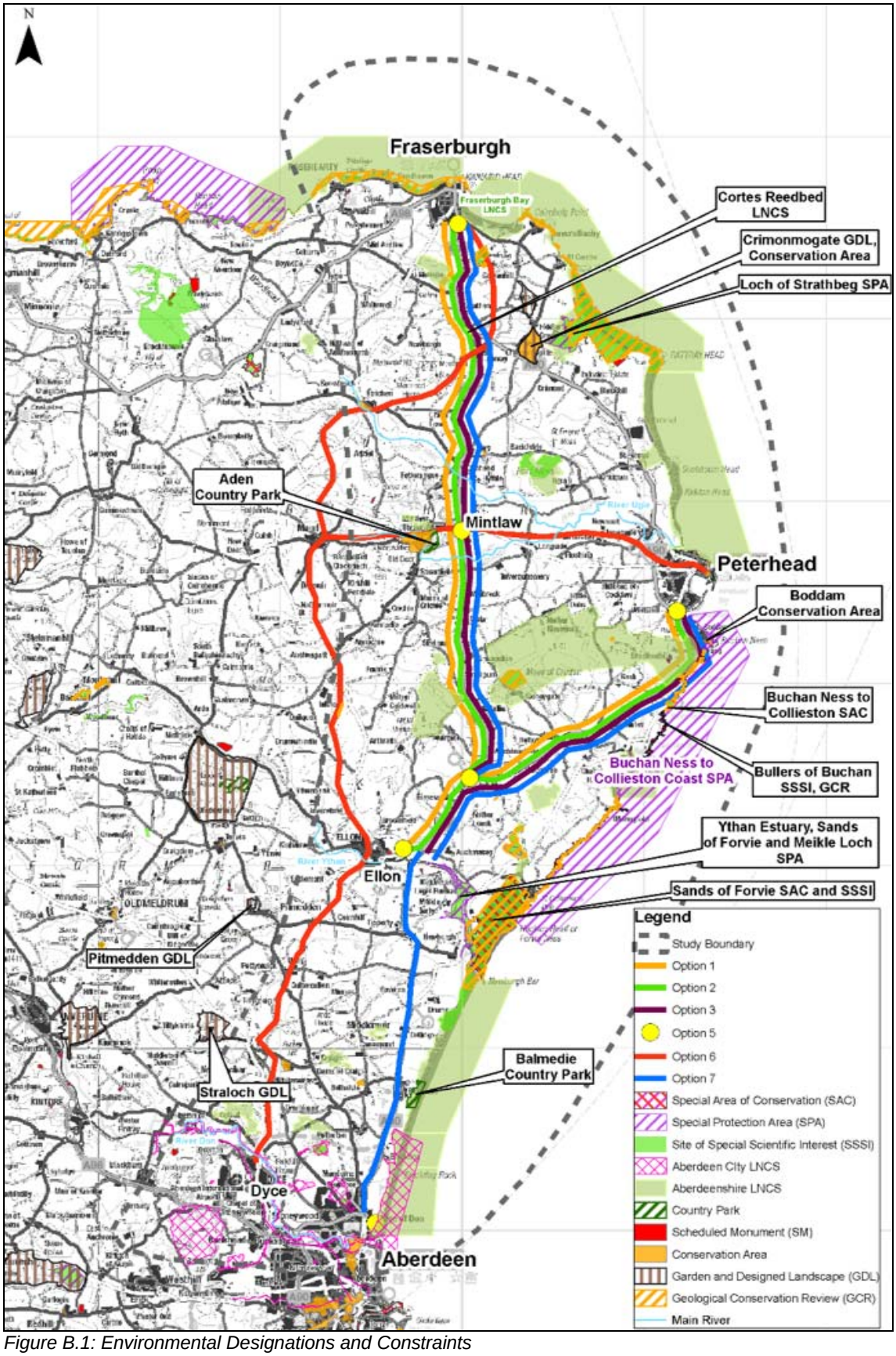

Figure B.1: Environmental Designations and Constraints

C OPTION 6 AND 7: OPERATING COSTS

It should be noted that the assumptions used when estimating operating costs and potential revenue, have been made at a high level. While the assumptions enable an indication of the potential costs and revenue of the schemes to be made, attention should be paid to the assumptions used and caution applied when considering the figures.

Detailed cost and revenue calculations would be expected to be undertaken at the more detailed STAG Part 2 stage when the assumptions used would be refined.

C.1 Option 6 Operating Costs

Estimated operating costs for a heavy rail route reinstatement on the Formartine & Buchan line have been calculated for the **full route** reinstatement (from Dyce to both Peterhead and Fraserburgh (via Maud) assuming:

- **Weekday and Saturday:**
  - A half hourly service frequency, alternating between Fraserburgh and Peterhead to Aberdeen (i.e. every half hour from Ellon and hourly from Fraserburgh and Peterhead) between 07:00 – 20:00 with an hourly service from Aberdeen between 20:00 – 23:00
  - 5 trains required, each undertaking approximately 6 return trips per day, a total of 30 return trips per day
  - 2 carriages per train
- **Sunday:**
  - An hourly service frequency, alternating between Fraserburgh and Peterhead to Aberdeen (i.e. every hour from Ellon and every 2hr from Fraserburgh and Peterhead) between 08:00 – 20:00
  - 3 trains required, each undertaking approximately 4 return trips per day, a total of 12 return trips per day
  - 2 carriages per train
- A return trip distance of 90 miles
- Per annum:
  - A total of approximately 900,000 train miles
  - A total of approximately 1.8million vehicle miles

Based on the above assumptions, **operating costs for the full rail route to Peterhead and Fraserburgh** (including track access fees, fuel costs, maintenance, wages, and rolling stock leasing etc.) are estimated at **£4.2million.**

Estimated operating costs have also been calculated for the **part route reinstatement of the rail line, as far north as Ellon only**, assuming:

- **Weekday and Saturday:**
  - A half hourly service frequency to Ellon between 07:00 – 20:00 with an hourly service from Aberdeen between 20:00 – 23:00
  - 3 trains required, each undertaking approximately 9 return trips per day, a total of 27 return trips per day
  - 2 carriages per train
- **Sunday:**
  - An hourly service frequency to Ellon between 08:00 – 20:00
  - 2 trains required, each undertaking approximately 6 return trips per day, a total of 12 return trips per day
  - 2 carriages per train
- A return trip distance of 40 miles
- Per annum:
  - A total of approximately 360,000 train miles
  - A total of approximately 725,000 vehicle miles

Based on the above assumptions, **operating costs for the part route to Ellon** (including track access fees, fuel costs, maintenance, wages and rolling stock leasing, etc.) are estimated at **£2.2million.**

C.2 Option 7 Operating Costs

Estimated operating costs for a new heavy rail route alignment from Aberdeen to Peterhead and Fraserburgh have been calculated for:

- The full route from Aberdeen to both Peterhead and Fraserburgh (via branch lines from Ellon)
- The full route from Aberdeen to both Peterhead and Fraserburgh (with a continuous line to Peterhead and on to Fraserburgh)
- The part route from Aberdeen to Ellon only

The following assumptions have been made:

- **Weekday and Saturday:**
  - For the branch line, a half hourly service frequency, alternating between Fraserburgh and Peterhead to Aberdeen (i.e. every half hour from Ellon and hourly from Fraserburgh and Peterhead) between 07:00 – 20:00 with an hourly service from Aberdeen between 20:00 – 23:00
  - For the continuous line, a half hourly service frequency between 07:00 – 20:00 with an hourly service from Aberdeen between 20:00 – 23:00
  - 5 trains required (for both the branch and continuous route), each undertaking approximately 6 return trips per day, a total of 30 return trips per day
  - 2 carriages per train
- **Sunday:**
  - For the branch line, an hourly service frequency, alternating between Fraserburgh and Peterhead to Aberdeen (i.e. every hour from Ellon and every 2 hours from Fraserburgh and Peterhead) between 08:00 – 20:00
  - For the continuous line, an hourly service frequency between 08:00 – 20:00
  - 3 trains required, each undertaking approximately 4 return trips per day, a total of 12 return trips per day
  - 2 carriages per train
- A return trip distance of 74 miles for the branch line and 98 miles for the continuous route
- Per annum:
  - A total of approximately 740,000 train miles and approximately 1.5million vehicle miles for the branch line route
  - A total of approximately 980,000 train miles and approximately 2.0million vehicle miles for the continuous route

Based on the above assumptions, **operating costs** (including track access fees, fuel costs, maintenance, wages, and rolling stock leasing, etc.) are estimated at:

- **£3.7million,** for the full rail route to Peterhead and Fraserburgh with branch line routes from Ellon
- **£4.5million,** for the full rail route to Peterhead and Fraserburgh with a continuous rail route to Peterhead and on to Fraserburgh

Estimated operating costs have also been calculated for the **part route implementation of the rail line, as far north as Ellon only**, assuming:

- **Weekday and Saturday:**
  - A half hourly service frequency between Aberdeen and Ellon between 07:00 – 20:00 with an hourly service from Aberdeen between 20:00 – 23:00
  - 3 trains required, each undertaking approximately 9 return trips per day, a total of 27 return trips per day
  - 2 carriages per train
- **Sunday:**
  - An hourly service frequency between Aberdeen and Ellon between 08:00 – 20:00
  - 2 trains required, each undertaking approximately 6 return trips per day, a total of 12 return trips per day
  - 2 carriages per train
- A return trip distance of 32 miles
- Per annum:
  - A total of approximately 290,000 train miles
  - A total of approximately 580,000 vehicle miles

Based on these assumptions, **operating costs for the part route from Aberdeen to Ellon** (including track access fees, fuel costs, maintenance, wages, and rolling stock leasing, etc.) are estimated at **£2.0million.**

D OPTION 6: PATRONAGE & REVENUE

Two different methodologies have been used to estimate rail patronage and revenue, and these are discussed separately in this section. The two methods are based on a different set of starting assumptions and the inclusion of both methodologies allows for an understanding of the range of rail revenue benefits that may be accrued through rail implementation.

It should be noted that the assumptions used when estimating operating costs and potential revenue, have been made at a high level. While the assumptions enable an indication of the potential costs and revenue of the schemes to be made, attention should be paid to the assumptions used and caution applied when considering the figures.

Detailed cost and revenue calculations would be expected to be undertaken at the more detailed STAG Part 2 stage when the methodology to adopt and the assumptions used in the methodology would be refined.

D.1 Option 6 Patronage and Revenue: Method 1

D.1.1 Patronage

A high level estimate of the potential patronage for the rail route, has been undertaken for the rail line if it extended to Peterhead and Fraserburgh, and if it extended only as far north as Ellon.

From these estimated demands, potential annual revenue for the rail route has been estimated.

To estimate patronage, for Method 1, the following steps have been followed:

1. A rough 'catchment' area for each of the seven assumed stations was assumed and the population of the main conurbations that each station would serve was estimated.

2. A percentage (49.3%, based on NOMIS figures) was applied to the overall population to roughly provide an estimate of the number of working people in each location.

3. The percentage of the working population from each location commuting to either Dyce or Aberdeen (based on the sector analysis for the areas as presented in the study Baseline Report) was applied to the total working population for each location, as appropriate, to provide an indication of the total number of commuters to Dyce and Aberdeen.

4. A percentage (10.2%) was applied to the number of commuters to provide an estimate of the number of people who may utilise rail as their mode of transport. The 10.2% applied has been calculated by considering the similar split for Laurencekirk, i.e. by considering the total number commuting from Laurencekirk to Aberdeen, and of these, the proportion doing so by rail.

5. A factor (40%) was then applied to the total number of assumed rail commuters to 'factor-up' to take account of 'Other Purposes'. This figure has been obtained from the *National Railway Travel Survey Data* which shows approximately 60% of rail trips are for commuting purposes, i.e. 40% are for Business, Recreation, and Leisure ("other purposes").

6 The total number of assumed daily rail users are then annualised (using a factor of 230 to account for holidays, bank holidays, and weekends) to reach a figure for the total annual rail market.

7 When the rail route is assumed to route only as far north as Ellon, it is assumed that a proportion of patronage from stations further north (which are no longer in place) would transfer to utilise the station at Ellon. Three sensitivity tests have been undertaken considering varying potential transfer of: 30%, 50%, and 80%.

The patronage estimation calculations for the full route are shown in Table D.1. Similar estimations for the part route to Ellon, including for the sensitivity tests are shown in Table D.2. The analysis shows an annual rail market of:

- Approximately 235,000 passengers a year for the full route
- Approximately 160,000 passengers a year for the part route to Ellon (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 180,000 passengers a year for the part route to Ellon (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 215,000 passengers a year for the part route to Ellon (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

It should be noted that:

- The catchment area analysis is at a very high level and does not take account of any population outwith the main conurbations (i.e. in the more rural areas). To do so would require a much more involved catchment area analysis, which it is anticipated would be undertaken at the more detailed appraisal stage.
- No account has been taken of potential station to station trips above those between the key conurbations and Aberdeen/Dyce, i.e. trips between Ellon and Peterhead, Fraserburgh and Mintlaw etc. have not been considered. The inclusion of these trips would increase the overall patronage (and hence revenue). Again, it is anticipated that this would be undertaken at the more detailed appraisal stage.
- No account has been taken of future development in the area, which would also increase the overall patronage of rail services. To include for this would require a much wider exercise considering the location, size, trip rates and likely build-out associated with all future development sites in the area. Detailed modelling of this would be expected to be undertaken if the option were to progress to the more detailed STAG Part 2 appraisal stage.
- No account has been taken of the likely travel time in the estimates of patronage. This is particularly relevant given the circuitous nature of the Option 6 route to Peterhead (when compared to Option 7), which may reduce the attractiveness of the route and, hence, patronage.

Table D.1 : Option 6 Estimated Demand (Full Route): Method 1

Option 6 - Estimated Demand (Full Route)						Daily		Annual	
Station	**Main conurbations in catchment**	**Population**	**Working Population[1]**	**% Commuting to Aberdeen or Dyce[2]**	**Population Commuting to Aberdeen or Dyce**	**Estimated rail commuters[3]**	**Estimated rail users (factored to all purposes)[5]**	**Estimated rail commuters[4]**	**Estimated rail users (factored to all purposes)[5]**
Newmachar	Newmachar	2,510	1,237	43%	532	54	90	12483	20805
	Kingseat	750	370	43%	159	16	27	3730	6217
	Pitmedden	1,420	700	43%	301	31	51	7062	11770
Ellon	Ellon	10,100	4,979	39%	1942	198	330	45558	75929
	Cruden Bay	1,670	823	39%	321	33	55	7533	12555
Maud	Maud	870	429	12%	51	5	9	1207	2012
Mintlaw	Mintlaw	2,720	1,341	34%	456	47	78	10696	17827
	New Leeds	641	316	12%	38	4	6	890	1483
	Stuartfield	700	345	34%	117	12	20	2753	4588
	Longside	960	473	8%	38	4	6	888	1480
Peterhead	Peterhead	18,450	9,096	12%	1092	111	186	25607	42678
	St. Fergus	750	370	12%	44	5	8	1041	1735
	Crimond	860	424	12%	51	5	9	1194	1989
	Boddam	1,290	636	12%	76	8	13	1790	2984
Strichen	Strichen	963	475	12%	57	6	10	1337	2228
	New Pitsligo	1,103	544	12%	65	7	11	1531	2551
Fraserburgh	Fraserburgh	13,100	6,458	8%	517	53	88	12121	20202
	Rosehearty	1,320	651	8%	52	5	9	1221	2036
	Sandhaven	824	406	8%	32	3	6	762	1271
	Cairnbulg/Inverallochy	1,340	661	8%	53	5	9	1240	2066
	St. Combs	660	325	8%	26	3	4	611	1018

[1] 49.3% of population assumed to be in employment (based on Scottish Government figures). [2] %'s taken from Baseline Report for Travel to Work areas assumed. [3] 10.2% figure taken from average rail mode share for all those commuting to Aberdeen from Laurencekirk (Census, 2011). [4] Annualisation based on 230 days of travel taking account of holidays, bank holidays and weekends. [5] Accounts for other trip purposes outwith commuting. National Railway Travel Survey Data shows approx 60% of rail trips are for commuting i.e. 40% are for Business, and Recreation and Leisure

Total daily rail market	**1,024**
Annual rail market - Commuting[4]	**141,254**
Annual rail market - Other Purposes[5]	**94,169**
Total Annual Rail Market	**235,423**

Table D.2 : Option 6 Estimated Demand (Rail Line to Ellon only): Method 1

Option 6 - Estimated Demand (Rail line to Ellon only)			% of rail users resident north of Ellon assumed to utilise Ellon station (via Park & Ride site)					
			Daily (all purposes)			Annual[4] (all purposes)		
Station	Main conurbations in catchment	Estimated Rail Users[1,2,3,5]	30%	50%	80%	30%	50%	80%
Newmachar[6]	Newmachar	90	90	90	90	20805	20805	20805
	Kingseat	27	27	27	27	6217	6217	6217
	Pitmedden	51	51	51	51	11770	11770	11770
Ellon[6]	Ellon	330	330	330	330	75929	75929	75929
	Cruden Bay	55	55	55	55	12555	12555	12555
Ellon (Utilising Park & Ride)	Maud	9	3	4	7	604	1006	1610
	Mintlaw	78	23	39	62	5348	8913	14261
	New Leeds	6	2	3	5	445	741	1186
	Stuartfield	20	6	10	16	1376	2294	3670
	Longside	6	2	3	5	444	740	1184
	Peterhead	186	56	93	148	12803	21339	34142
	St. Fergus	8	2	4	6	520	867	1388
	Crimond	9	3	4	7	597	995	1591
	Boddam	13	4	6	10	895	1492	2387
	Strichen	10	3	5	8	668	1114	1782
	New Pitsligo	11	3	6	9	765	1276	2041
	Fraserburgh	88	26	44	70	6060	10101	16161
	Rosehearty	9	3	4	7	611	1018	1628
	Sandhaven	6	2	3	4	381	635	1017
	Cairnbulg/Inverallochy	9	3	4	7	620	1033	1653
	St. Combs	4	1	2	4	305	509	814
				Total Daily Rail Market		**694**	**788**	**930**
				Total Annual Rail Market		**159720**	**181349**	**213793**

[1] 49.3% of population assumed to be in employment (based on Scottish Government figures)

[2] % commuting to Aberdeen/Dyce taken from Baseline Report for Travel to Work areas assumed

[3] 10.2% assumed average rail mode share for all those commuting to Aberdeen, based on similar split for Laurencekirk (Census, 2011). [4] Annualisation based on 230 days of travel taking account of holidays, bank holidays and weekends. [5] Accounts for other trip purposes outwith commuting. National Railway Travel Survey Data shows approx 60% of rail trips are for commuting i.e. 40% are for Business, Recreation & Leisure. [6] Demand remains at 100% in all sensitivity tests as patronage at Ellon and Newmachar is anticipated to remain at 100%

D.1.2 Fares

In order to calculate likely revenue based on the estimated patronage, fares to apply between each station and Aberdeen/Dyce have been based on the distance travelled, with an average fare per kilometre calculated by considering the current fare price and distance travelled from a range of regional stations into Aberdeen, as shown in Table D.3. The table shows an **average cost per kilometre of £0.20**.

These fares have been applied in both Method 1 and Method 2 for calculating estimated revenue.

Table D.3 : Estimated Fare Calculation

Station	Distance from Station to Aberdeen (km)	Average single ticket price	Average cost per km	Average cost per km (all)
Inverurie	27.2	£5.30	£0.19	£0.20
Portlethen	16.0	£3.70	£0.23	
Stonehaven	25.6	£5.20	£0.20	
Laurencekirk	49.6	£10.80	£0.22	
Huntly	65.6	£12.00	£0.18	
Keith	84.8	£15.50	£0.18	

D.1.3 Revenue

In the first method for estimating rail revenue, the annual revenue has then been calculated by:

1. Calculating the single trip ticket price for each station to Aberdeen by applying the average fare per kilometre to the distance between Aberdeen and the respective station
2. Applying a factor of 70% to the single fare to take account of monthly and weekly passes, child and concessionary passes, i.e. to calculate the 'out-turn' fare revenue from a single ticket
3. Doubling the factored single fare to obtain an approximate return fare ticket price
4. Estimating daily revenue for each station by multiplying the return fare by the estimated daily patronage for each station
5. Estimating an annual revenue for each station by applying the annualisation factor of 230 (as per the demand forecasting)

The annual revenue calculations for the full routes are shown in Table D.4, and for the route to Ellon only in Table D.5, and shows total average revenue of:

- Approximately £3.10million for the full route
- Approximately £1.27million for the part route to Ellon
  (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £1.47million for the part route to Ellon
  (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £1.76million for the part route to Ellon
  (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

Table D.4 : Option 6 Estimated Revenue (Full Route): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2,3] (£)
Newmachar	16.0	£3.23	£2.26	£4.53	£764	£175,623
Ellon	32.0	£6.47	£4.53	£9.05	£3,483	£801,194
Maud	50.4	£10.19	£7.13	£14.26	£125	£28,700
Mintlaw	59.2	£11.97	£8.38	£16.75	£1,848	£425,105
Peterhead	72.8	£14.71	£10.30	£20.60	£4,423	£1,017,319
Strichen	59.2	£11.97	£8.38	£16.75	£348	£80,053
Fraserburgh	76.0	£15.36	£10.75	£21.50	£2,486	£571,858
					Total Annual Revenue	**£3,099,851**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

[3] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

Table D.5 : Option 6 Estimated Revenue (Rail Line to Ellon only): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)			Annual Revenue[2,3] (£)		
					30% transfer	50% transfer	80% transfer	30% transfer	50% transfer	80% transfer
Newmachar	16.0	£3.23	£2.26	£4.53	£764	£764	£764	£175,623	£175,623	£175,623
Ellon	32.0	£6.47	£4.53	£9.05	£3,483	£3,483	£3,483	£801,194	£801,194	£801,194
Ellon (tranferring from stations further north)	32.0	£6.47	£4.53	£9.05	£1,277	£2,129	£3,406	£293,771	£489,618	£783,389
							Total Annual Revenue	**£1,270,587**	**£1,466,435**	**£1,760,205**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

[3] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

As fare calculations have been based on distance travelled, this means the further the distance travelled, the higher the fare. Consequently, a more direct rail route (as in Option 7), with shorter distances between stations and, as such, lower fares, equates to a lower overall revenue. This is perhaps counter-intuitive, as it can be argued that quicker travel times between stations would attract a higher patronage. To take account of this, and provide a more comparable Option 6 to Option 7 revenue comparison, the fares calculated for similar stations in Option 7 (the more direct routeing) have been applied to the same stations (Ellon, Mintlaw, Peterhead, and Fraserburgh) in Option 6, and the revenue re-calculated. Table D.6 shows the recalculated revenue for the full route, which is approximately **£2.45million.**

Table D.6 : Option 6 Estimated Revenue (Full Route, with Fares equating to those for Option 7 where possible): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance[4] (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2,3] (£)
Newmachar	16.0	£3.23	£2.26	£4.53	£764	£175,623
Ellon	32.0	£5.17	£3.62	£7.24	£2,787	£640,955
Maud	50.4	£10.19	£7.13	£14.26	£125	£28,700
Mintlaw	59.2	£9.31	£6.52	£13.04	£1,439	£330,892
Peterhead	72.8	£10.22	£7.15	£14.31	£3,072	£706,534
Strichen	59.2	£11.97	£8.38	£16.75	£348	£80,053
Fraserburgh	76.0	£13.13	£9.19	£18.38	£2,125	£488,788
					Total Annual Revenue	**£2,451,545**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

[3] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

[4] *To take accout of the distance travelled - the cost for travel from Ellon, Peterhead and Fraserburgh in this version is taken from the derived cost from the direct Option 7 alignment (i.e the distance travelled is assumed to be as per Option 7)*

D.2 Option 6 Patronage and Revenue: Method 2

D.2.1 Patronage

A high level estimate of the potential patronage for the railway route, has been undertaken for the rail line if it extended to Peterhead and Fraserburgh, and if it extended only as far north as Ellon, based on Method 2.

From the estimated patronage, potential annual revenue for the railway route has been estimated.

To estimate patronage, for Method 2, the following steps have been followed:

1. An implied trip rate per day per head population was calculated for all rail stations in Aberdeen and Aberdeenshire. This was estimated by considering the total number of passengers existing and entering each station in 2014 – 2015 (figures published by the Office of Rail and Road (ORR)). Dyce was not considered given the significant in-bound trips to the station to the airport and industrial areas. The large majority of travel through the other stations is assumed to be generated within that station catchment. Note that the population used to establish this trip rate was for the settlement in which the station is situated only.

2. The relationship between this implied trip rate per day per head population and the distance of the station from Aberdeen was plotted and a line of best fit applied to 'fit' the relationship. It should be noted that Portlethen was removed from the analysis as an outlier given the close proximity to Aberdeen, but the low rail patronage from the station. It should be noted also that while the population used relates to the towns in question, those using the rail station will come from a wider catchment area than the town itself. The relationship and line of best fit is shown in Figure D.1.

3. Using the relationship between distance from Aberdeen and trips per head population, the distance of the proposed new rail stations from Aberdeen and the population of the proposed station settlements was used to estimate daily rail patronage for each station. Note that as the relationship was estimated based on the population of the existing towns (and not their wider catchment areas), the relationship was applied to the new stations in a consistent manner i.e. the population of Ellon itself was used to estimate likely rail patronage from the station, not the population of the potential wider catchment area.

4. The estimated number of daily passengers was divided by two to estimate the number of daily return passengers, as the figures are based on ORR exits *and* entrances.

5. The total number of assumed daily rail users were then annualised for each station (using a factor of 365 given the number of trips per person was based on annual rail figures) to reach a figure for the total annual rail market.

6. When the rail route is assumed to route only as far north as Ellon, it is assumed that a proportion of potential patronage from stations further north (which are no longer in place) would transfer to utilise the station at Ellon. Three sensitivity tests have been undertaken considering varying potential transfer of: 30%, 50%, and 80%.

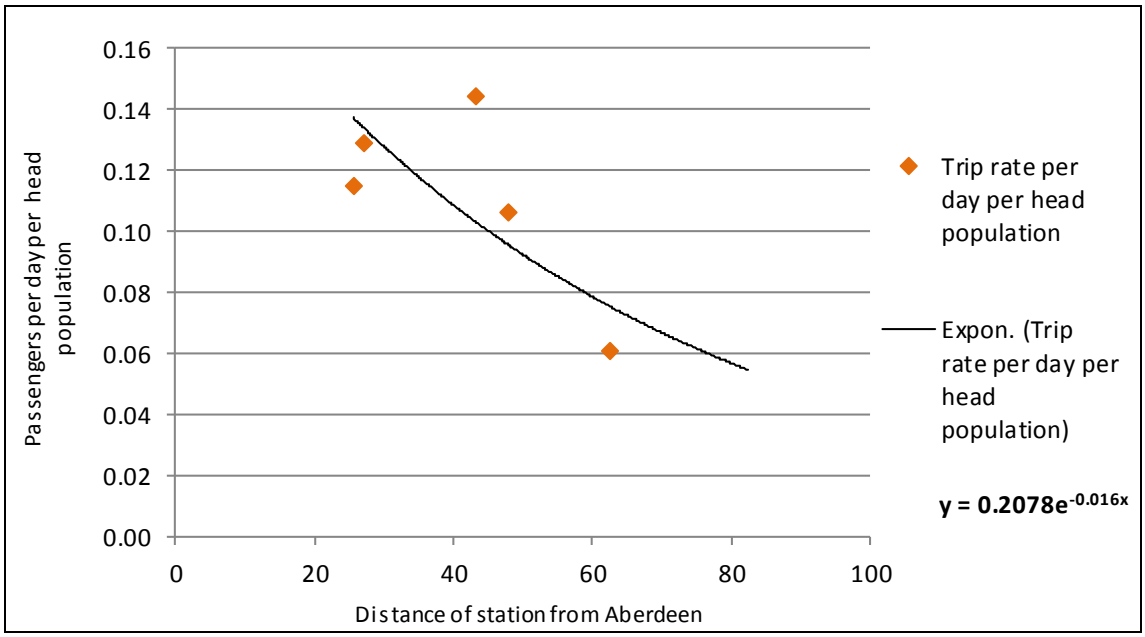

Figure D.1: Ratio of station distance from Aberdeen vs. trips per head population

The patronage estimation calculations for the full route are shown in Table D.7. Similar estimations for the part route to Ellon, including for the sensitivity tests are shown in Table D.8. The analysis shows an annual rail market of:

- Approximately 740,000 passengers a year for the full route
- Approximately 435,000 passengers a year for the part route to Ellon (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 520,000 passengers a year for the part route to Ellon (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 650,000 passengers a year for the part route to Ellon (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

It should be noted that:

- The approach assumes everyone entering/exiting each station is bound for Aberdeen. While this is likely to be the most significant destination for the stations closest to Aberdeen, Huntly, for example, will have a certain number of users whose destination is Inverness. Given this, the patronage levels calculated for the new stations are likely to be an over-estimate.
- No account has been taken of future development in the area, which would also increase the overall patronage of rail services. To include for this would require a much wider exercise considering the location, size, trip rates and likely build-out associated with all future development sites in the area. Detailed modelling of this would be expected to be undertaken if the option were to progress to the more detailed STAG Part 2 appraisal stage.
- No account has been taken of the likely travel time in the estimates of patronage. This is particularly relevant given the circuitous nature of the Option 6 route to Peterhead (when compared to Option 7), which may reduce the attractiveness of the route and, hence, patronage.

Table D.7 : Option 6 Estimated Demand (Full Route): Method 2

Option 6 - Estimated Demand (Full Route)						
Station	**Population**	**Distance from Aberdeen (km)**	**Trip rate per day per head population (based on distance from Aberdeen)[1]**	**Daily number of passengers**	**Daily number of return passengers**	**Annual number of return passengers**
Newmachar	2,510	16.0	0.16	404	202	73,689
Ellon	10,100	32.0	0.12	1258	629	229,547
Maud	870	50.4	0.09	81	40	14,730
Mintlaw	2,720	59.2	0.08	219	110	40,005
Peterhead	18,450	72.8	0.06	1196	598	218,292
Strichen	963	59.2	0.08	78	39	14,164
Fraserburgh	13,100	76.0	0.06	807	403	147,258
*[1] Ratio calculated based on graph line of best fit equation: 0.2078*e^-0.016*distance*				**Total Daily Rail Market**		**2,021**
				Total Annual Rail Market		**737,684**

Table D.8 : Option 6 Estimated Demand (Rail Line to Ellon only): Method 2

Option 6 - Estimated Demand (Rail line to Ellon only)			% of rail users resident north of Ellon assumed to utilise Ellon station (via Park & Ride site)					
			Daily			Annual		
Station	Main conurbations in catchment	Estimated Rail Users[1]	30%	50%	80%	30%	50%	80%
Newmachar[6]	Newmachar	202	202	202	202	73,689	73,689	73,689
Ellon[6]	Ellon	629	629	629	629	229,547	229,547	229,547
Ellon (Utilising Park & Ride)	Maud	40	12	20	32	4,419	7,365	11,784
	Mintlaw	110	33	55	88	12,001	20,002	32,004
	Peterhead	598	179	299	478	65,488	109,146	174,634
	Strichen	39	12	19	31	4,249	7,082	11,331
	Fraserburgh	403	121	202	323	44,177	73,629	117,806
				Total Daily Rail Market		**1,188**	**1,426**	**1,783**
				Total Annual Rail Market		**433,570**	**520,460**	**650,795**

[1] *Based on applying ratio of passengers per population based on station distance from Aberdeen, where the ratio is: 0.2078*e-0.016*distance*

[2] *Demand remains at 100% in all sensitivity tests as patronage at Ellon and Newmachar is anticipated to remain at 100%*

D.2.2 Fares

The fares applied are those as in Method 1 shown in Table D.3.

D.2.3 Revenue

For estimating rail revenue using Method 2, the annual revenue has then been calculated as per the approach used in Method 1 outlined in D.1, with the exception that the annualisation factor applied is 365 (as per the Methods 2 patronage forecasting).

The annual revenue calculations for the full routes are shown in Table D.9, and for the route to Ellon only in Table D.10, and shows total average revenue of:

- Approximately £11.19million for the full route
- Approximately £3.59million for the part route to Ellon
  (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £4.38million for the part route to Ellon
  (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £5.56million for the part route to Ellon
  (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

Table D.9 : Option 6 Estimated Revenue (Full Route): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2,3] (£)
Newmachar	16.0	£3.23	£2.26	£4.53	£914	£333,615
Ellon	32.0	£6.47	£4.53	£9.05	£5,694	£2,078,471
Maud	50.4	£10.19	£7.13	£14.26	£576	£210,071
Mintlaw	59.2	£11.97	£8.38	£16.75	£1,836	£670,129
Peterhead	72.8	£14.71	£10.30	£20.60	£12,320	£4,496,689
Strichen	59.2	£11.97	£8.38	£16.75	£650	£237,255
Fraserburgh	76.0	£15.36	£10.75	£21.50	£8,676	£3,166,752
					Total Annual Revenue	**£11,192,982**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

[3] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

Table D.10 : Option 6 Estimated Revenue (Rail Line to Ellon only): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)			Annual Revenue[2] (£)		
					30% transfer	50% transfer	80% transfer	30% transfer	50% transfer	80% transfer
Newmachar	16.0	£3.23	£2.26	£4.53	£914	£914	£914	£333,615	£333,615	£333,615
Ellon	32.0	£6.47	£4.53	£9.05	£5,694	£5,694	£5,694	£2,078,471	£2,078,471	£2,078,471
Ellon (tranferring from stations further north)	32.0	£6.47	£4.53	£9.05	£3,233	£5,389	£8,622	£1,180,138	£1,966,896	£3,147,034
							Total Annual Revenue	**£3,592,223**	**£4,378,982**	**£5,559,119**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

As discussed for Method 1, as fare calculations have been based on distance travelled, this means the further the distance travelled, the higher the fare. Consequently, a more direct rail route (as in Option 7), with shorter distances between stations and, as such, lower fares, equates to a lower overall revenue. This is perhaps counter-intuitive, as it can be argued that quicker travel times between stations would attract a higher patronage. To take account of this, and provide a more comparable Option 6 to Option 7 revenue comparison, the fares calculated for similar stations in Option 7 (the more direct routeing) have been applied to the same stations (Ellon, Mintlaw, Peterhead, and Fraserburgh) in Option 6 (here, for Methods 2), and the revenue re-calculated. Table D.11 shows the recalculated revenue for the full route, which is approximately **£8.80million.**

Table D.11 : Option 6 Estimated Revenue (Full Route, with Fares equating to those for Option 7 where possible): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance[3](£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2] (£)
Newmachar	16.0	£3.23	£2.26	£4.53	£914	£333,615
Ellon	32.0	£5.17	£3.62	£7.24	£4,556	£1,662,777
Maud	50.4	£10.19	£7.13	£14.26	£576	£210,071
Mintlaw	59.2	£9.31	£6.52	£13.04	£1,429	£521,614
Peterhead	72.8	£10.22	£7.15	£14.31	£8,556	£3,122,975
Strichen	59.2	£11.97	£8.38	£16.75	£650	£237,255
Fraserburgh	76.0	£13.13	£9.19	£18.38	£7,416	£2,706,740
					Total Annual Revenue	**£8,795,046**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

[3] *To take accout of the distance travelled - the cost for travel from Ellon, Peterhead and Fraserburgh in this version is taken from the derived cost from the direct Option 7 alignment (i.e the distance travelled is assumed to be as per Option 7)*

E OPTION 7: PATRONAGE & REVENUE

As discussed and presented in with regards Option 6 in Appendix D, two different methodologies have been used to estimate rail patronage and revenue, and these are discussed separately in this section. The two methods are based on a different set of starting assumptions and the inclusion of both methodologies allows for an understanding of the range of rail revenue benefits that may be accrued through rail implementation.

It should be noted that the assumptions used when estimating operating costs and potential revenue, have been made at a high level. While the assumptions enable an indication of the potential costs and revenue of the schemes to be made, attention should be paid to the assumptions used and caution applied when considering the figures.

Detailed cost and revenue calculations would be expected to be undertaken at the more detailed STAG Part 2 stage when the methodology to adopt and the assumptions used in the methodology would be refined.

E.1 Option 7 Patronage and Revenue: Method 1

E.1.1 Patronage

A high level estimate of the potential patronage for the Option 7 railway route, has been undertaken for the rail line if it extended to Peterhead and Fraserburgh, and if it extended only as far north as Ellon.

From these estimated patronage, potential annual revenue for the rail route has been estimated.

Patronage was estimated using the steps as outlined in Appendix D.1.1.

The patronage estimation calculations for Method 1 for the full route (branch line) are shown in Table E.1. Similar estimations for the full route (for the extended line from Peterhead through to Fraserburgh) are shown in Table E.2. Similar demand estimates for the part route to Ellon, including for the sensitivity tests are shown in Table E.3. The tables show an annual rail market of:

- Approximately 240,000 passengers a year for the full route for both the branch and continuous routes
- Approximately 175,000 passengers a year for the part route to Ellon (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 195,000 passengers a year for the part route to Ellon (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 220,000 passengers a year for the part route to Ellon (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

As with Option 6, it should be noted that:

- The catchment area analysis is at a very high level and does not take account of any population outwith the main conurbations (i.e. in the more rural areas). To do so would require a much more involved catchment area analysis, which it is anticipated would be undertaken at the more detailed appraisal stage.

- No account has been taken of potential station to station trips above those between the key conurbations and Aberdeen/Dyce, i.e. trips between Ellon and Peterhead, Fraserburgh and St. Fergus, etc. have not been considered. The inclusion of these trips would increase the overall patronage (and hence revenue). Again, it is anticipated that this would be undertaken at the more detailed appraisal stage.
- No account has been taken of future development in the area, which would also increase the overall patronage of rail services. To include for this would require a much wider exercise considering the location, size, trip rates, and likely build-out associated with all future development sites in the area. Detailed modelling of this would be expected to be undertaken if the option were to progress to the more detailed STAG Part 2 appraisal stage.

Table E.1 : Option 7 Estimated Demand (Full Route with branch lines to Fraserburgh & Peterhead from Ellon): Method 1

Option 7 - Estimated Demand (Full Route - Branch line)						Daily		Annual	
Station	**Main conurbations in catchment**	**Population**	**Working Population[1]**	**% Commuting to Aberdeen**	**Population Commuting to Aberdeen**	**Estimated rail commuters[3]**	**Estimated rail users (factored to all purposes)[5]**	**Estimated rail commuters[4]**	**Estimated rail users (factored to all purposes)[5]**
Bridge of Don	Bridge of Don	3904	1925	65%	1251	128	213	29349	48916
Blackdog	Blackdog	201	99	38%	38	4	6	883	1472
	Potterton	899	443	38%	168	17	29	3951	6585
Balmedie	Balmedie	2520	1242	38%	472	48	80	11075	18459
	Newburgh	1436	708	38%	269	27	46	6311	10519
Ellon	Ellon	10,100	4979	30%	1494	152	254	35044	58407
Hatton	Hatton	882	435	27%	117	12	20	2754	4590
	Cruden Bay	1670	823	27%	222	23	38	5215	8692
Peterhead	Peterhead	18,450	9096	9%	819	83	139	19205	32008
	Boddam	1,290	636	9%	57	6	10	1343	2238
	St. Fergus	750	370	9%	33	3	6	781	1301
	Crimond	860	424	9%	38	4	6	895	1492
Mintlaw	Mintlaw	2,720	1341	27%	362	37	62	8494	14157
	New Leeds	641	316	9%	28	3	5	667	1112
	Stuartfield	700	345	27%	93	10	16	2186	3643
	Maud	870	429	9%	39	4	7	906	1509
	Longside	960	473	9%	43	4	7	999	1665
Fraserburgh	Fraserburgh	13,100	6458	6%	387	40	66	9091	15151
	Strichen	963	475	9%	43	4	7	1002	1671
	Rosehearty	1,320	651	9%	59	6	10	1374	2290
	Sandhaven	824	406	9%	37	4	6	858	1430
	Cairnbulg/Inverallochy	1,340	661	9%	59	6	10	1395	2325
	St. Combs	660	325	9%	29	3	5	687	1145

[1] *49.3% of population assumed to be in employment (based on NOMIS figures)*

[2] *%'s taken from Baseline Report for Travel to Work areas assumed*

[3] *10.2% figure taken from average rail mode share for commuting to Aberdeen from Laurencekirk (Census, 2011)*

[4] *Annualisation based on 230 days of travel taking account of holidays, bank holidays and weekends*

[5] *Accounts for other trip purposes outwith commuting (additional 40%). (National Railway Travel Survey Data)*

Total daily rail market	**1,047**
Annual rail market - Commuting[4]	**144,466**
Annual rail market - Other Purposes[5]	**96,311**
Total Annual Rail Market	**240,777**

Table E.2 : Option 7 Estimated Demand (Full Route with extended line from Peterhead to Fraserburgh): Method 1

Option 7 - Estimated Demand (Full Route - Continuous line)						Daily		Annual	
Station	**Main conurbations in catchment**	**Population**	**Working Population[1]**	**% Commuting to Aberdeen**	**Population Commuting to Aberdeen**	**Estimated rail commuters[3]**	**Estimated rail users (factored to all purposes)[5]**	**Estimated rail commuters[4]**	**Estimated rail users (factored to all purposes)[5]**
Bridge of Don	Bridge of Don	3904	1925	65%	1251	128	213	29349	48916
Blackdog	Blackdog	201	99	38%	38	4	6	883	1472
	Potterton	899	443	38%	168	17	29	3951	6585
Balmedie	Balmedie	2520	1242	38%	472	48	80	11075	18459
	Newburgh	1436	708	38%	269	27	46	6311	10519
Ellon	Ellon	10,100	4979	30%	1494	152	254	35044	58407
	Mintlaw	2,720	1341	27%	362	37	62	8494	14157
	New Leeds	641	316	9%	28	3	5	667	1112
	Stuartfield	700	345	27%	93	10	16	2186	3643
	Maud	870	429	9%	39	4	7	906	1509
Hatton	Hatton	882	435	27%	117	12	20	2754	4590
	Cruden Bay	1670	823	27%	222	23	38	5215	8692
Peterhead	Peterhead	18,450	9096	9%	819	83	139	19205	32008
	Boddam	1,290	636	9%	57	6	10	1343	2238
	Longside	960	473	9%	43	4	7	999	1665
St. Fergus	St. Fergus	750	370	9%	33	3	6	781	1301
	Crimond	860	424	9%	38	4	6	895	1492
Fraserburgh	Fraserburgh	13,100	6458	6%	387	40	66	9091	15151
	Strichen	963	475	9%	43	4	7	1002	1671
	Rosehearty	1,320	651	9%	59	6	10	1374	2290
	Sandhaven	824	406	9%	37	4	6	858	1430
	Cairnbulg and Inverallochy	1,340	661	9%	59	6	10	1395	2325
	St. Combs	660	325	9%	29	3	5	687	1145

Total daily rail market		**1,047**
Annual rail market - Commuting[4]		**144,466**
Annual rail market - Other Purposes[5]		**96,311**
Total Annual Rail Market		**240,777**

[1] 49.3% of population assumed to be in employment (based on Scottish Government figures)

[2] %'s taken from Baseline Report for Travel to Work areas assumed

[3] 10.2% figure taken from average rail mode share for commuting to Aberdeen from Laurencekirk (Census, 2011)

[4] Annualisation based on 230 days of travel taking account of holidays, bank holidays and weekends

[5] Accounts for other trip purposes outwith commuting (additional 40%). (National Railway Travel Survey Data)

Table E.3 : Option 7 Estimated Demand (Part Route to Ellon Only): Method 1

Option 7 - Estimated Demand (Rail line to Ellon only)			% of rail users resident north of Ellon assumed to utilise Ellon station (via Park & Ride site)					
			Daily (all purposes)			Annual[4] (all purposes)		
Station	Main conurbations in catchment	Daily Rail Users[1,,2,3,5]	30%	50%	80%	30%	50%	80%
Bridge of Don[6]	Bridge of Don	213	213	213	213	48916	48916	48916
Blackdog[6]	Blackdog	6	6	6	6	1472	1472	1472
	Potterton	29	29	29	29	6585	6585	6585
Balmedie[6]	Balmedie	80	80	80	80	18459	18459	18459
	Newburgh	46	46	46	46	10519	10519	10519
Ellon[6]	Ellon	254	254	254	254	58407	58407	58407
Ellon (Utilising Park & Ride)	Hatton	62	18	31	49	4247	7078	11325
	Cruden Bay	5	1	2	4	334	556	890
	Peterhead	16	5	8	13	1093	1822	2915
	Boddam	7	2	3	5	453	755	1207
	Longside	20	6	10	16	1377	2295	3672
	St. Fergus	38	11	19	30	2608	4346	6953
	Crimond	139	42	70	111	9602	16004	25607
	Mintlaw	10	3	5	8	671	1119	1790
	New Leeds	7	2	4	6	500	833	1332
	Stuartfield	6	2	3	5	390	651	1041
	Maud	6	2	3	5	448	746	1194
	Fraserburgh	66	20	33	53	4545	7576	12121
	Strichen	7	2	4	6	501	835	1337
	Rosehearty	10	3	5	8	687	1145	1832
	Sandhaven	6	2	3	5	429	715	1144
	Cairnbulg/Inverallochy	10	3	5	8	697	1162	1860
	St. Combs	5	1	2	4	344	573	916
				Total daily Rail Market		**753**	**837**	**963**
				Total Annual Rail Market		**173,284**	**192,568**	**221,493**

[1] 40% of population assumed to be in employment (based on Scottish Government figures)

[2] % commuting to Aberdeen/Dyce taken from Baseline Report for Travel to Work areas assumed

[3] 10.2% assumed average rail mode share for all those commuting to Aberdeen, based on similar split for Laurencekirk (Census, 2011). [4] Annualisation based on 230 days of travel taking account of holidays, bank holidays and weekends. [5] Accounts for other trip purposes outwith commuting (additional 40%), (National Railway Travel Survey Data). [6] Demand remains at 100% in all sensitivity tests as patronage at Ellon, Balmedie, Blackdog and Bridge of Don is anticipated to remain at 100%.

E.1.2 Fares

As per Option 6, fares to apply between each station and Aberdeen/Dyce have been based on the distance travelled, with an average fare per kilometre calculated by considering the current fare price and distance travelled from a range of regional stations into Aberdeen, as shown in Table D.3 The table shows an average cost per kilometre of £0.20.

E.1.3 Revenue

nnual Revenue, using Method 1, has then been calculated following the process as laid out for Option 6 in Appendix D.1.3.

The annual revenue calculations for the full route (branch and continuous lines) are shown in Table E.4 and Table E.5 and for the route to Ellon only in Table E.6, and shows total average revenue of:

- Approximately £2.02million for the full route (branch lines from Ellon)
- Approximately £1.91million for the full route
  (extended route from Peterhead to Fraserburgh)
- Approximately £0.83million for the part route to Ellon
  (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £0.97million for the part route to Ellon
  (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £1.18million for the part route to Ellon
  (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

Table E.4 : Option 7 Estimated Revenue (Full Route with branch lines to Fraserburgh & Peterhead from Ellon): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2] (£)
Bridge of Don	5.4	£1.10	£0.77	£1.54	£327	£75,295
Blackdog	8.6	£1.75	£1.22	£2.44	£86	£19,699
Balmedie	12.5	£2.52	£1.77	£3.53	£445	£102,330
Ellon	25.6	£5.17	£3.62	£7.24	£1,840	£423,087
Hatton	36.3	£7.34	£5.14	£10.28	£593	£136,501
Peterhead	50.6	£10.22	£7.15	£14.31	£2,304	£529,900
Mintlaw	46.1	£9.31	£6.52	£13.04	£1,252	£287,981
Fraserburgh	65.0	£13.13	£9.19	£18.38	£1,919	£441,348
					Total Annual Revenue	**£2,016,141**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

Table E.5 : Option 7 Estimated Revenue (Full Route with extended line from Peterhead to Fraserburgh): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2] (£)
Bridge of Don	5.4	£1.10	£0.77	£1.54	£327	£75,295
Blackdog	8.6	£1.75	£1.22	£2.44	£86	£19,699
Balmedie	12.5	£2.52	£1.77	£3.53	£445	£102,330
Ellon	25.6	£5.17	£3.62	£7.24	£2,483	£571,012
Hatton	36.3	£7.34	£5.14	£10.28	£593	£136,501
Peterhead	50.6	£10.22	£7.15	£14.31	£2,234	£513,767
St. Fergus	58.1	£11.74	£8.22	£16.43	£200	£45,903
Fraserburgh	65.0	£13.13	£9.19	£18.38	£1,919	£441,348
					Total Annual Revenue	**£1,905,856**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

Table E.6 : Option 7 Estimated Revenue (Part Route to Ellon Only): Method 1

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)			Annual Revenue[2,3] (£)		
					30% transfer	50% transfer	80% transfer	30% transfer	50% transfer	80% transfer
Bridge of Don	5.4	£1.10	£0.77	£1.54	£327	£327	£327	£75,295	£75,295	£75,295
Blackdog	8.6	£1.75	£1.22	£2.44	£86	£86	£86	£19,699	£19,699	£19,699
Balmedie	12.5	£2.52	£1.77	£3.53	£445	£445	£445	£102,330	£102,330	£102,330
Ellon	25.6	£5.17	£3.62	£7.24	£1,840	£1,840	£1,840	£423,087	£423,087	£423,087
Ellon (tranferring from stations further north)	25.6	£5.17	£3.62	£7.24	£911	£1,518	£2,429	£209,531	£349,218	£558,749
							Total Annual Revenue	**£829,941**	**£969,628**	**£1,179,159**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis only takes account of trip to Aberdeen and does not include other trips between intermediate stations i.e. Peterhead to Mintlaw, Newmachar to Dyce etc.*

[3] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

E.2 Option 7 Patronage & Revenue: Method 2

E.2.1 Patronage

A high level estimate of the potential patronage for the rail**way** route, has been undertaken for the rail**way** line if it extended to Peterhead and Fraserburgh, and if it extended only as far north as Ellon, based on Method 2.

From these estimated demands, potential annual revenue for the railway route has been estimated.

To estimate demand, for Method 2, the same steps were followed as described in D.2.1 for Option 6.

The patronage estimation calculations for the full route (branch line) are shown in Table E.7. Similar estimations for the full route (for the extended line from Peterhead through to Fraserburgh) are shown in Table E.8.

Similar estimations for the part route to Ellon, including for the sensitivity tests are shown in Table E.9.

The analysis shows an annual rail market of:

- Approximately 1.0million passengers a year for the full route for the branch route
- Approximately 990,000 passengers a year for the full route for both the continuous route. Note that this patronage figure does not equate to the branch line patronage as it did under Method 1. This is due to the Method 2 approach basing patronage levels on the population of the station conurbations and not the wider station catchment area (which is taken account of in the assigned trip rate per head).
- Approximately 645,000 passengers a year for the part route to Ellon (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 760,000 passengers a year for the part route to Ellon (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately 930,000 passengers a year for the part route to Ellon (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

As per Option 6 it should be noted that:

- The approach assumes everyone entering/exiting each station is bound for Aberdeen. While this is likely to be the most significant destination for the stations closest to Aberdeen, Huntly, for example, will have a certain number of users whose destination is Inverness. Given this, the patronage levels calculated for the new stations are likely to be an over-estimate.
- No account has been taken of future development in the area, which would also increase the overall patronage of rail services. To include for this would require a much wider exercise considering the location, size, trip rates and likely build-out associated with all future development sites in the area. Detailed modelling of this would be expected to be undertaken if the option were to progress to the more detailed STAG Part 2 appraisal stage.

Table E.7 : Option 7 Estimated Demand (Full Route with branch lines to Fraserburgh & Peterhead from Ellon): Method 2

Option 7 - Estimated Demand- Branch Line (Full Route)						
Station	**Population**	**Distance from Aberdeen (km)**	**Trip rate per day per head population (based on distance from Aberdeen)[1]**	**Daily number of passengers**	**Daily number of return passengers**	**Annual number of return passengers**
Bridge of Don	3,904	5.4	0.19	744	372	135,712
Blackdog	201	8.6	0.18	36	18	6,638
Balmedie	2,520	12.5	0.17	429	214	78,269
Ellon	10,100	25.6	0.14	1393	697	254,298
Hatton	882	36.3	0.12	103	51	18,707
Peterhead	18,450	50.6	0.09	1707	854	311,586
Mintlaw	2,720	46.1	0.10	270	135	49,349
Fraserburgh	13,100	65.0	0.07	963	481	175,708
[1] *Ratio calculated based on graph line of best fit equation: 0.2078*e^-0.016*distance*				**Total Daily Rail Market**		**2,823**
				Total Annual Rail Market		**1,030,267**

Table E.8 : Option 7 Estimated Demand (Full Route with extended line from Peterhead to Fraserburgh) : Method 2

Option 7 - Estimated Demand - Continuous Line (Full Route)						
Station	**Population**	**Distance from Aberdeen (km)**	**Trip rate per day per head population (based on distance from Aberdeen)[1]**	**Daily number of passengers**	**Daily number of return passengers**	**Annual number of return passengers**
Bridge of Don	3,904	5.4	0.19	744	372	135,712
Blackdog	201	8.6	0.18	36	18	6,638
Balmedie	2,520	12.5	0.17	429	214	78,269
Ellon	10,100	25.6	0.14	1393	697	254,298
Hatton	882	36.3	0.12	103	51	18,707
Peterhead	18,450	50.6	0.09	1707	854	311,586
St. Fergus	750	58.1	0.08	62	31	11,227
Fraserburgh	13,100	65.0	0.07	963	481	175,708
[1] *Ratio calculated based on graph line of best fit equation: 0.2078*e^-0.016*distance*				**Total Daily Rail Market**		**2,718**
				Total Annual Rail Market		**992,144**

Table E.9 : Option 7 Estimated Demand (Part Route to Ellon Only) : Method 2

Option 7 - Estimated Demand (Rail line to Ellon only)			% of rail users resident north of Ellon assumed to utilise Ellon station (via Park & Ride site)					
			Daily			Annual		
Station	Main conurbations in catchment	Estimated Rail Users[1]	30%	50%	80%	30%	50%	80%
Bridge of Don[2]	Bridge of Don	372	372	372	372	135,712	135,712	135,712
Blackdog[2]	Blackdog	18	18	18	18	6,638	6,638	6,638
Balmedie[2]	Newmachar	214	214	214	214	78,269	78,269	78,269
Ellon[2]	Ellon	697	697	697	697	254,298	254,298	254,298
Ellon (Utilising Park & Ride)	Hatton	51	15	26	41	5,612	9,353	14,965
	Peterhead	854	256	427	683	93,476	155,793	249,269
	St. Fergus	31	9	15	25	3,368	5,613	8,981
	Mintlaw	135	41	68	108	14,805	24,675	39,479
	Fraserburgh	481	144	241	385	52,712	87,854	140,566
				Total Daily Rail Market		**1,767**	**2,077**	**2,543**
				Total Annual Rail Market		**644,890**	**758,205**	**928,178**

[1] *Based on applying ratio of passengers per population based on station distance from Aberdeen, where the ratio is: 0.2078*e-0.016*distance*

[2] *Demand remains at 100% in all sensitivity tests as patronage at Ellon and Newmachar is anticipated to remain at 100%*

E.2.2 Fares

As per Method 1, fares to apply between each station and Aberdeen/Dyce have been based on the distance travelled, with an average fare per kilometre calculated by considering the current fare price and distance travelled from a range of regional stations into Aberdeen, as shown in Table D.3.The table shows an average **cost per kilometre of £0.20.**

E.2.3 Revenue

Annual Revenue, using Method 2 has been calculated following the approach as discussed for Option 6 in Section D.2.3.

The annual revenue calculations, based on Method 2, for the full route (branch and continuous lines) are shown in Table E.10 and Table E.11, and for the route to Ellon only in Table E.12, and shows total average revenue of:

- Approximately £10.87million for the full route (branch lines from Ellon)
- Approximately £10.41millionfor the full route
  (extended route from Peterhead to Fraserburgh)
- Approximately £3.57million for the part route to Ellon
  (assuming 30% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £4.40million for the part route to Ellon
  (assuming 50% of estimated passengers from stations north of Ellon transfer to Ellon)
- Approximately £5.62million for the part route to Ellon
  (assuming 80% of estimated passengers from stations north of Ellon transfer to Ellon)

Table E.10 : Option 7 Estimated Revenue (Full Route with branch lines to Fraserburgh & Peterhead from Ellon): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2] (£)
Bridge of Don	5.4	£1.10	£0.77	£1.54	£572	£208,900
Blackdog	8.6	£1.75	£1.22	£2.44	£44	£16,229
Balmedie	12.5	£2.52	£1.77	£3.53	£757	£276,393
Ellon	25.6	£5.17	£3.62	£7.24	£5,047	£1,842,068
Hatton	36.3	£7.34	£5.14	£10.28	£527	£192,251
Peterhead	50.6	£10.22	£7.15	£14.31	£12,213	£4,457,670
Mintlaw	46.1	£9.31	£6.52	£13.04	£1,763	£643,452
Fraserburgh	65.0	£13.13	£9.19	£18.38	£8,848	£3,229,686
					Total Annual Revenue	**£10,866,649**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

Table E.11 : Option 7 Estimated Revenue (Full Route with extended line from Peterhead to Fraserburgh): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)	Annual Revenue[2] (£)
Bridge of Don	5.4	£1.10	£0.77	£1.54	£572	£208,900
Blackdog	8.6	£1.75	£1.22	£2.44	£44	£16,229
Balmedie	12.5	£2.52	£1.77	£3.53	£757	£276,393
Ellon	25.6	£5.17	£3.62	£7.24	£5,047	£1,842,068
Hatton	36.3	£7.34	£5.14	£10.28	£527	£192,251
Peterhead	50.6	£10.22	£7.15	£14.31	£12,213	£4,457,670
St. Fergus	58.1	£11.74	£8.22	£16.43	£505	£184,501
Fraserburgh	65.0	£13.13	£9.19	£18.38	£8,848	£3,229,686
					Total Annual Revenue	**£10,407,698**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

Table E.12 : Option 7 Estimated Revenue (Part Route to Ellon Only): Method 2

Station	Distance from Station to Aberdeen (km)	Estimated ticket price based on distance (£)	Out-turn fare revenue[1] (£)	Return Revenue (£)	Daily Revenue (£)			Annual Revenue[2] (£)		
					30% transfer	50% transfer	80% transfer	30% transfer	50% transfer	80% transfer
Bridge of Don	5.4	£1.10	£0.77	£1.54	£572	£572	£572	208,900	208,900	208,900
Blackdog	8.6	£1.75	£1.22	£2.44	£44	£44	£44	16,229	16,229	16,229
Balmedie	12.5	£2.52	£1.77	£3.53	£757	£757	£757	276,393	276,393	276,393
Ellon	25.6	£5.17	£3.62	£7.24	£5,047	£5,047	£5,047	1,842,068	1,842,068	1,842,068
Ellon (tranferring from stations further north)	25.6	£5.17	£3.62	£7.24	£3,373	£5,622	£8,995	1,231,240	2,052,067	3,283,307
							Total Annual Revenue	**£3,574,831**	**£4,395,657**	**£5,626,898**

[1] *Out-turn fare is 70% of single fare (Lennon data) which takes account of monthly, weekly passes etc., children fares and concessionary passes*

[2] *Note that the analysis is based on existing population figures and does not take into account future planned development and increased travel demand*

F PARTICIPATION AND CONSULTATION: PUBLIC EVENTS

F.1 Introduction

In order to gauge public support for the options being appraised at Part 1, as well as further engage with those consulted during the earlier stages of the study, a series of public event were held in late October/early November 2015 at the following locations:

- Bridge of Don: Monday 26 October
- Ellon: Tuesday 27 October
- Fraserburgh: Monday 2 November
- Peterhead: Tuesday 3 November

The events all ran from 15:00 – 19:00 with:

- An invitation only session from 15:00 – 16:00, to which councillors were invited
- Public session from 16:00 – 19:00 which was widely advertised to the public through social media channels and in local papers with key stakeholders consulted with during Pre-Appraisal also sent details of the events

Two members of the consultant team and representatives from Aberdeenshire Council and Nestrans attended the events, as well as a representative from Aberdeen City Council at the Bridge of Don event.

The events ran as informal drop in sessions with a number of display boards setting out:

- The study purpose and study area
- The key transport problems and opportunities identified
- The Transport Planning Objectives developed
- The seven options taken forward to Part 1 Appraisal
- Details of the high level Part 1 Appraisal of the seven options

All those who attended were invited to fill out a feedback questionnaire form providing an opportunity to comment on the proposed options and outcomes.

F.2 Capturing Feedback

In order to accurately gauge public opinion, two feedback streams were made available to allow the public to provide feedback on the material presented at the events and give their views on the study in general, the problems identified and the options that had been developed.

The public were invited to provide feedback:

- Through a short survey, which was available from 26 October to 18 December:
  - In hard-copy form for completion at the events, or to be posted back thereafter
  - Electronically, with a link to the on-line version provided on the hard-copy form given out at the events
  - Electronically, through a link on the Nestrans website, where all the event material was also made available, allowing those who were unable to attend the events to view the material and provide feedback
- Via a dedicated study email account where open comments could be provided outwith those in the survey

The feedback links were publicised by Nestrans, Aberdeenshire Council, and Aberdeen City Council on social media and through other channels and importantly, was picked up by local politicians and press and further advertised.

F.3 Survey Analysis

The survey received 629 responses, the majority (98%) through the online version, however, not all respondents answered all questions in the survey and as a result some questions have a smaller sample size.

Of the total number of participants in the survey, only 6% (35 responses) responded on behalf of an organisation. Participating organisations included:

- Aberdeen & Grampian Chamber of Commerce
- Begg Shoes & Bags
- Bransburn Farm
- BrewDog
- British Horse Society
- CTC Grampian (Cycle Club)
- Direct Waste management Ltd
- Early Bird Catering Ltd
- Ferryhill Railway Heritage Trust
- Formartine Partnership
- Fraserburgh Community Council
- George Donald Ltd
- Hatton Public Hall
- Leiper Associated Packaging Ltd
- Longhaven District Hall Association
- Militimber
- Newmachar Community Council
- Peterhead Port Authority
- Railfuture Scotland
- RSPB Scotland
- RWG Healthcare Ltd
- Score (Europe) Ltd
- Scottish Association for Public Transport
- SEPA
- SureLift UK Ltd
- Tillydrone Community Council
- Transform Scotland

The remaining 94% of respondents were members of the public while a small number did not provide an answer to this question.

As shown in Figure F.1, the majority of respondents (84%) indicated they did not attended a drop in session, around 8% attended the drop in session organised in Peterhead, with only 1% attending the drop in session in Bridge of Don. Survey software allowed response rates to be monitored 'live', and key spikes in responses could be seen as and when media attention was devoted to it.

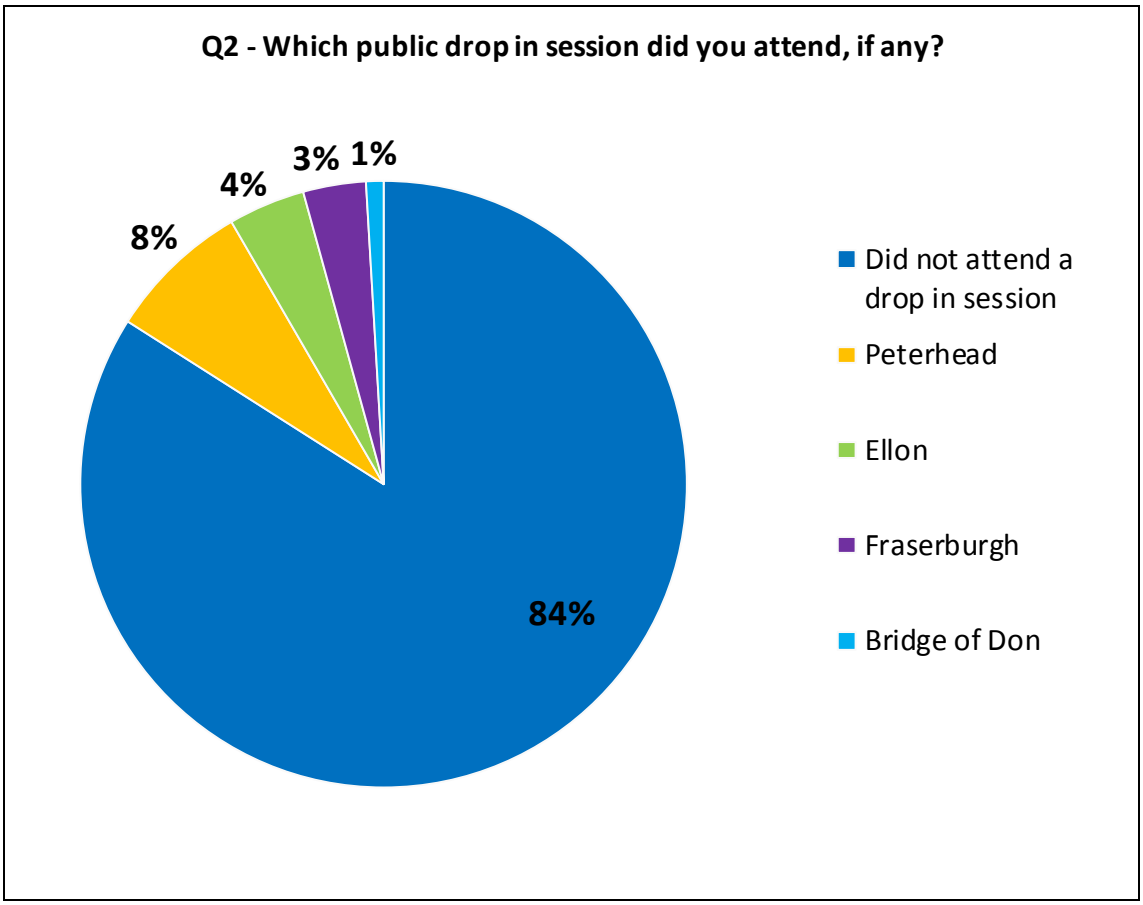

Figure F.1 : Question 2: Which drop in session did you attend, if any?

Respondents were provided with a list of areas and asked to choose the one that best described where they live. The locations mentioned by respondents as 'Other' have been grouped into three areas: Other Aberdeenshire (e.g. Collieston, Inverurie, etc.), Other Scotland (e.g. Edinburgh, Troon, etc.) and Other UK (London). Figure F.2 provides a breakdown of respondents by geographical area. Approximately 40% of 591 respondents live in Peterhead and the surrounding area.

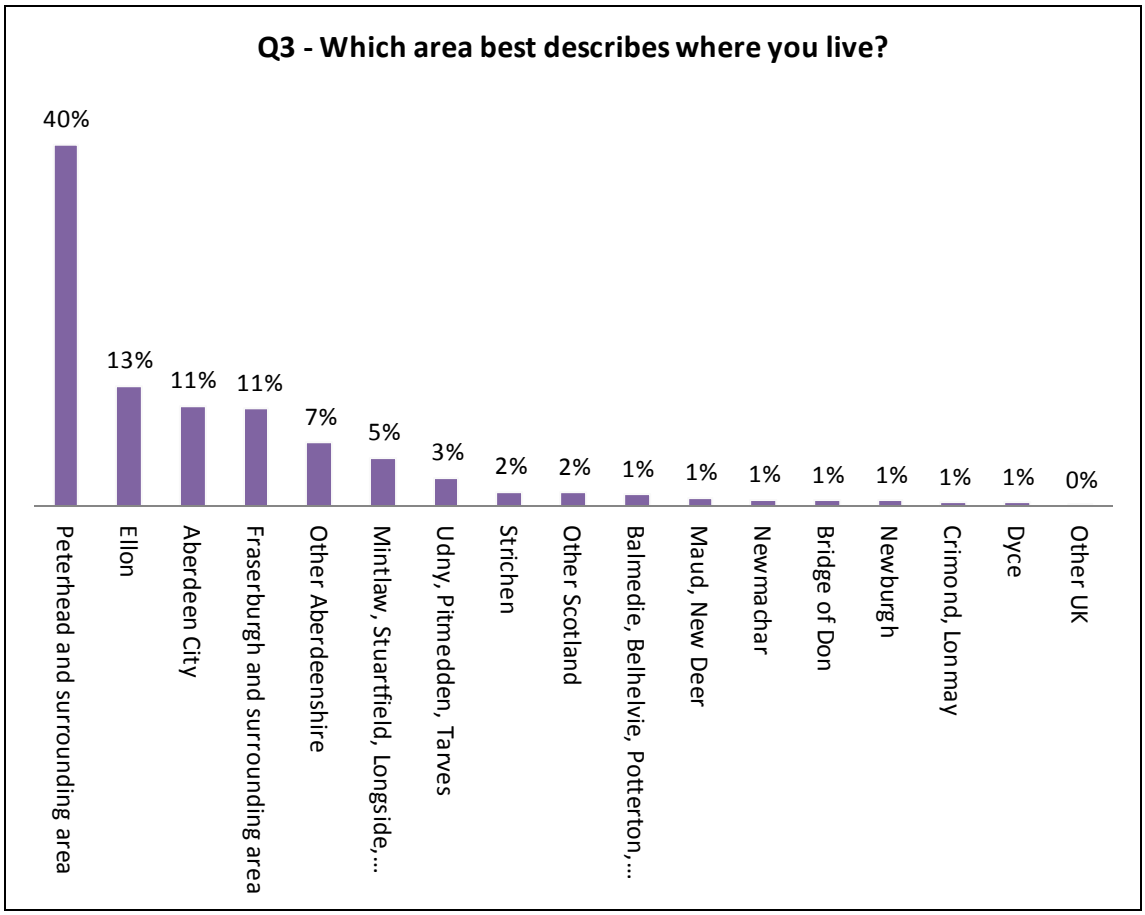

Figure F.2 : Question 3: Which area best describes where you live?

When asked *'Which mode of transport do you most regularly use when you go about your day to day activities?'* the respondents' preferred mode of transport is the car with 91% of respondents driving for their day to day activities and 16% travelling as passengers in a car, as shown in Figure F.3.

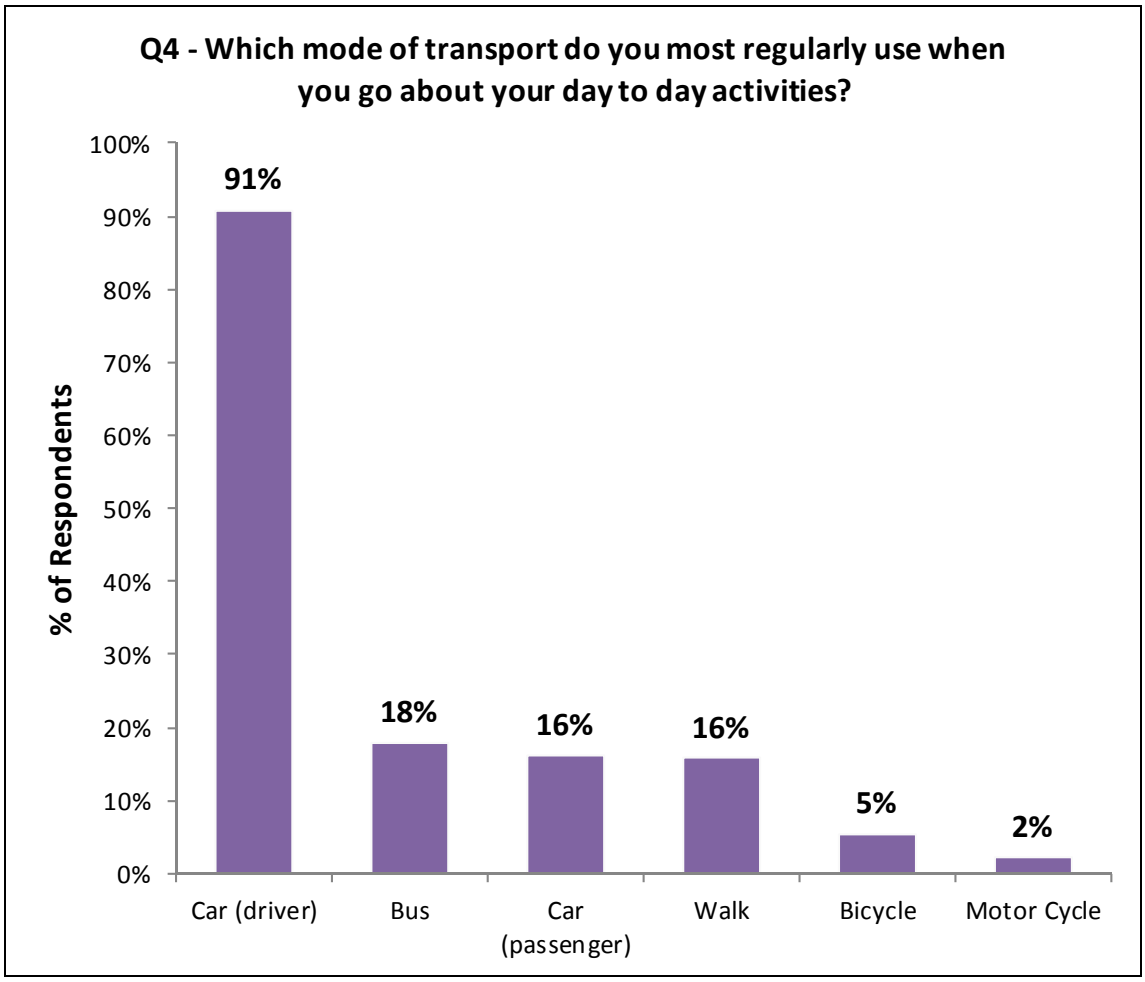

Figure F.3 : Question 4: Which mode of transport do you most regularly use when you go about your day to day activities?

This high level of car based transport is consistent with analysis undertaken during the study. A considerably high proportion (7%) also use active modes when they go about their day to day activities.

Question 5 provided survey participants with the three Strategic Transport Problems identified for the study, and participants were asked how these problems impacted on them on a regular basis. The analysis, shown in Figure F.4 to Figure F.9, identified for the three problems:

- 73% (n=524) of respondents believe that *Traffic speeds significantly below posted speed limits, and unreliable and unpredictable journey time* is a major problem in their area and most of these responses came from Peterhead and the surrounding area, Ellon and Fraserburgh and the surrounding areas
- 69% (n=521) of respondents indicated that *Road safety risk on the A90(T) and A952* is a major problem in their area and 22% believe it's only a slight problem; with the majority of respondents from Peterhead and surrounding area, Ellon and Fraserburgh and surrounding area
- 92% of respondents indicated that *Limited travel mode choice* — is either a major or a slight problem in their area

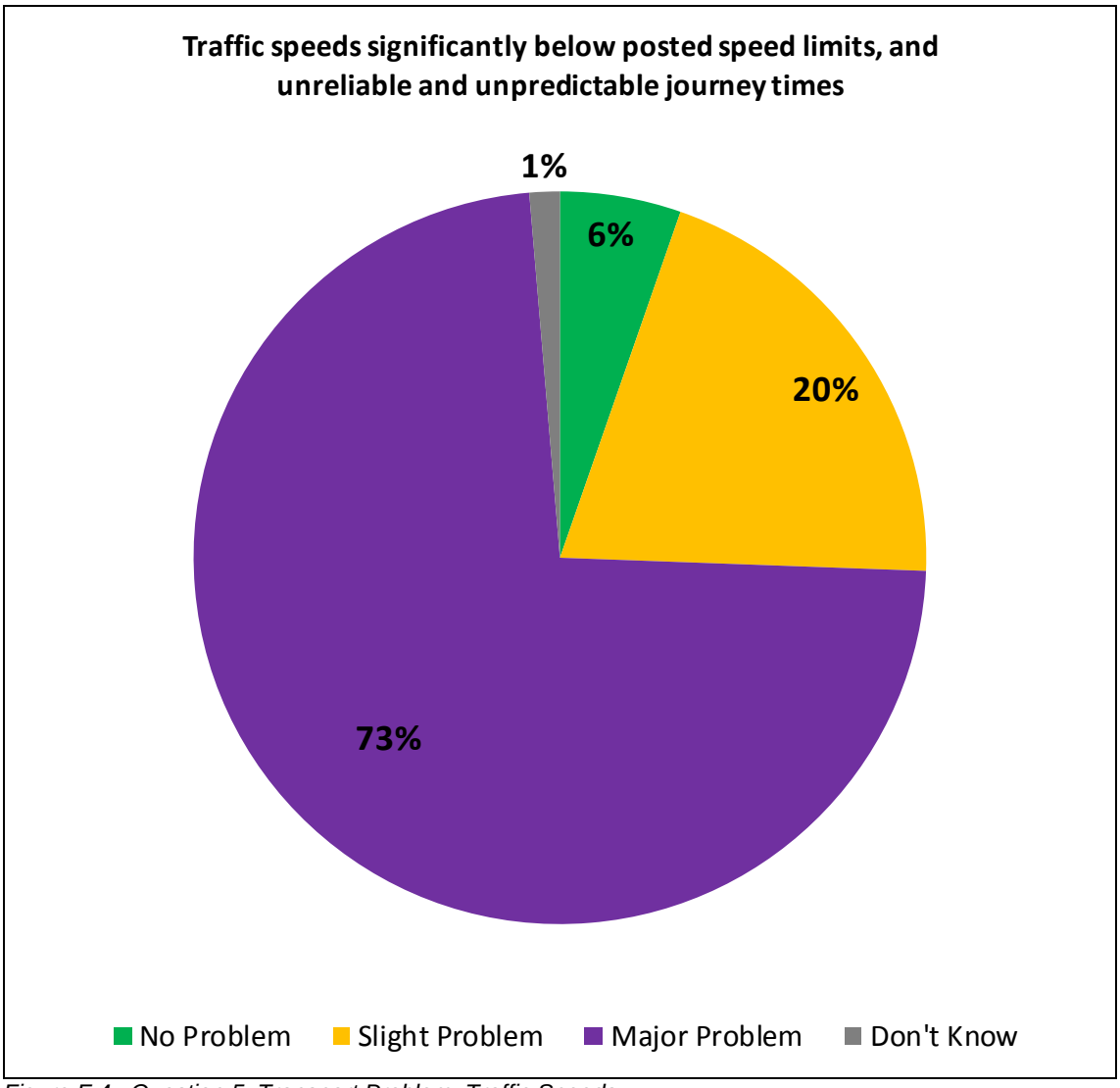

Figure F.4 : Question 5: Transport Problem: Traffic Speeds

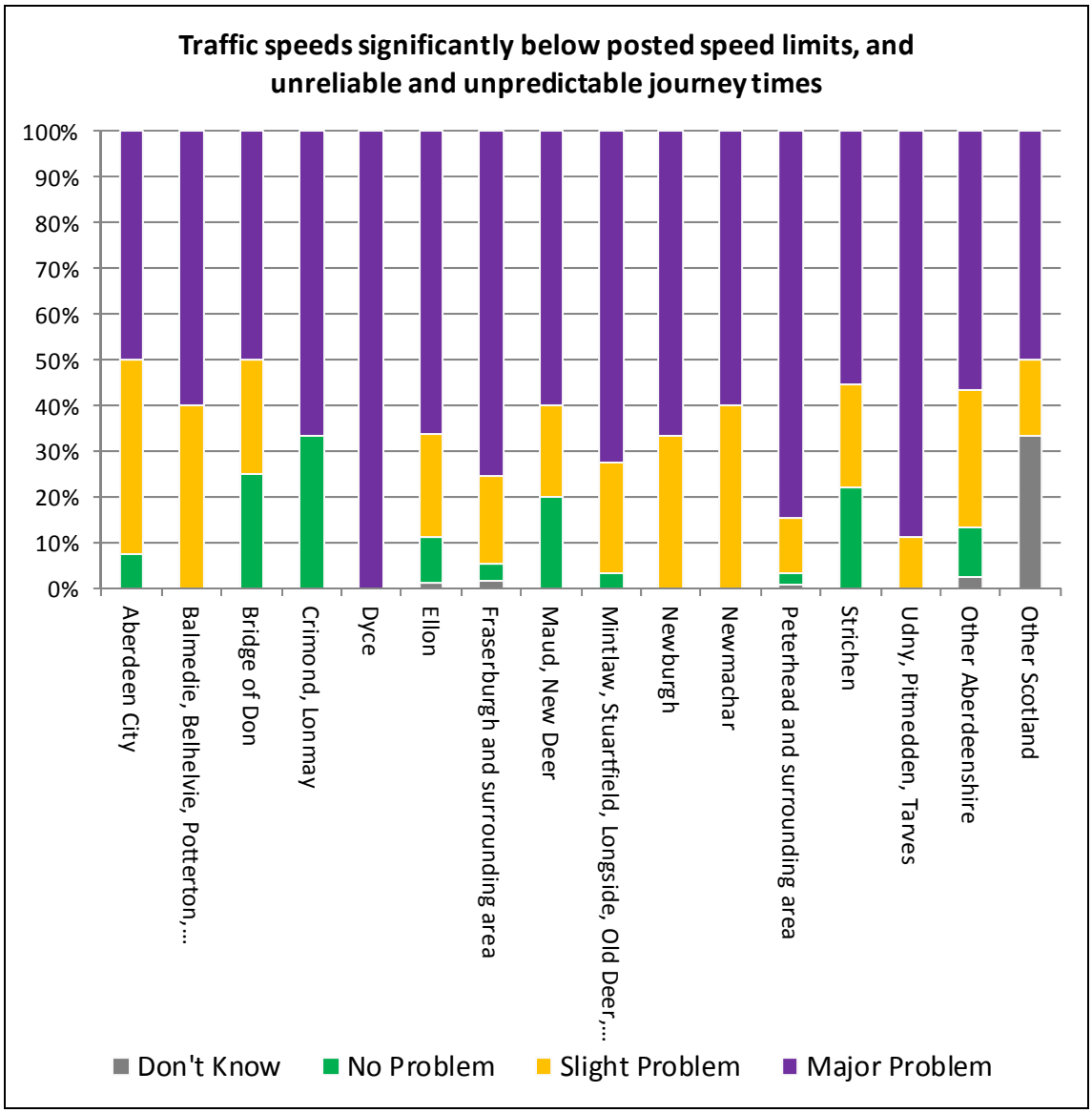

Figure F.5 : Question 5: Transport Problem: Traffic Speeds Breakdown by location

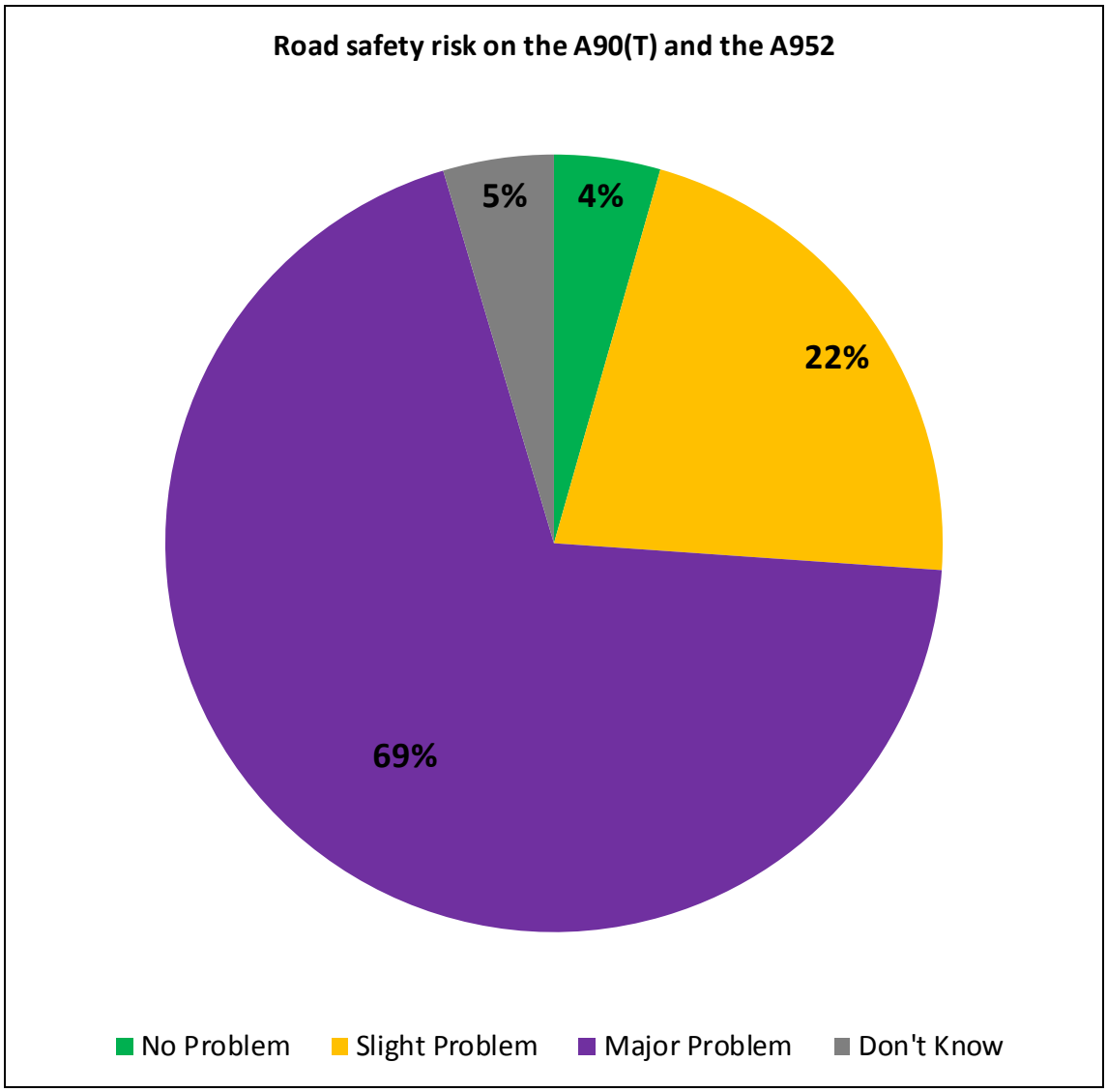

Figure F.6 : Question 5: Transport Problem: Road Safety

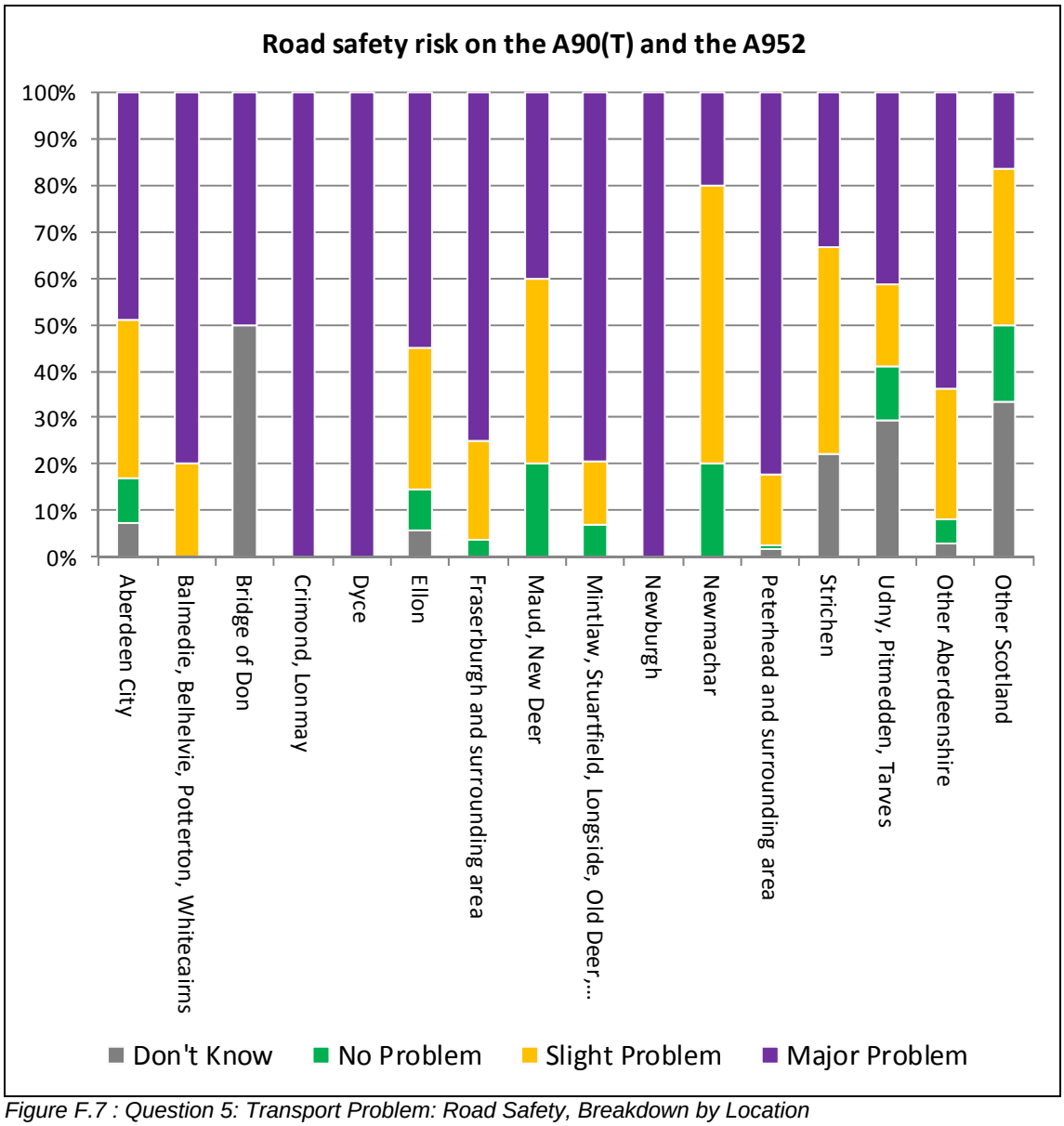

Figure F.7 : Question 5: Transport Problem: Road Safety, Breakdown by Location

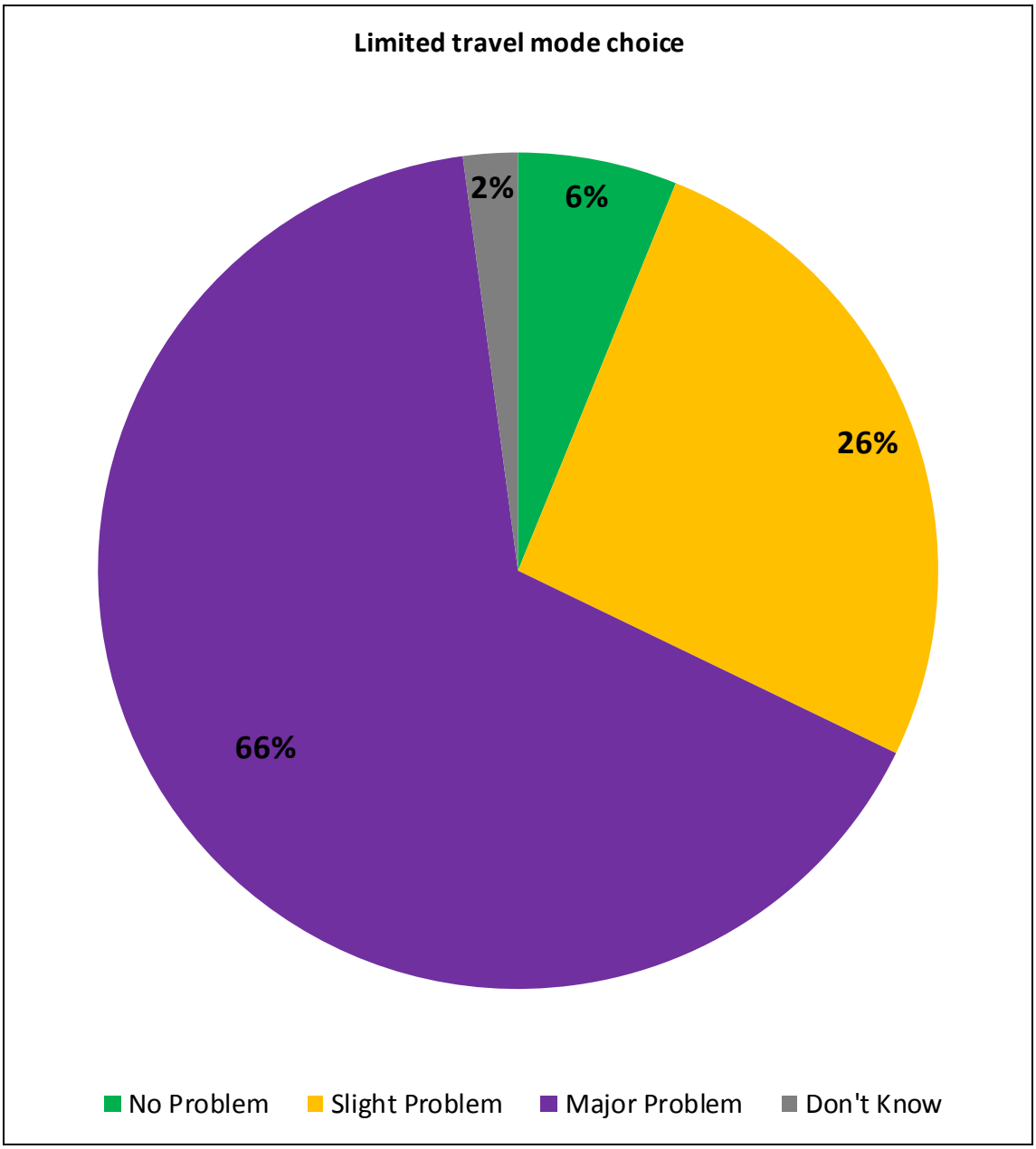

Figure F.8 : Question 5: Transport Problem: Limited Mode Choice

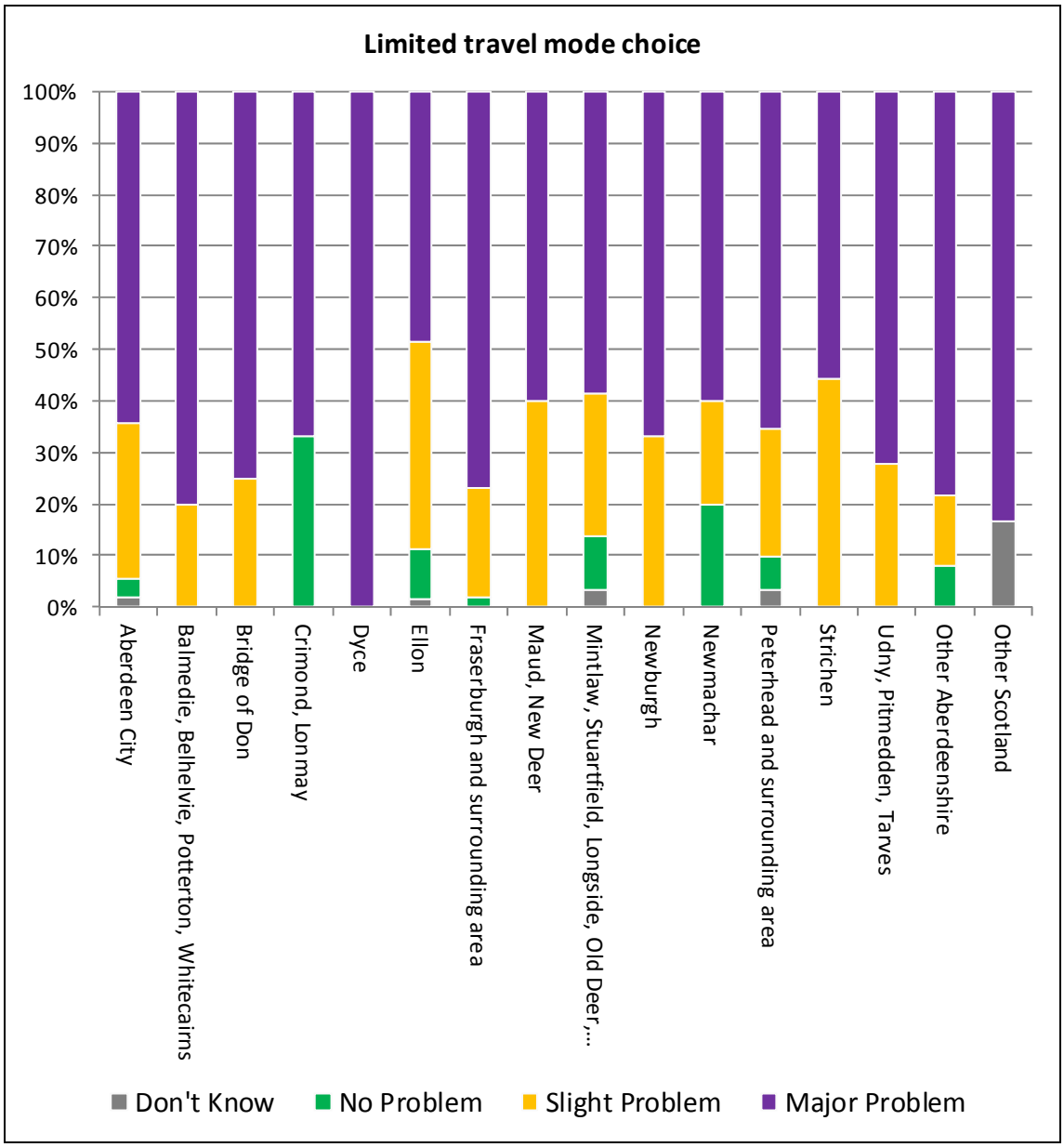

Figure F.9 : Question 5: Transport Problem: Limited Mode Choice, Breakdown by Location

Respondents were also asked to consider the seven developed transport options and indicate for each option whether they expected it to lead to improvements/benefits or negative impacts. The following was noted:

Option 1:
Phased road dualling north of Ellon (A90(T) and A952), with junction improvements

89% of respondents, as shown in Figure F.10 and Figure F.11, considered this option is likely to have positive benefits such as:

- Increase road capacity and eliminate congestion caused by slower moving vehicles which currently leads to a lot of dangerous driving due to limited overtaking opportunities
- Improve road safety and accidents rates
- Improve journey times for both car and bus
- Increase the attractiveness of the area to investors and employees
- Ease the commute of students and workers

Some respondents believed this option will have negative impacts because it would:

- Encourage car and lorry use
- Speed up traffic and endanger cyclists
- Increase carbon emissions

Specific comments included:

> *"The large amount of slow-moving vehicles found on the A90 & A952 (lorries and agricultural vehicles) are a severe hindrance to traffic flow throughout the day. Dualling of these roads would allow the faster moving traffic to overtake these slow vehicles, increase the average speeds on the road and prevent tailbacks. The sheer volume of traffic on the roads north of Ellon at peak times is not a significant issue at the moment but may well become so as the towns and villages increase in size, therefore dualling the roads north of Ellon will alleviate the pressure the increased traffic will bring, much like the Balmedie - Tipperty dualling is to alleviate the current peak time issues south of Ellon"*

> *"Making improvements to the road would in the long term help with travel however the effect it would have on commuters whilst this was being put in place would be disastrous unless the railway issue was done first."*

> *"The majority of transportation proposals in Aberdeen and Aberdeenshire involve either widening an existing road or building a new road. We do not need any more roads because it encourages car use and the money should be better spent improving the attractiveness of sustainable modes such as cycling or rail travel."*

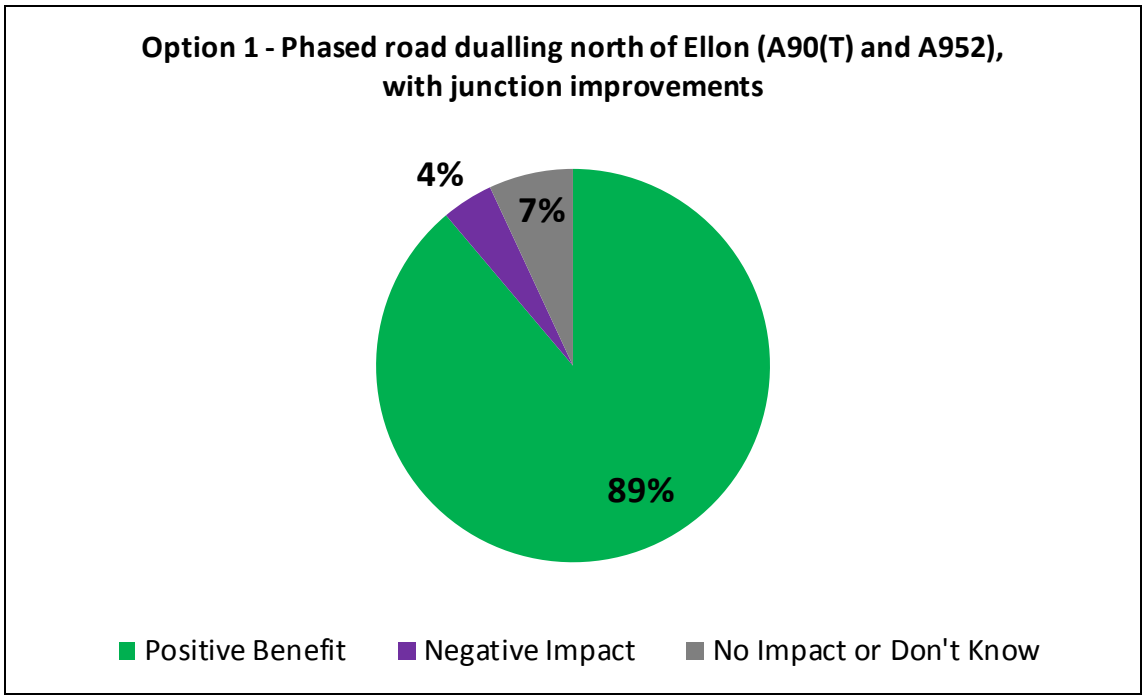

Figure F.10 : Question 6: Option 1 Benefits and Impacts

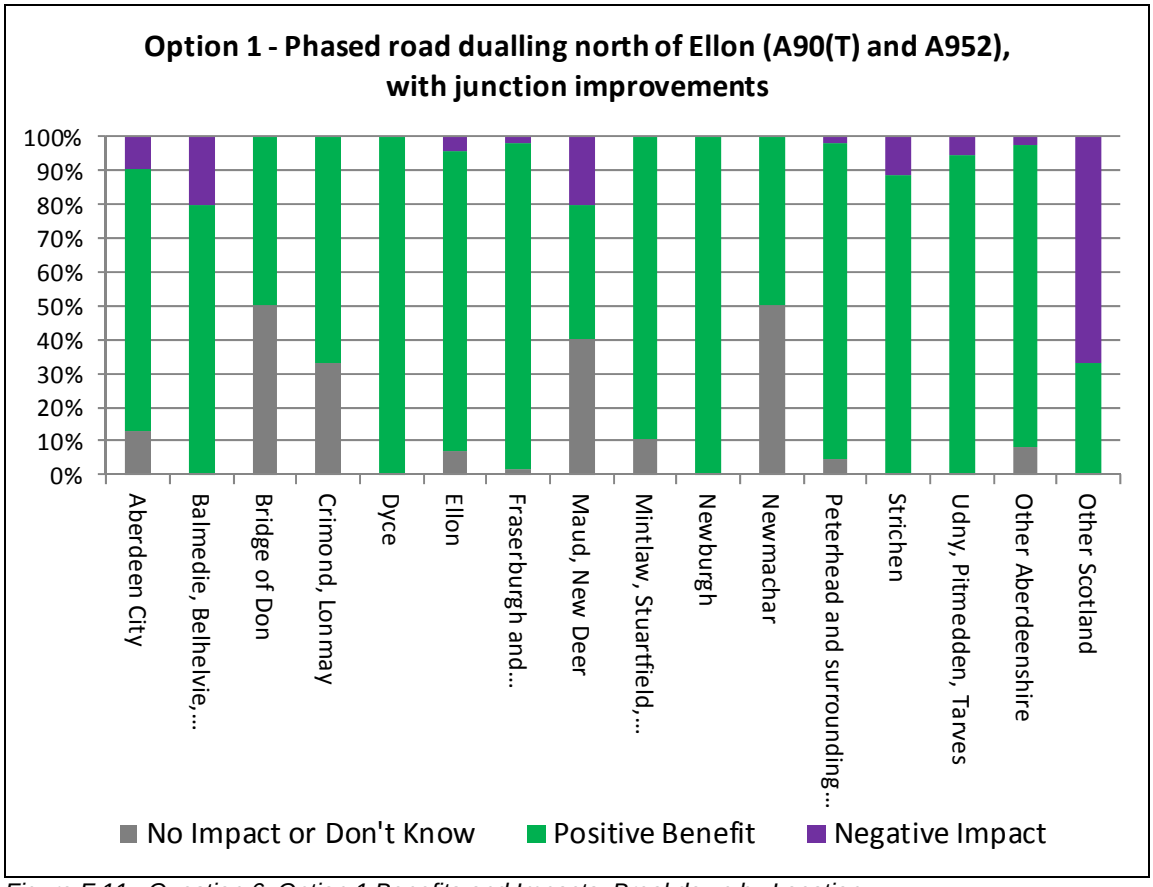

Figure F.11 : Question 6: Option 1 Benefits and Impacts, Breakdown by Location

Option 2:
Phased road dualling north of Ellon (A90(T) and A952), with junction improvements

63% of respondents, as shown in Figure F.12 and F.13, considered this option likely to have some positive outcomes with the following positive benefits noted:

- Reduce road collisions
- Smooth traffic for all parts of the A90(T)
- Improve road safety
- Reduce journey times at reasonable costs

There was a general feeling amongst respondents that the option would only be a short-term solution and would not be as effective as the dualling option.

Concerns shared by respondents related to the adverse impact of overtaking lanes on road safety, i.e. causing drivers to take additional risks to pass slower moving traffic.

Specific comments included:

> *"Probably a compromise in terms of reducing cost and delivering a potential solution in a shorter timeframe when compared to Option 1. Overtaking lanes would address safety/frustration issues and could be delivered on key sections of the A952 as an alternative to full blown dual carriageway which would probably be more effective/feasible on the A90(T). "*

> *"Overtaking lanes would be of benefit, however, there are a high volume of slow moving large vehicles and overtaking lanes may not be enough to deal with this."*

> *"This will encourage more to drive and continue driving, which in the long term will just result in even more traffic on the roads and vehicle emissions. It will also encourage rushing/speeding and possibly risky overtaking."*

> *"Could lead to more accidents. People will race and drive at excessive speeds to ensure they get in front of slow moving vehicles. It's what happened on Tipperary to Ellon dual already and the amount of traffic that builds up behind a lorry will cause frustration and risky moves to get in front before end of overtaking lane."*

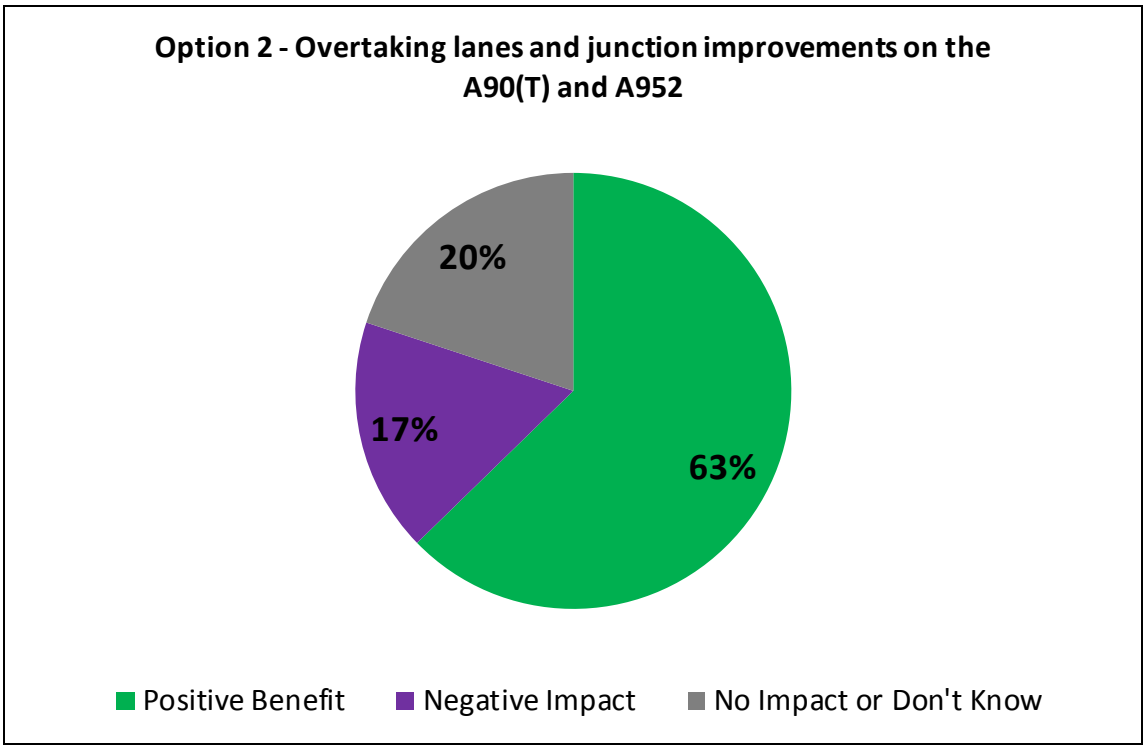

Figure F.12 : Question 6: Option 2 Benefits and Impacts

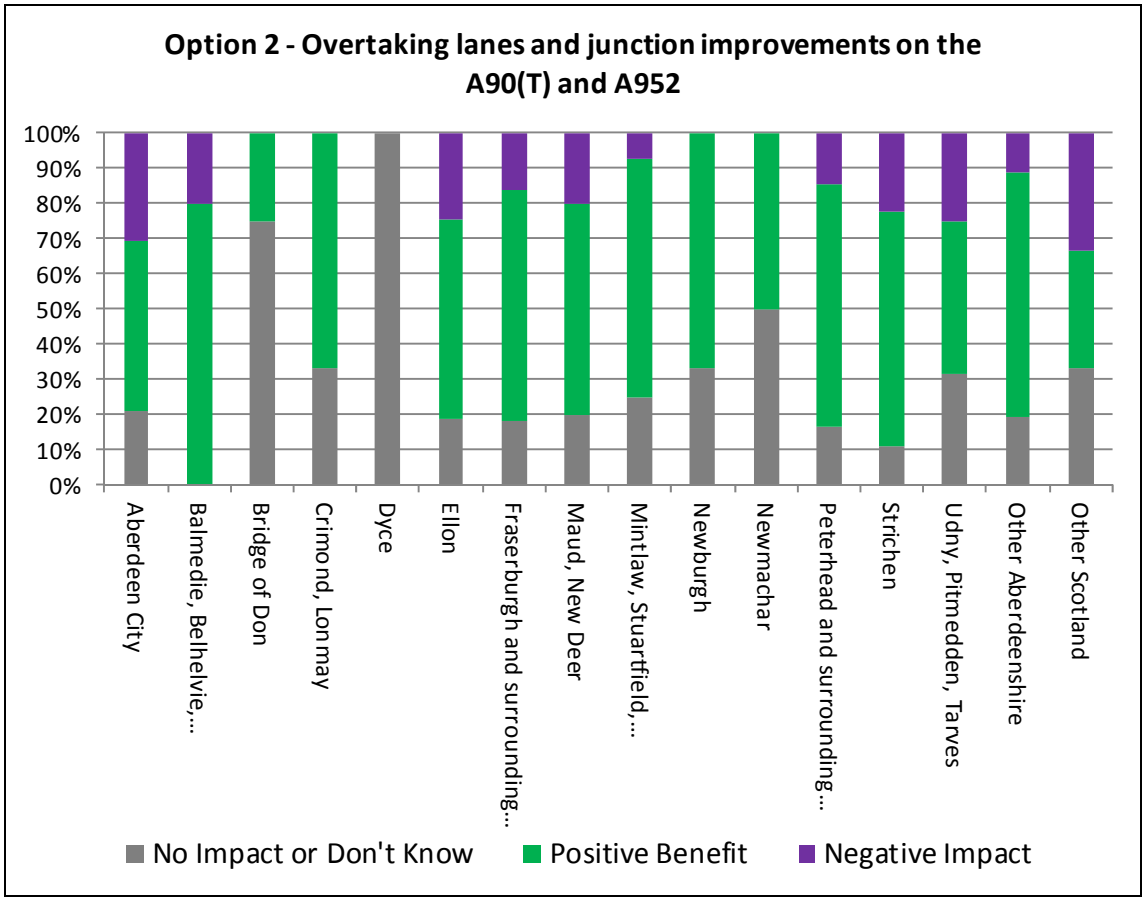

Figure F.13 : Question 6: Option 2 Benefits and Impacts, Breakdown by Location

Option 3:
Safety improvements on the A90(T) and A952

73% of respondents, as shown in Figure F.14 and F.15, considered this option likely to have positive outcomes, especially for the Toll of Birness junction which is currently thought to be poorly lit and hard to see at night by some drivers and also very busy in the mornings and evenings. This is consistent with the public consultation exercise carried out in March 2015.

Specific comments included:

> *"Surely the Toll of Birness should be a big well lit roundabout, it's an unbelievable junction in this day. I believe that a change there would make it a lot safer for people travelling to Peterhead and Fraserburgh, even for locals it is bad in the summer and in the winter it is a total nightmare. How can we expect tourists to feel comfortable?"*

> *"Speed is a problem and this option won't make it safer, Bridgend Cruden bay junction still very dangerous."*

> *Whilst there was significant support for this option, there were a significant number of responses noting that improving safety aspects will do nothing to solve the issues of traffic congestion, and slow and unreliable journey times, with comments such as:*

> *"Better than do-nothing, but does not address journey times and sense of peripherality"*

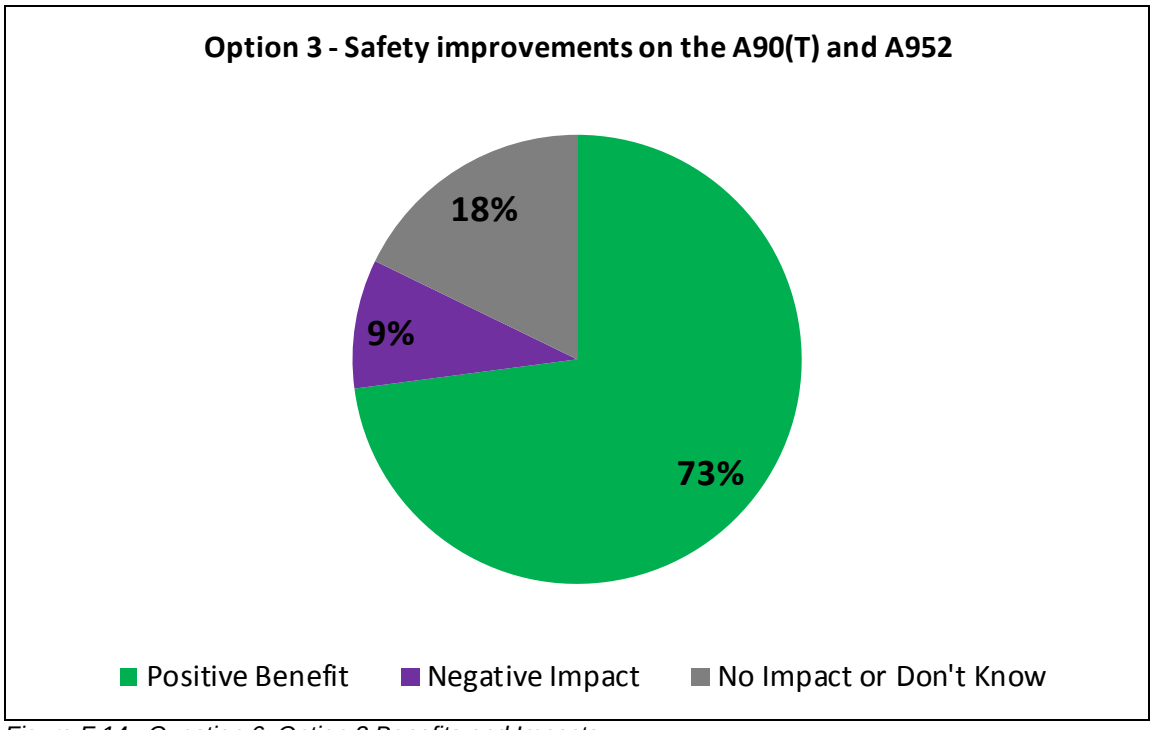

Figure F.14 : Question 6: Option 3 Benefits and Impacts

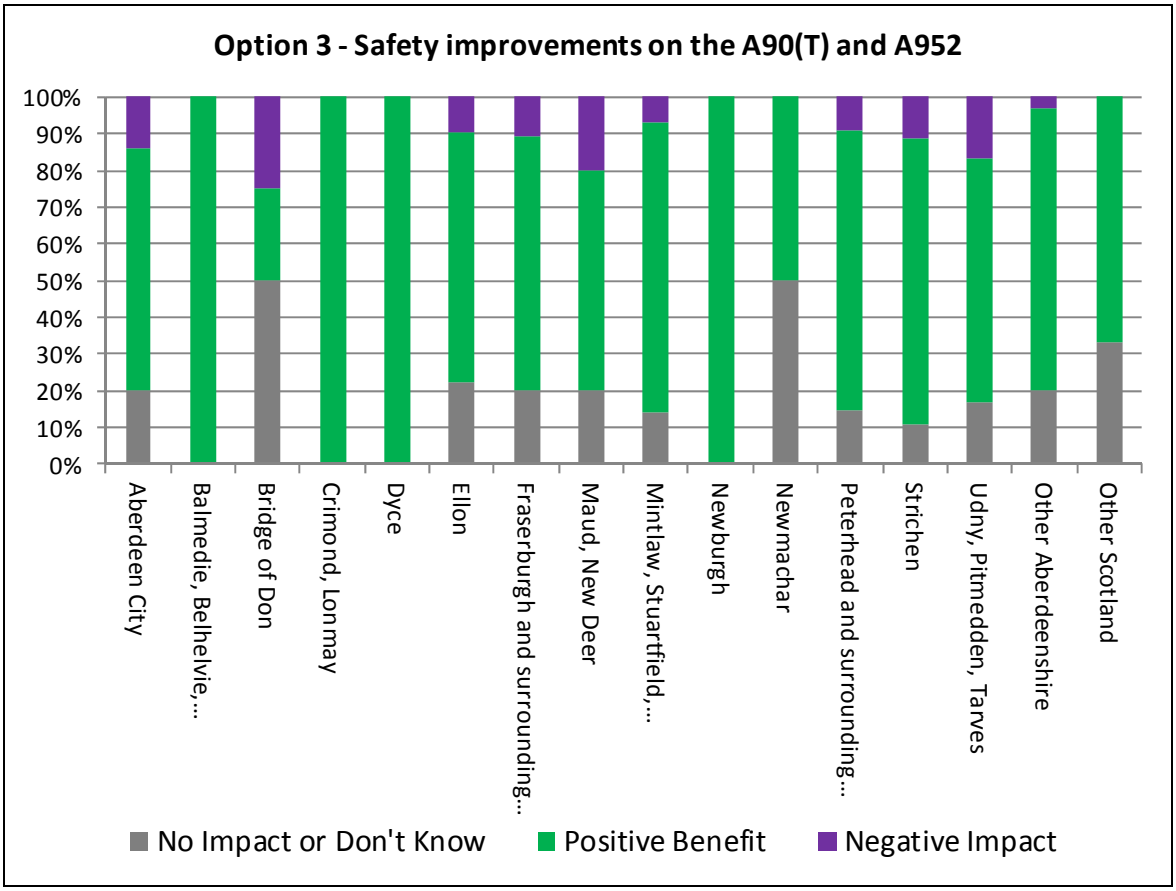

Figure F.15 : Question 6: Option 3 Benefits and Impacts, Breakdown by Location

Option 4: Bus service improvements including new direct and increased express services between the study area and key employment, health, and social facilities in the Aberdeen conurbation

As shown in Figure F.16 and Figure F.17:

- 55% of respondents, considered this option is likely to have positive outcomes
- 32% believed it might have no impact or said they did not know

The open comments provided for this option ranged from support of the proposed option through to concerns that it may either not provide enough improvement, or it may not work at all, with the following themes noted:

- Although the option would improve links to Aberdeen City Centre itself, there will still be the requirement to interchange for onward journeys
- While the option would improve services from key points, it would do nothing for populations living outwith Fraserburgh and Peterhead or service points on the route
- Buses themselves were a contributor to the slow journey times.
- The price of bus travel is too high and not competitive with the private car
- Buses were viewed by some to be environmentally unfriendly

Specific comments included:

> *"While improvements to bus service would be an advantage, express services do not serve small locations or rural residents"*

> *"In principle could work but still has to join the congested roadways. More services could in turn contribute to more congestion if people do not switch to bus services."*

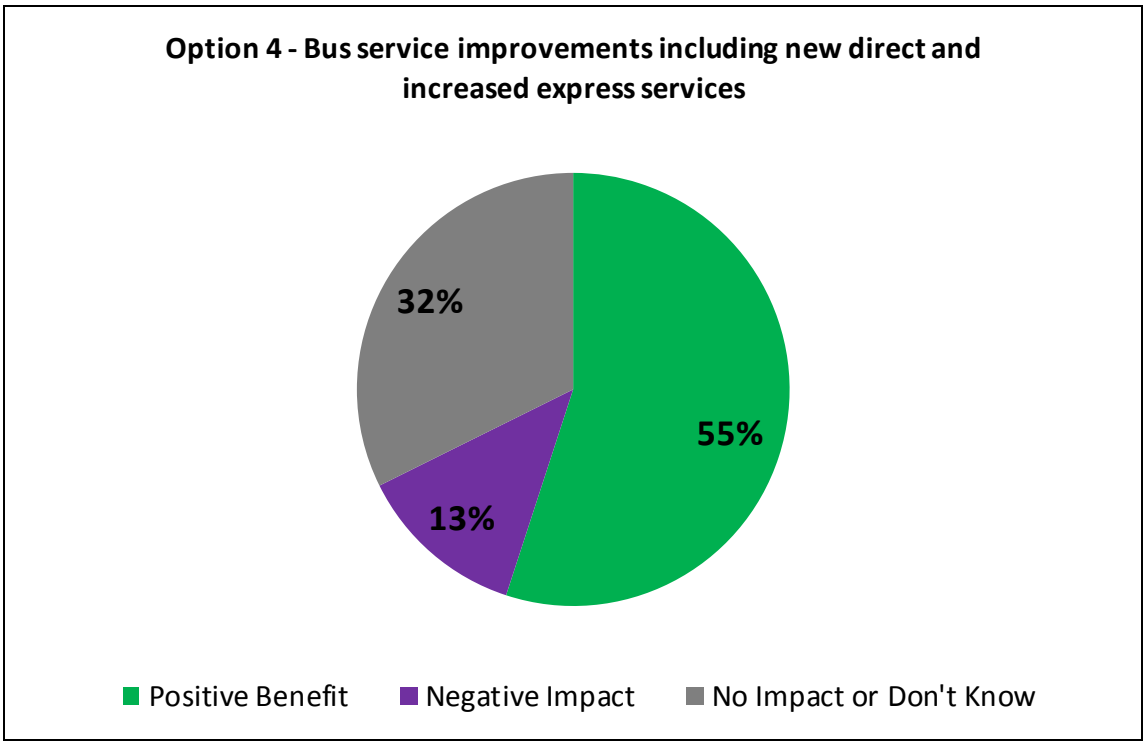

Figure F.16 : Question 6: Option 4 Benefits and Impacts

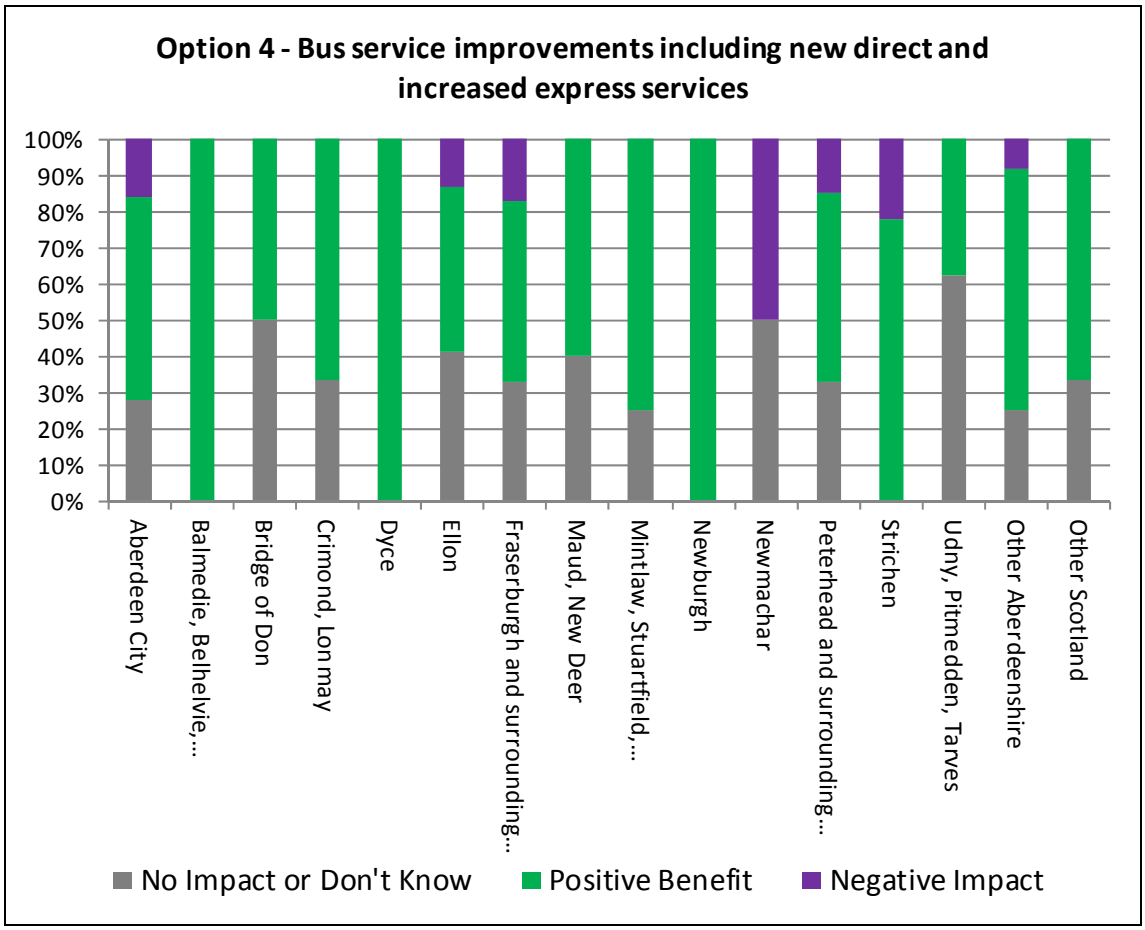

Figure F.17 : Question 6: Option 4 Benefits and Impacts, Breakdown by Location

Option 5:
Bus service improvements (as Option 4) accompanied by priority infrastructure and Park & Ride improvements

As shown in Figure F.18 and Figure F.19:

- 51% of respondents considered this option is likely to have positive outcomes
- 35% believed it might have no impact or said they did not know

The open comments provided were generally similar to Option 4, with concerns about the price of bus travel and the impact buses can cause on the network, contributing to congestion and slow journey times. Additional comments were noted in relation to the Park & Ride and bus priority infrastructure proposals. In general:

- There was enthusiasm for the Park & Ride sites with respondents noting the success of current Park & Ride arrangements at Ellon and the ease this provides
- There was tacit support for increasing Park & Ride options beyond those provided at present
- There were concerns that increasing dedicated bus lanes would remove valuable road space and only serve to exacerbate the problems of congestion and slow journey times on the network

Specific comments included:

> *"P&R is a popular method and certainly one which I have used in the past when working in Aberdeen. Improvements would encourage new users to engage with the service."*

> *"Would probably use the bus if there was somewhere to park my car properly/safely in Peterhead."*

> *"I'm not convinced making provision especially for buses would be at all beneficial on the road. In Aberdeen definitely, but A90 should flow at all times for all vehicles."*

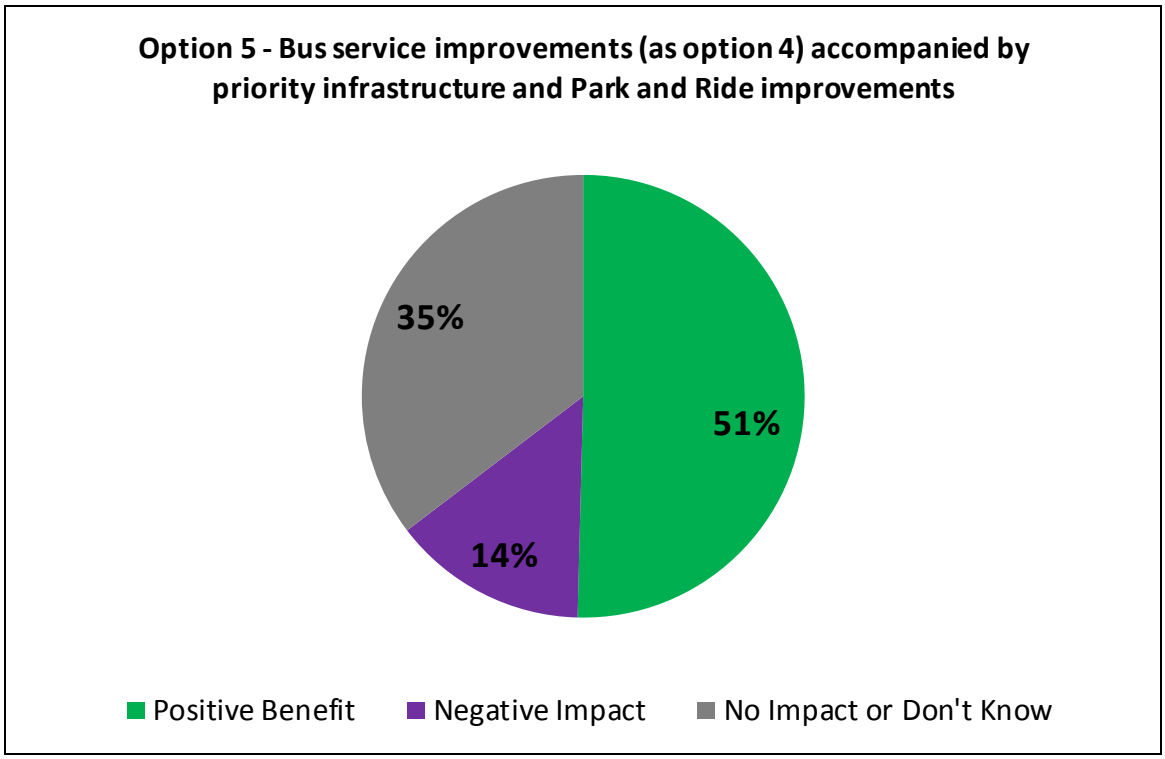

Figure F.18 : Question 6: Option 5 Benefits and Impacts

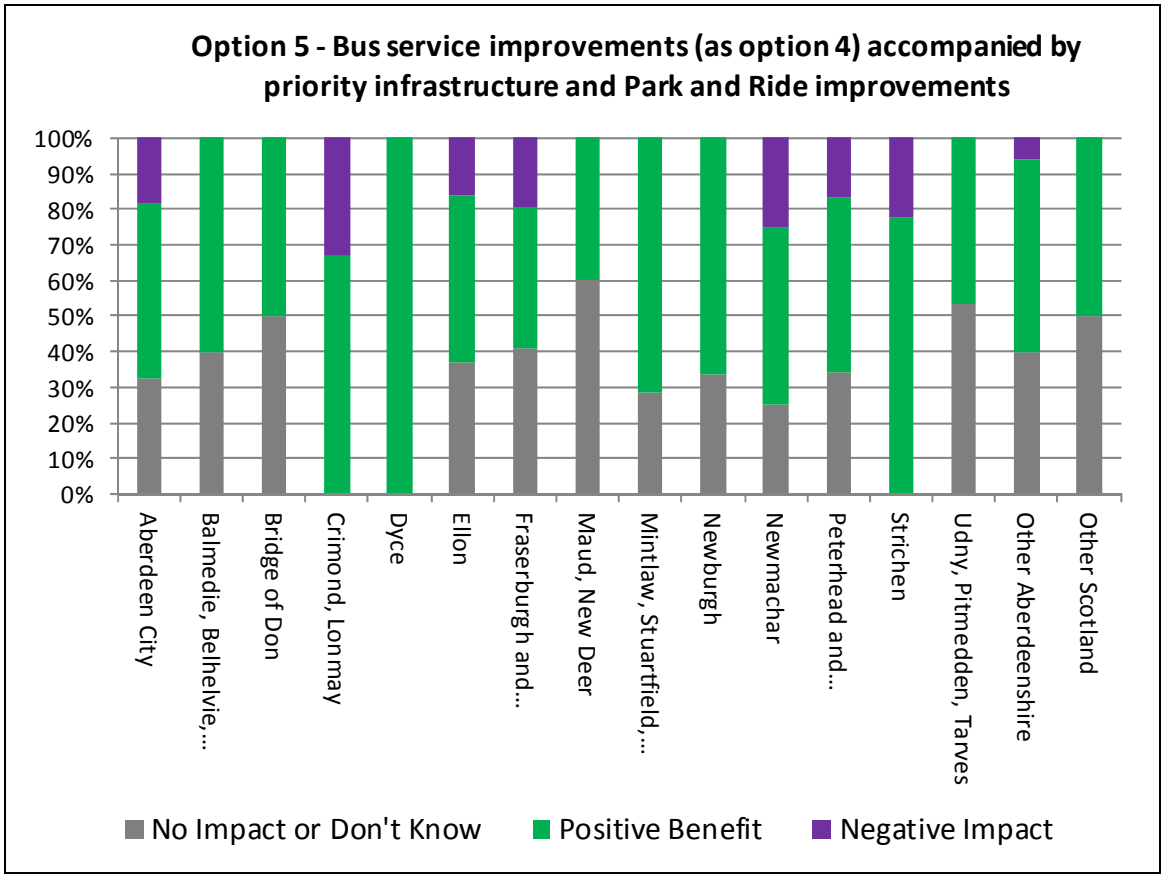

Figure F.19 : Question 6: Option 5 Benefits and Impacts, Breakdown by Location

Option 6:
Phased reinstatement on existing railway alignments, via Dyce, including examining options for light rail or tram

As shown in Figure F.20 and F.21:

- 86% of respondents considered this option is likely to have positive outcomes

The open comments provided overwhelmingly supported the introduction of a rail based option with 70% comments noting support. The reasons for support included:

- Journey times would be reduced by a rail service
- Rail would offer the opportunity to remove freight from the road
- Rail would be more reliable than road based measures
- Investment in rail would provide economic benefits for the region as a whole.

Specific comments included:

> *"Railway line all the way from Peterhead to Aberdeen can only be a great resource for both public and organisations, it is a shame that the railways north of Aberdeen were ripped up in the first place."*

> *"Much quicker and safer method of travel which I think would be of a huge popularity"*

Despite the popularity of the option, there were those who disagreed with the proposal. Concerns were raised regarding:

- The proposed alignment, with a number of respondents noting the circuitous nature of the route.
- The use of the Foramrtine & Buchan Way for recreational purposes.
- The large capital cost of building and operating the scheme.

Specific comments included:

> *"Capital expenditure would be too high and I don't think usage would be high enough to justify."*

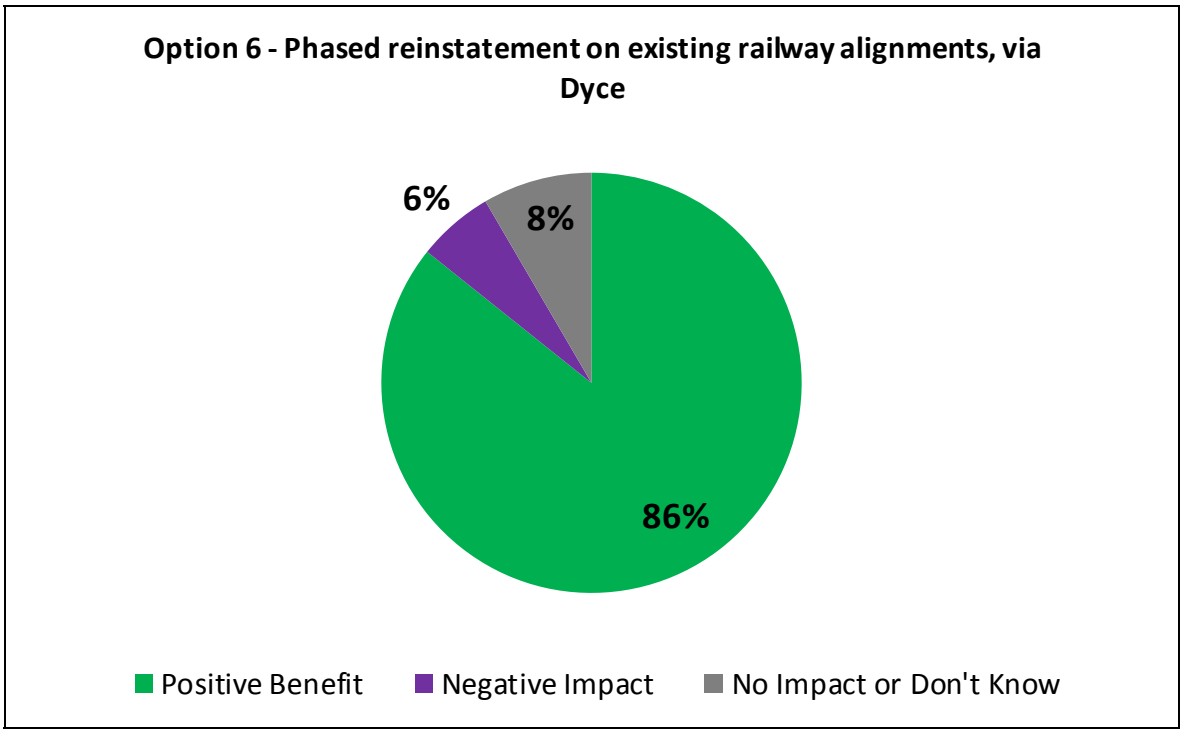

Figure F.20 : Question 6: Option 6 Benefits and Impacts

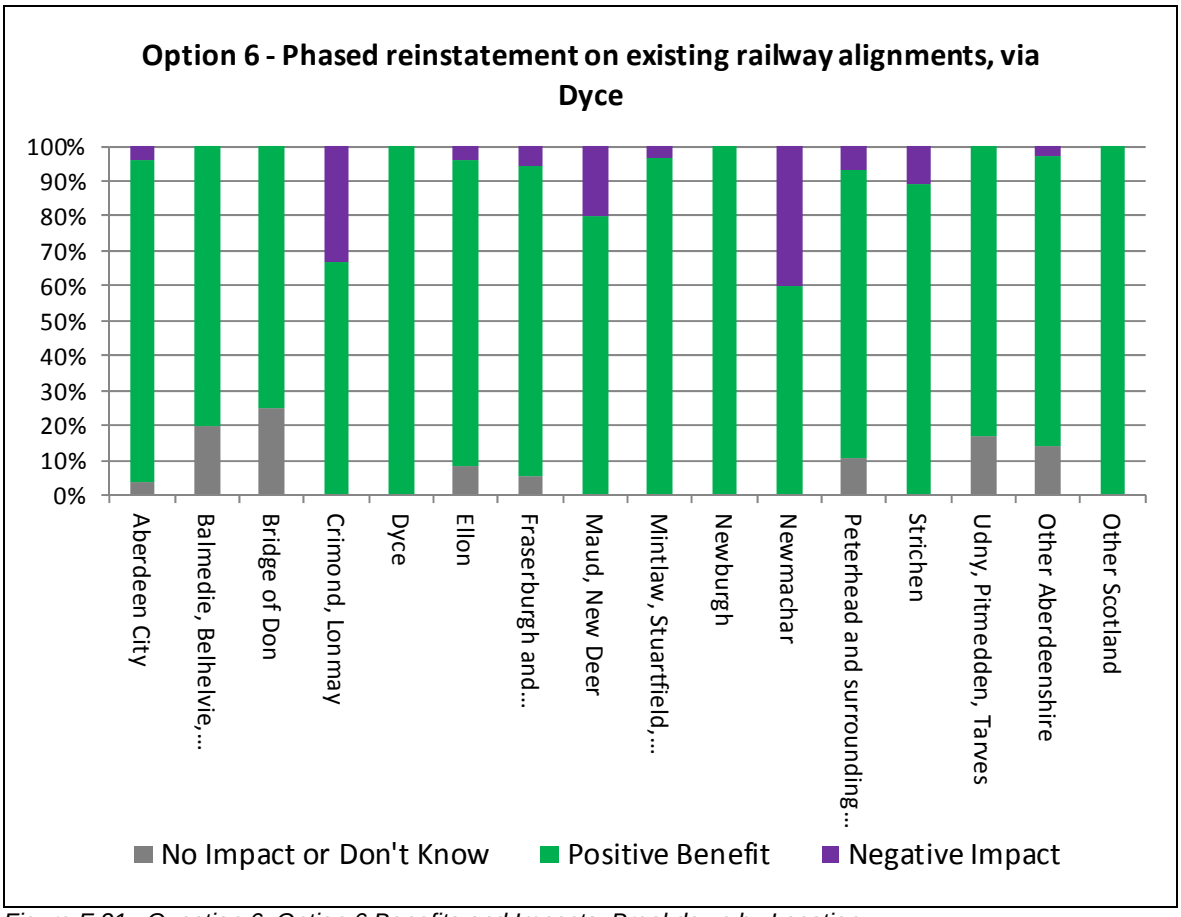

Figure F.21 : Question 6: Option 6 Benefits and Impacts, Breakdown by Location

Option 7:
Phased reinstatement of a railway line on a new railway alignment, via the Bridge of Don, including examining options for light rail or tram

As shown in Figure F.22 and Figure F.23:

- 81% of respondents considered this option is likely to have positive outcomes similar to Option 6.

Open comments received noted that the option:

- Should also incorporate freight movement by rail with rail offering the opportunity to remove freight from the road, and increase revenue through additional use of rail for transporting goods
- Would improve commuting for travellers in the Bridge of Don and Ellon area
- Provide better links into Aberdeen
- Relieve issues with infrastructure on the roads and reduce traffic and traffic emissions
- Improve choices of public transport available and attract/retain more people in the area
- Benefits will only be realised if this option results in a travel opportunity that is significantly cheaper and quicker than the car with integrated timetables for a smoother and quicker onward journey
- Might have negative or zero impacts
- Is unfeasible due to high costs and the difficulties and challenges in building the railway which could take a long time to overcome

Specific comments included:

> *"This would majorly reduce traffic on both the A90 and the A952, drastically reduce journey times, take a lot of freight and lorries off the road etc. - by far the best option."*

> *"A new railway (using a new route) is probably the most expensive solution included in the study but would be the one that would deliver the greatest benefits in the area in terms of reducing congestion etc. A new route would avoid the loss of the Buchan & Formartine line whilst providing the real alternative that the people in the north could use and solve many traffic problems in the study area."*

> *"Not sure if the rail network would take much industrial transport away from articulated lorries. Passenger benefits might be increased by aligning with towns and villages, but again I don't know if it can be justified alongside a fine new dual carriageway. I'd rather see the roads dualled than a railway line installed."*

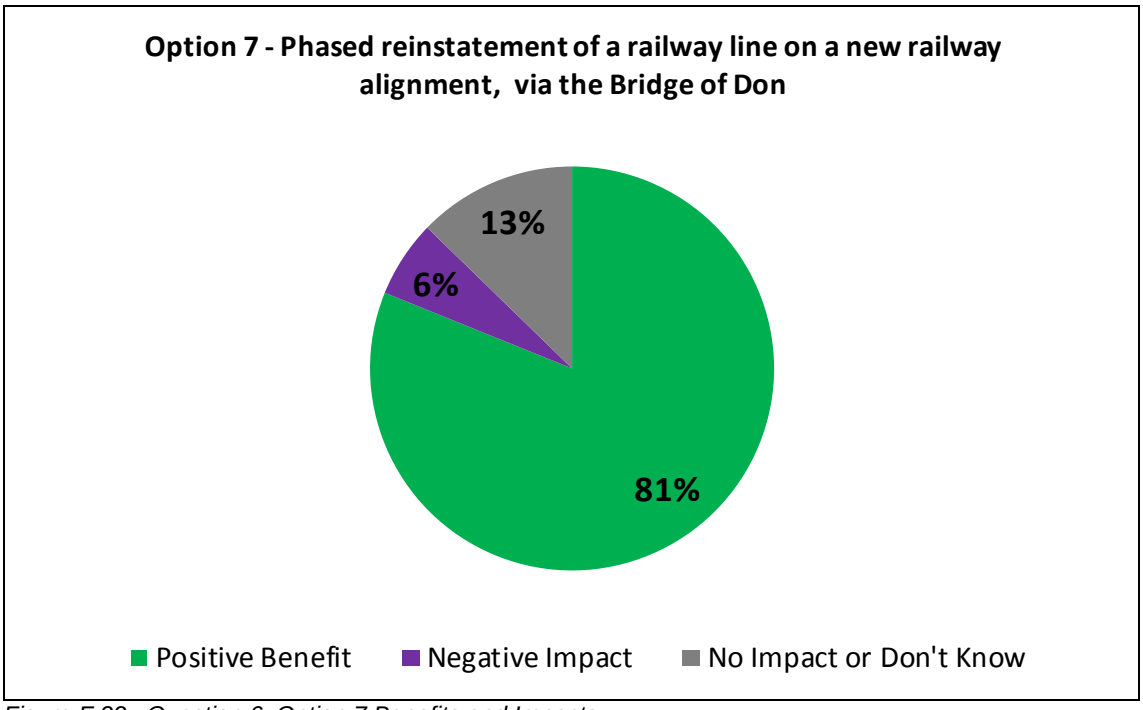

Figure F.22 : Question 6: Option 7 Benefits and Impacts

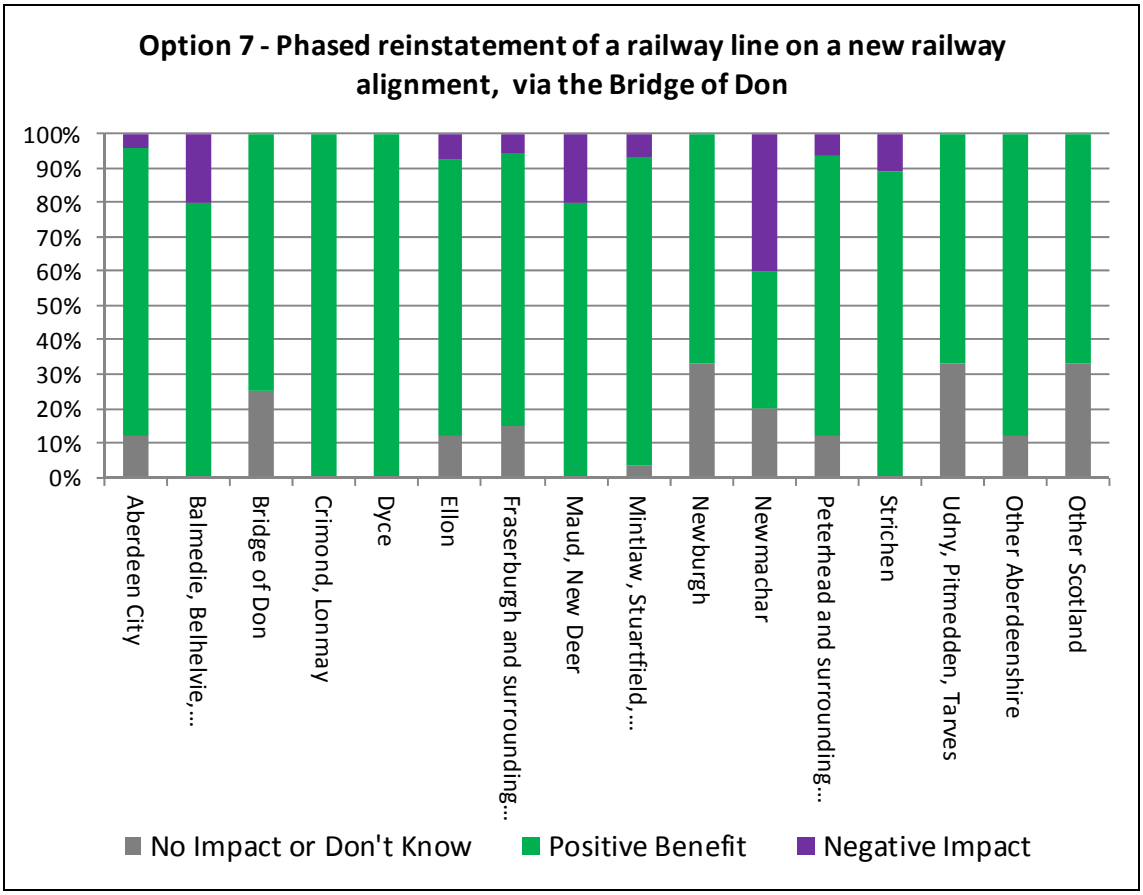

Figure F.23 : Question 6: Option 7 Benefits and Impacts, Breakdown by Location

F.4 Open Comment Analysis

While the survey was available electronically, a small number of organisations and members of the public chose to submit open responses, unguided by the survey structure. Many of the key themes noted within the survey analysis were repeated within the open responses. Additional points raised by organisations included:

- The Scottish Association for Public Transport (SAPT) who concluded that the most effective option would be to build an initial rail route between Ellon, Dyce, and Aberdeen City Centre, with Park & Ride provision and improved bus services north across the study area providing access to Fraserburgh and Peterhead. SAPT also noted that such a solution would allow future extensions to be added north of Ellon.
- The Scottish Environmental Protection Agency (SEPA) who provided detailed feedback on a number of issues which can be summarised as follows:
  - Option 4 is likely to have the least impact through engineering and discharge activities during construction, and then through pollution
  - In terms of Air Quality, SEPA suggest that air pollution should be strategically linked into the environmental considerations of the Transport Strategy
  - SEPA note that all proposals with the exception of Option 4 will have the potential to develop waste as part of construction
  - Option 7 will pass over or near to areas which have historically been quarried sites and have since been used for landfill
- Community Councils providing open responses noted their support for rail re-openings, however, options and reasoning differed:
  - Newmachar Community Council supported reopening of the former Buchan Railway Line, noting positive benefits in terms of reducing traffic congestion and reducing carbon emissions.
  - Tillydrone Community Council however supported Option 7, a new rail/light line on a more direct alignment as it will alleviate traffic congestion, link with areas of development and access the Energetica corridor
- A number of open responses stressed the success of reopening Laurencekirk Station and other stations and lines across Scotland, noting that evidence shows higher than forecast usage figures for rail infrastructure across Scotland.

Points raised by the public included:

- General split of opinions favouring full dualling of the road, and introduction of rail based solutions. Respondents generally noted the issues of traffic congestion and long journey times.
- Safety concerns across the entire route, but in particular at and around the Toll of Birness Junction.
- Benefits of traffic reductions if rail solutions are pursued.
- Two members of the public disputed the reports suggestion that rail capacity issues on the line between Aberdeen and Inverurie would be problematic for any rail based options, noting the Scottish Governments package of rail improvements between Aberdeen and Inverness which includes redoubling of track between Aberdeen and Inverurie. Both suggested that these measures would address any capacity constraints concerning the reinstatement of rail options.

G APPRAISAL SUMMARY TABLES

Table G.1 : Option 1 Appraisal Summary Table (Table 1 of 5)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	3	3	3	1	1	0
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 1: Phased road dualling north of Ellon**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-2	3	3	2	1	
Proposal Description	Phased road dualling north of Ellon, with junction improvements, including consideration of: • A90(T) Ellon to Toll of Birness • A90(T) Toll of Birness to Peterhead • A952 and A90(T) Toll of Birness to Fraserburgh	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	Medium	Low	High	Low		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.2 : Option 1 Appraisal Summary Table (Table 2 of 5)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	3	Option 1 is likely to significantly reduce journey times by providing additional road capacity and importantly a second lane which can be used for overtaking slower moving vehicles. Essentially, dualling of both the A90 (T) and A952 will provide infrastructure allowing for unimpeded, free flowing traffic. Journey time savings , when comapred against predicted 2033 journey times by road, are estimated at around 5-8 minutes from Ellon to Peterhead (on A90(T)) and 6-11 minutes from Ellon to Fraserburgh (on A952 & A90(T)) dependant on the time of day.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	3	The A90(T) and the A952 are currently constrained in terms of overtaking opportunity. The introduction of dual carriageway will provide continuous overtaking opportunities and specifically the provision of additional carriageway on the A90(T) between Ellon and the Toll of Birness would remove current capacity constraints on this key section, generating more predictable and reliable journey times, helping to minimise the impact at times when there are significant fluctuations in traffic on the route due to industry operations.
3	Reduce accidents on the A90(T) and A952	3	Accident data highlights the entire A90(T) route between Aberdeen and Fraserburgh, and the southern sections of the A952 between Mintlaw and the Toll or Birness as having a higher than expected number of serious of fatal accidents. Providing dual carriageway will reduce driver frustration by providing for safe overtaking opportunities which will reduce accidents.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	1	Dualling the A90 (T) and A952 will have no impact upon this Transport Planning Objective.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	1	Dualling the A90(T) and A952 will not improve public transport connectivity between North East communities and main trip attractors in Aberdeen. It may however act as a catalyst for the introduction of new public transport services given the potential journey time savings and journey tine reliability the dualling could bring.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	0	Dualling the A90(T) and A952 will make the route more attractive for all modes as journey times reduce and journey time reliability increases. As the private car will also be subject to the same improvements, it is unlikely that this option would deliver any significant modal shift from car to public transport. The option may however generate new public transport journeys as the overall journey becomes faster, more reliable and more attractive in general.

Table G.3 : Option 1 Appraisal Summary Table (Table 3 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-2	Road dualling is predicted to result in some minor beneficial impacts from relief of congestion in some areas. However most impacts of the proposals are predicted to range between minor to moderate negative taking account of mitigation due to: • Increased noise from traffic on the upgraded roads for nearby sensitive receptors • Increased carbon emissions and concentrations of local air pollutants from traffic emissions for sensitive receptors • Changes in hydrology from permanent development of land and from river crossings including in areas of flood risk • Land take (including prime agricultural land) from agricultural production and effects on farm unit viability • Changes to landscape character in the road corridors and increased visual intrusion of the road and traffic for some sensitive views and visual receptors • Habitat loss/fragmentation with potential indirect effects on some designated sites of nature conservation importance • Effects on areas of as yet unrealised archaeology and potentially affecting the setting of a small number of designated sites
Safety	3	The options would bring safety benefits by reducing delay on the A90(T) and A952 and in turn reducing driver frustration at delay as well as providing continuous safe overtaking opportunity which would reduce accidents on the routes. However, any increase in speeds on the routes could lead to a greater severity of accidents and may create severance for pedestrians wishing to cross the widened carriageways.
Economy	3	Phased road dualling with junction improvements, would bring benefits including: • Improvement in journey times for all user groups including commuters, leisure and recreational users, bus users and freight carriers. Journey time savings , when compared against predicted 2023 journey times by road, are estimated at around 5-8 minutes from Aberdeen to Peterhead (on A90(T)) and 6-10.5 minutes from Aberdeen to Fraserburgh (on A952 & A90(T)) dependant on direction and the time of day. • Improvements to road capacity, currently constrained between Ellon and the Toll of Birness, allowing more efficient flow and hence, improved reliability for all modes. Journey time savings are estimated at around 1.5-3.5 minutes between Ellon and the Toll of Birness • Journey time reliability significantly improved by providing additional vehicle lanes, allowing traffic to pass slower agricultural and freight vehicles. • Journey time and journey reliability improvement, making the area more attractive to business investment. The option will help to both attract new business and retain existing business, ensuring job creation and retention. • Acting as a catalyst for economic regeneration as the area becomes a more attractive place to live, work and invest • Enhanced access to employment opportunities encouraging more people to enter the workforce and enabling a better matching of skills with employers' needs as commuting time/costs decline • Supporting residential and industrial development identified in development plans, particularly at Ellon, Peterhead, Mintlaw and Fraserburgh.

Table G.4 : Option 1 Appraisal Summary Table (Table 4 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	2	Moderate positive benefit relating to directly supporting development north of Aberdeen and providing support to the business community. Moderate positive benefit in terms of improving journey times and creating an efficient transport network. Proposal supports national, regional and local policies. Overall, moderate benefit likely to be realised through general consistency with policy documents. Impact on transport integration is expected to be neutral.
Accessibility & Social Inclusion	1	While the option does not include any direct improvements to public transport network coverage, reduced journey times, and reduced journey time unreliability and unpredictability on the A90(T) and A952 routes would benefit bus services operating on the 'Buchan Link' routes between Aberdeen, Ellon, Peterhead and Fraserburgh. The option is unlikely to provide any increase in access to local services by walking and cycling. The potential increased accessibility by bus brought about thorough reduced journey times would positively impact those without a car, the young and elderly for whom driving is not an option and the unemployed for whom employment opportunities may be widened. Fraserburgh and Peterhead are recognised as the region's regeneration priority , the option is likely to have a more positive benefit to those who live furthest away from Aberdeen as the benefit will increase the further the distance away from Aberdeen due to the increased length of the dualled road section utilised. The business community in Ellon, Peterhead and Fraserburgh as well as in smaller villages within the study area will benefit from a potential widening of the labour catchment market due to reduced journey times and the ability of the workforce to commute a further distance in the same time.

Table G.5 : Option 1 Appraisal Summary Table (Table 5 of 5)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	Medium	The construction involved would be well within the bounds of standard civil engineering experience for similar road schemes, and it is not anticipated that major technical issues would be presented. Construction of additional lanes would be the subject of the usual statutory procedures for road schemes in Scotland, which may take time for a dual carriageway, but will not present a major obstacle. However, there may be many contractors, stakeholders and land owners which would increase the complexity of delivery and consent risk leading to an overall medium risk for deliverability.
Operation	Low	In the case of the A90(T) the promoter and operator would be the Transport Scotland/Scottish Government, while Aberdeenshire Council would assume responsibly for the A952 and once operational the complexity of operation will have a low attached risk.
Affordability	High	The option represents a significant financial undertaking. An estimation of the constructions costs, using costs from other Scottish road schemes, provides an estimated capital cost of the dualling of both the A90(T) and A952 at between **£570million and £1.3 billion.** Currently no funding is set aside by Transport Scotland for option implementation. Given the additional carriageway that would be required to be maintained post implementation, on-going maintenance costs for both Transport Scotland (for the A90(T)) and Aberdeenshire Council (for the A952) would increase.
Public Acceptability	Low	There is current support from campaigns and interest groups for this option in the area, with a general feeling that the current road geometry is unfit for purpose. A high degree of public support for this option would be likely.

Table G.6 : Option 2 Appraisal Summary Table (Table 1 of 5)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	2	2	2	0	0	0
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 2: Overtaking lanes and junction improvements**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-1	2	2	1	0	
Proposal Description	Overtaking lanes and junction improvements, including consideration of: • A90(T) from Ellon to Peterhead • A952 and A90(T) Toll of Birness to Fraserburgh	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	Medium	Low	Medium	Low		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.7 : Option 2 Appraisal Summary Table (Table 2 of 5)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	2	The option is likely to reduce journey times by providing overtaking lanes at key points on the A90(T) and A952, allowing vehicles to pass slower moving traffic. Journey time savings, when compared to predicted 2033 journey times by road, are estimated at around 30 seconds between the Toll of Birness, Peterhead and Fraserburgh. This does not account for further reductions in journey times on the remaining single lane carraigeways due to the break up of platoons in the overtaking sections
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	2	Provision of overtaking lanes and junction improvements on these routes will improve journey time reliability and predictability as vehicles will have opportunities to overtake slow moving traffic.
3	Reduce accidents on the A90(T) and A952	2	Accident data highlights the entire A90(T) route between Aberdeen and Fraserburgh, and the southern sections of the A952 between Mintlaw and the Toll or Birness as having a higher than expected number of serious of fatal accidents. Providing overtaking lanes and junction improvements will reduce driver frustration by providing for safe overtaking opportunities which will reduce accidents.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	0	Providing overtaking lanes and junction improvements on the A90(T) and A952 will have no impact upon this TPO.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	0	Providing overtaking lanes and junction improvements on the A90(T) and A952 will have very limited impact upon this TPO. While it will not increase direct public transport connectivity on its own, it may act as a catalyst for introduction of new services as journey times reduce and journey time reliability improves.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	0	Providing overtaking lanes and junction improvements on the A90(T) and A952 will make the routes more attractive for all travel modes as journey times reduce and journey time reliability increases, however the scale of these benefits will not be as high as Option 1. As the private car will also be subject to the same improvements, it is unlikely that this option will deliver any significant modal shift from car to public transport. The option may however generate new public transport journeys as the overall journey becomes faster, more reliable and more attractive in general.

Table G.8 : Option 2 Appraisal Summary Table (Table 3 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-1	The option his predicted to result in some minor beneficial impacts from relief of congestion in some areas. However most impacts of the proposals are predicted to range between neutral to moderate negative taking account of mitigation due to: • Minor increases in noise from traffic on the upgraded roads for nearby sensitive receptors • Minor increasesin carbon emissions and concentrations of local air pollutants from traffic emissions for sensitive receptors • Changes in hydrology from permanent development of land from the works including in areas of flood risk • Land take (including prime agricultural land) from agricultural production and affecting some farm units • Changes in local landscape character in the road corridors and some increased visual intrusion of the road and traffic for sensitive views and visual receptors • Habitat loss/fragmentation with some potential for indirect effects on some designated sites of nature conservation importance • Effects on small areas of as yet unrealised archaeology and potentially affecting the setting of a small number of designated sites Overall the option is predicted to have a minor negative impact taking account of all the aspects that have been assessed.
Safety	2	The option will bring safety benefits as per Option 1, but to a lesser extent as overtaking opportunities will not be prevalent along the full length of the route but with overtaking lanes (such as WS2+ 1) located at appropriate intervals. Some level of driver frustration will therefore still be prevalent on remaining single lane carriageway sections.
Economy	2	The option will bring economic benefits as per Option 1, but to a lesser extent as overtaking opportunities will not be prevalent along the full length of the route but with overtaking lanes (such as WS2+ 1) located at appropriate intervals. Phased road dualling with junction improvements, would bring benefits including: • Improvement in journey times for all user groups including commuters, leisure and recreation users, bus users and freight carriers. Journey time savings, when compared to predicted 2023 journey times by road, are estimated at around 30 seconds between the Toll of Birness and Peterhead, and around 30 seconds between the Toll of Birness and Fraserburgh. • Improvements to road capacity at intervals allowing more efficient flow and hence and improved reliability for all modes • Journey time reliability improved by providing additional vehicle lanes at appropriate intervals, allowing traffic to pass slower agricultural and freight vehicles. • Journey time and journey reliability improvement, making the area more attractive to business investment. The option would help to both attract new business and retain existing business, ensuring job creation and retention. • Acting as a catalyst for economic regeneration as the area becomes a more attractive place to live, work and invest • Enhanced access to employment opportunities encouraging more people to enter the workforce and enabling a better matching of skills with employers' needs as commuting time/costs decline • Supporting residential and industrial development identified in development plans, particularly at Ellon, Peterhead, Mintlaw and Fraserburgh.

Table G.9 : Option 2 Appraisal Summary Table (Table 4 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	1	The option is unlikely to provide any impacts in terms of transport integration. It will however provide positive benefit relating to directly supporting development north of Aberdeen and providing support to the business community. It will also generate positive benefits in terms of small improvements to journey times. There will also be small positive benefits likely to be realised through general consistency with policy documents.
Accessibility & Social Inclusion	0	The option will bring accessibility and social inclusion benefits as per Option 1, but to a lesser extent as overtaking opportunities will not be prevalent along the full length of the route but with overtaking lanes (such as WS2+ 1) located at appropriate intervals. Some level of journey time benefit will therefore be derived from the option with benefits as noted in Option 1. While the option does not include any direct improvements to public transport network coverage, reduced journey times, and reduced journey time unreliability and unpredictability on the A90(T) and A952 routes would benefit bus services operating on the 'Buchan Link' routes between Aberdeen, Ellon, Peterhead and Fraserburgh. The option is unlikely to provide any increase in access to local services by walking and cycling. The potential increased accessibility by bus brought about thorough reduced journey times would positively impact those without a car, the young and elderly for whom driving is not an option and the unemployed for whom employment opportunities may be widened. Fraserburgh and Peterhead are recognised as the region's regeneration priority , the option is likely to have a more positive benefit to those who live furthest away from Aberdeen as the benefit will increase the further the distance away from Aberdeen due to the increased length of the dualled road section utilised. The business community in Ellon, Peterhead and Fraserburgh as well as in smaller villages within the study area will benefit from a potential widening of the labour catchment market due to reduced journey times and the ability of the workforce to commute a further distance in the same time.

Table G.10 : Option 2 Appraisal Summary Table (Table 5 of 5)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	Medium	The construction involved would be well within the bounds of standard civil engineering experience for similar road schemes, and it is not anticipated that major technical issues would be presented. Construction of overtaking lanes, would be the subject of the usual statutory procedures for road schemes in Scotland, but will not present a major obstacle. However, there many contractors, stakeholder and land owners increases the complexity of delivery risk and consent risk leading to an overall medium risk for deliverability. There may be a number of contractors, stakeholders and land owners which would increase the complexity of delivery and consent risk leading to an overall medium risk for deliverability.
Operation	Low	In the case of the A90(T) the promoter and operator would be the Transport Scotland/Scottish Government, while Aberdeenshire Council would assume responsibly for the A952 and once operational the complexity of operation will have a low attached risk.
Affordability	Medium	The option represents a significant financial undertaking. An estimation of the constructions costs, using costs from other Scottish road schemes, provides an estimated capital cost of each 1km section of overtaking lane provided (single side of route) would be in the region of £5 million to £11.5 million. With 12 assumed overtaking sections the overall cost would be in the region of **£60-£138million**. Currently no funding is set aside by Transport Scotland for option implementation. Given the additional carriageway that would be required to be maintained post implementation, on-going maintenance costs for both Transport Scotland (for the A90(T)) and Aberdeenshire Council (for the A952) would increase.
Public Acceptability	Low	There is current support from campaigns and interest groups for this road improvements in the area, with a general feeling that the current road geometry is unfit for purpose. A high degree of public support for this option would be likely although it could be anticipated that the public may be disappointed that a full dualling option is not provided.

Table G.11 : Option 3 Appraisal Summary Table (Table 1 of 5)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	1	2	3	0	0	0
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 3: Safety improvements on A90(T) and A952**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-1	3	1	1	0	
Proposal Description	Safety improvements on: • A90(T) from Ellon to Peterhead • A952 and A90(T) Toll of Birness to Fraserburgh	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	Medium	Low	Medium	Low		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.12 : Option 3 Appraisal Summary Table (Table 2 of 5)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	1	Option 3 will have a minor-moderate impact upon journey times. While safety improvements will lower accidents and the subsequent delays caused by accidents, these are not a daily occurrence and hence will not provide consistent benefits in terms of journey time savings. However, more signficant safety improvements such as a bypass of Mintlaw or road realignemnt would provide more significant journey time reductions, experienced on a daily basis.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	2	This option will have a minor impact upon journey time reliability and predictability as there will be a reduction in the unpredictable nature of the delay caused by accidents.
3	Reduce accidents on the A90(T) and A952	3	Accident data from 2009 – 2013 highlights sections of the A90(T) south of Peterhead and south of Fraserburgh as having a higher than average number of serious accidents than would be expected on a road of this nature. In addition the A952 has a higher than expected number of fatal accidents on the southern section between Mintlaw and the Toll or Birness. This option is based upon improving safety measures on these routes and it would therefore be anticipated that significant benefits would be gained.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	0	Providing safety improvements will have no effect on strategic travel choice.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	0	Providing safety improvements will have no effect on increasing direct public transport connectivity
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	0	Providing safety improvements will have no effect on increasing mode share for non car based modes.

Table G.13 : Option 3 Appraisal Summary Table (Table 3 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-1	The option has the potential for generally minor adverse impacts on the environment taking account of mitigation. Adverse impacts are predicted due to the potential to: • Reduce impacts of noise and local air quality for properties benefitting from the new Mintlaw Bypass and to increase impacts at properties in proximity to it • Take some land (including prime agricultural land particularly for the Mintlaw Bypass) from agricultural production with minor impacts on farm units • Change local landscape character in the road corridors and along the line of the bypass and result in increases in visual intrusion of the road and traffic for sensitive views and visual receptors • Result in minor habitat loss/fragmentation with slight potential for indirect effects on some designated sites of nature conservation importance • Affect small areas of as yet unrealised archaeology (no adverse effects on the setting of designated sites are predicted) Overall the option is predicted to have a minor negative impact taking account of all the aspects that have been assessed
Safety	3	The option will bring safety benefits including: • Reducing accident potential at the Toll of Birness junction both for exiting traffic from the A952 and for traffic on the A90(T) trunk road • Reducing the accident potential on the A90(T) south of Fraserburgh and south of Peterhead where higher than expected proportions of serious accidents are occurring • Enabling safer vehicle turning from the trunk road into side road accesses and allowing mainline traffic to safety pass • Reducing the economic and social costs of accidents A reduction in accidents on both the A90(T) and A952(T) routes would reduce unpredictable delays on the road network and: • Provide efficiency benefits to businesses using the routes • Provide more predictable and reliable journey times for public transport between the study area and the Aberdeen conurbation
Economy	1	Targeted safety improvements, would bring benefits including: • Reductions in accidents across all modes which will result in significant monetary savings through the costs of accidents. • Reductions in accident rates will also help to improve journey time reliability and unpredictability. • Provisions for right turners will improve both average journey times across the route and journey time reliability as the flow of traffic is less disrupted. • As journey time reliability is improved, the route will become more attractive to those seeking employment opportunities along the route or in Aberdeen. It should be noted that this benefit in terms of access will not be as great as that observed with Options 1 or 2.

Table G.14 : Option 3 Appraisal Summary Table (Table 4 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	1	The option will provide a positive benefit relating to directly supporting development north of Aberdeen and providing support to the business community through a more reliable road network. There will also be positive benefit in terms of improvements to road safety. Small positive benefits are likely to be realised through general consistency with policy documents. The impact on transport integration is expected to be neutral.
Accessibility & Social Inclusion	0	It is unlikely that the option would have any positive benefits or negative impacts in relation to accessibility and social inclusion.

Table G.15 : Option 3 Appraisal Summary Table (Table 5 of 5)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	Medium	The construction involved would be well within the bounds of standard civil engineering experience for similar road schemes, and it is not anticipated that major technical issues would be presented.
Operation	Low	In the case of the A90(T) the promoter and operator would be the Transport Scotland/Scottish Government, while Aberdeenshire Council would assume responsibly for the A952. There would be no major changes to operation and maintenance of these routes and once operational the complexity of operation will have a low attached risk
Affordability	Medium	The option would be a moderate financial undertaking in the region of **£50 - £100million**. Transport Scotland have funding set aside to deliver accident reduction measures as part of their Route Accident Reduction Plan although the funding required for this option would be significantly greater than this.
Public Acceptability	Low	The public are aware that there are high levels of accidents on this route at present. As such, there can be confidence that there will be public support for this option however it should be noted that the public may view this as an intervention which although welcomed, will not provide adequate relief from the issues of slow moving traffic and unpredictable journey times. Considering the campaign to provide dual carriageway on the length of the route, it can be anticipate that there will be an element of disappointment that this option does not deliver requested improvements.

Table G.16 : Option 4 Appraisal Summary Table (Table 1 of 5)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	1	0	1	2	2	1
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 4: Bus service improvements**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	1	1	1	2	2	
Proposal Description	Bus service improvements including consideration of: • New direct bus linkages between the study area Aberdeen conurbation • Increased express services between the study area and Aberdeen conurbation	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	Low	Low	Low	Medium		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.17 : Option 4 Appraisal Summary Table (Table 2 of 5)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	1	The option would provide journey time reductions for current public transport users within the study area, especially for those who must currently interchange in Aberdeen City centre. As an example, journey times between Fraserburgh, Peterhead and Dyce could be reduced by around 50 minutes if a direct service were provided. There would be no benefits for public transport users for whom the express services cannot be utilised due to the limited stopping points where either the trip origin or destination is not directly serviced. There will also be no benefit to car drivers or freight traffic.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	0	Introduction of new direct and express bus services would have no impact upon journey time reliability and predictability. While direct and express services would provide journey time improvements for users of the services, they would however be subject to existing road conditions.
3	Reduce accidents on the A90(T) and A952	1	Introduction of new direct and express bus services would have no significant impact upon accidents although if some modal shift to public transport could be achieved this may reduce traffic on the strategic routes within the study area and as such reduce the potential for accident along the routes.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	2	The introduction of new direct and express bus services would provide increased strategic travel choice between the study area and the Aberdeen conurbation as journey times become quicker due to the express service provision. Direct services would remove the need to interchange, reducing travel time, enabling greater accessibility between the study area communities and Aberdeen allowing the bus to be used as a potential travel option.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	2	The option fully supports the TPO to increase direct public transport connectivity between the study area and the main trip attractors within the Aberdeen conurbation.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	1	Introducing new and direct bus services will both improve public transport connectivity and journey times between the study area and the Aberdeen conurbation. These incentives would encourage modal shift from the private car to the bus for those who did not feel the journey was previously viable by bus are now able to utilise the services.

Table G.18 : Option 4 Appraisal Summary Table (Table 3 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	1	The option has the potential for generally neutral to minor impacts on the environment as the scale of the interventions is limited to changes in bus services and does not involve new development of infrastructure. New bus service operations may slightly increase road traffic (bus) flows on key routes in the study area with the potential for increased carbon emissions and very slight increases in roadside traffic noise and local air quality effects, dependent on the bus vehicle type deployed. However it is predicted that these effects would be offset by modest levels of modal shift from car to bus which would be predicted to reduce road traffic levels in some locations with associated beneficial impacts on global and local air quality and on roadside traffic noise along key routes. No significant impacts are predicted for the option on geology and soils, water quality, landscape and visual, biodiversity or cultural heritage. Overall the option is predicted to have a minor beneficial on the environment taking account of all the aspects that have been assessed.
Safety	1	Accidents on the A90(T) and A952 are caused by a number of factors including young and inexperienced drivers and older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives that suit their needs. The option would provide increased public transport accessibility to these groups with a high propensity for accidents which has the potential to increase their use of public transport and reduce the overall accident potential on the road network. There may also be a general modal shift to public transport from the private car, reducing the volume of traffic on the road network and hence the accident potential, leading to increased safety on roads within the study area for cyclists and pedestrians and a reduction in unpredictable delays on the road network leading to lessening of the impact of unpredictability on business.
Economy	1	Bus service Improvements including new direct and express services, would bring benefits including: • Improved access to employment by public transport. Reducing journey times will improve this accessibility, in particular, to those who reply on public transport. • Reduced public transport journey times between Fraserburgh, Peterhead and Dyce which may be reduced by around 50 minutes if a direct service were provided. • Encourage modal shift away from the private car which will reduce traffic and result in improved journey times and efficiency savings on the network. • Improved access to essential services including education and healthcare • Direct bus services may lead to a small level of disbenefits through connecting the local labour market with more attractive jobs further afield. This may result in a strain on the local labour market in the north of the study area.

Table G.19 : Option 4 Appraisal Summary Table (Table 4 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	2	The option will provide moderate benefits in terms of transport integration, providing increased frequency of public transport services and improved journey times. Active travel measures will also link with key services across the region. There will be positive benefits relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment. There will also be moderate positive benefits likely to be realised through supporting development plans and general consistency with policy documents. There should also be transport integration benefits as significant improvements and links to the public transport network will be observed.
Accessibility & Social Inclusion	2	The option will increase direct and express bus service coverage, improving accessibility by bus between the study area and key employment, health and social facilities in the Aberdeen conurbation, with reduced journey times and reduced need to interchange to reach required destinations. The option is unlikely to provide any increase in access to local services by walking and cycling, other than links to key bus stops and Park & Ride sites as part of the package of active travel measures assumed with the option. The potential increased accessibility by bus brought about thorough increased direct and express services would positively impact: • Those in the study are towns and villages without access to a car. • Young people and the elderly for whom driving is not an option. • Those currently unemployed, for whom employment opportunities may be widened with increased accessibility. Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan. potential increased accessibility by bus would positively benefit: • Those resident in the towns of Peterhead and Fraserburgh as well as in other smaller conurbations in the northern section of the study area will benefit greatly from reduced travel time by bus and express services which are currently limited.

Table G.20 : Option 4 Appraisal Summary Table (Table 5 of 5)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	Low	This option is entirely feasible and assumes no additional infrastructure will be required. All costs will be in relation to the purchase and running costs of additional public transport vehicles required to operate the service.
Operation	Low	There will be operational issues regarding time tabling with services needing to be planned both around the existing network and to integrate with other bus timetables to allow joined up journeys. Any services which call near Dyce rail station should also consider the rail timetable. While service vehicles will be run by a private operator, it has been assumed that these will have to be supported, at least initially by Nestrans, in which case, standard specification and procurement procedures are already in place. It is envisaged at this stage that current main service operator, Stagecoach, would be keen to become involved however this cannot be taken as fact.
Affordability	Low	To allow for a suitable step change in services, it is assumed that at least four new buses/coaches would need to be purchased at a cost of around **£12 million** over the 60 year appraisal period (covering capital costs and replacement). Operating costs include running costs (including wages, maintenance etc.) as well as potential operator subsidies. It is assumed that a partnership could be created with bus operators whereby the operators would invest in rolling stock and operate commercial services with minimal subsidy.
Public Acceptability	Medium	Evidence suggests that long and unreliable public transport journey times are a barrier to bus use in the area. As such, a large amount of public support is expected for this option. Evidence from engagement however suggests that the public view rail and road improvements as the most important transport measures required and while they would be happy to receive bus service improvements there will be an element of disappointment.

Table G.21 : Option 5 Appraisal Summary Table (Table 1 of 5)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	2	1	1	2	2	1
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 5: Bus service improvements (as Option 4) accompanied by priority infrastructure and Park and Ride improvements**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-1	1	1	2	2	
Proposal Description	Bus service improvements accompanied by priority infrastructure and Park & Ride improvements considering: new sections of dedicated bus lanes; extending operating hours for bus lanes and Development of a Park & Ride Strategy for the study corridor	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	Low	Low	Low	High		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.22 : Option 5 Appraisal Summary Table (Table 2 of 5)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	2	The option would provide journey time reductions for public transport users both to existing users and to users who may be attracted to the new service offering. As an example, journey times fom Peterhead and Fraserburgh to Dyce could reduce by around 50 minutes if a direct bus route were available. However, bus priority infrastructure results would likely result in a reduction of road space and therefore the road capacity available to other modes. Journey times may therefore increase for other road users.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	1	Priority infrastructure such as the extension of bus lanes would improve bus journey times and importantly improve bus journey reliability and predictability as buses are no longer delayed in general traffic. This benefit would not be felt by other road users who would be faced with a reduction in road space, leading to potentially decreased reliability and predictability.
3	Reduce accidents on the A90(T) and A952	1	Bus service improvements could have a minor impact upon accident rates in the study area if significant modal shift from car to bus were generated.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	2	The introduction of new direct and express bus services and priority bus lanes would provide increased strategic travel choice between the study area and the Aberdeen conurbation as journey times become quicker due to the express service provision and through bus priority measures. Direct services would remove the need to interchange, reducing travel time, enabling greater accessibility between the study area communities and Aberdeen allowing the bus to be used as a potential travel option.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	2	The option fully supports the TPO to increase direct public transport connectivity between the study area and the main trip attractors within the Aberdeen conurbation.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	1	Introducing new and direct bus services with Park & Ride facilities and bus priority infrastructure would both improve public transport connectivity and journey times between the study area and the Aberdeen conurbation. These incentives would encourage modal shift from the private car to the bus when those who did not feel the journey was previously viable by bus are now able to utilise the services.

Table G.23 : Option 5 Appraisal Summary Table (Table 3 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-1	New bus service operations and changes from use of Park & Ride sites may slightly increase road traffic flows on key routes in the study area (and around new/expanded park and ride sites particularly at peak hours) with the potential for increased carbon emissions and very slight increases in roaside traffic noise and local air quality effects. However it is predicted that these impacts would be offset by modest levels of modal shift from car to bus which would reduce road traffic levels in some locations with associated beneficial impacts on carbon emissions, local air quality and reduced traffic noise for roadside receptors on key routes. Minor negative impacts are predicted on geology and soils, water quality, landscape and visual, biodiversity and cultural heritage from permanent development of the new and expanded park and ride sites . The potential for significant effects would depend on the finalised location of the sites and proximity of environmental constraints. With mitigation it is assumed that significant effects on these sub-criteria would not be predicted. Overall the option is predicted to have a minor negative impact taking account of all the aspects that have been assessed. Modal shift would result in some benefits to the environment which are not reflected in this score.
Safety	1	Accidents on the A90(T) and A952 are caused by a number of factors including young and inexperienced drivers and older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives that suit their needs. The option would provide increased public transport accessibility to these groups with a high propensity for accidents which has the potential to increase their use of public transport and reduce the overall accident potential on the road network. There may also be a general modal shift to public transport from the private car, reducing the volume of traffic on the road network and hence the accident potential, leading to increased safety on roads within the study area for cyclists and pedestrians and a reduction in unpredictable delays on the road network leading to lessening of the impact of unpredictability on business.
Economy	1	The option will bring economic benefits as per Option 4, but to a further enhanced level. Benefits include: • Increasing dedicated priority infrastructure will further reduce public transport journey times and public transport reliability in those sections of the route • Further development of the park and ride facility will encourage modal shift. Consistent with Option 4, direct bus services accompanied with priority infrastructure and Park & Ride improvements may lead to disbenefits through connecting the local labour market with more attractive jobs further afield. While bus lanes will increase speed and reliability for public transport journey times, reallocation of road space will effectively reduce available capacity on section of the road network which will have an impact journey times for all vehicles who are not permitted access to bus lanes.

Table G.24 : Option 5 Appraisal Summary Table (Table 4 of 5)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	2	The option will provide moderate benefits in terms of transport integration, providing increased frequency of public transport services and improved journey times. Active travel measures will also link with key services across the region. There should be positive benefits relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment. Positive benefits will also be observed in terms of improvements to public transport journey times, road safety, integration, inclusion and emissions reductions. Should be noted that due to reductions in road space, there will be impacts upon journey times for non public transport vehicles. The option would support development plans, and shows a general consistency with policy documents.
Accessibility & Social Inclusion	2	The option will increase direct and express bus service coverage, improving accessibility by bus between the study area and key employment, health and social facilities in the Aberdeen conurbation, with reduced journey times and reduced need to interchange to reach required destinations. The option is unlikely to provide any increase in access to local services by walking and cycling, other than links to key bus stops and Park & Ride sites as part of the package of active travel measures assumed with the option. The potential increased accessibility by bus brought about thorough increased direct and express services would positively impact: • Those in the study are towns and villages without access to a car. • Young people and the elderly for whom driving is not an option. • Those currently unemployed, for whom employment opportunities may be widened with increased accessibility. Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan. potential increased accessibility by bus would positively benefit: • Those resident in the towns of Peterhead and Fraserburgh as well as in other smaller conurbations in the northern section of the study area will benefit greatly from reduced travel time by bus and express services which are currently limited.

Table G.25 : Option 5 Appraisal Summary Table (Table 5 of 5)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	Low	This option is entirely feasible and assumes the infrastructure required will be any new Park & Ride sites in addition to extensions to bus only lanes, neither of which should prove technically challenging.
Operation	Low	There will be operational issues regarding time tabling with services needing to be planned both around the existing network and to integrate with other bus timetables to allow joined up journeys. Any services which call near Dyce rail station should also consider the rail timetable. While service vehicles will be run by a private operator, it has been assumed that these will have to be supported, at least initially by Nestrans, in which case, standard specification and procurement procedures are already in place. It is envisaged at this stage that current main service operator, Stagecoach, would be keen to become involved however this cannot be taken as fact. Park & Ride sites will also have to be operated and integrated with the current network while statutory procedures for bus lanes will have to be taken forward.
Affordability	Low	As per Option 4, to allow for a suitable step change in services, it is assumed that at least four new buses/coaches would need to be purchased at a cost of around **£12 million** over the 60 year appraisal period (covering capital costs and replacement). Operating costs include running costs (including wages, maintenance etc.) as well as potential operator subsidies. It is assumed that a partnership could be created with bus operators whereby the operators would invest in rolling stock and operate commercial services with minimal subsidy. In addition for this option, implementing bus lane/bus priority measures is estimated to be approximately £1million. Addition Park & Ride sites (4 assumed) would cost in the region of £10million each, with the cost of expanding an existing site (Ellon and Bridge of Don) estimated at around £0.5million. **A total option cost would therefore be around £54million**
Public Acceptability	High	Evidence suggests that long and unreliable public transport journey times are a barrier to bus use in the area. As such, a reasonable amount of public support is expected for this option. Evidence from engagement however suggests that the public view rail and road improvements as the most important transport measures required and while they would be happy to receive bus service improvements there will be an element of disappointment. It is also noted that while public transport users will see benefits, any reallocation of road space required to extend bus lanes will result in longer journey times for other vehicles. There may be public opposition to further delays the road network.

Table G.26 : Option 6 Appraisal Summary Table (Table 1 of 6)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	1	2	1	3	3	2
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 6: Phased reinstatement on existing railway alignments, via Dyce, including examining options for light rail or tram**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-2	1	2	2	2	
Proposal Description	Phased reinstatement on existing railway alignments, via Dyce, including examining options for light rail or tram from: • Dyce to Ellon • Ellon to Maud/Peterhead • Maud to Fraserburgh	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	High	Low	High	Low		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.27 : Option 6 Appraisal Summary Table (Table 2 of 6)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	1	The introduction of a heavy rail route leads to journey time savings compared to the car, for those who choose to use the service dependant on the time of day/direction of travel. The existing alignment on the Formartine & Buchan Way is not in itself direct, and as such, there are not journey time savings, in particular for those who travel from Peterhead due to the alignment of the route via Maud. Should the heavy rail or tram/light rail route reinstatement result in modal shift from the private car, there may be a reduction in vehicles on the road which could provide minor journey time improvements for current road users. Any modal shift would be expected to be greater for heavy rail implementation (as opposed to tram/light rail) given the faster journey times that could be achieved.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	2	The introduction of tram/light rail services would improve journey time reliability and predictability for those who use the new service, which will not be subject to any delay, unreliability or unpredictability faced on the road network.
3	Reduce accidents on the A90(T) and A952	1	The introduction of tram/light rail services may have a minor impact upon road accidents if significant modal shift from road based modes to the new public transport service is achieved.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	3	Reinstatement of tram/light rail services on existing alignments would provide increase travel choice for users whose origin and destination is serviced by the route. This would result in significant benefits in terms of increasing strategic travel choice between North East communities and the Aberdeen conurbation.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	3	Reinstatement of tram/light rail services on existing alignments would provide a direct mode of travel for users whose origin and destination is serviced by the route.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	2	Reinstatement of tram/light rail services on existing alignments would provide a new, attractive direct mode of travel which is not currently available. Evidence from across the UK shows that the introduction of rail services can attract users from existing modes and also attract new users. As such, it would be expected that this option would generate modal shift from road based modes. Any modal shift would be expected to be greater for heavy rail implementation given the faster journey times that could be achieved.

Table G.28 : Option 6 Appraisal Summary Table (Table 3 of 6)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-2	Railway operations are predicted to result in minor beneficial impacts on noise, global and local air quality as a result of mode shift to railways reducing road traffic (cars and HGVs) on key roads. Beneficial impacts are also predicted for physical fitness provided loss of the active travel route along the railway is mitigated. The proposals are predicted to have minor to moderate adverse impacts due to: • Noise from railway traffic on the reopened rail corridor affecting nearby sensitive receptors • Carbon emissions and emissions of local air pollutants from (diesel) rail locomotive operations affecting nearby receptors • Changes in hydrology from permanent development of land and from river crossings including in areas of flood risk • Severance of existing access routes along the former rail corridor which are used by farmers to access fields • Changes in landscape character of the railway corridor and increased visual intrusion of the railway for sensitive views /receptors • Habitat loss/fragmentation from redevelopment works including loss of areas of scrub woodland and effects on dependent species • Effects on as yet unrealised archaeology and potentially affecting the setting of a small number of designated sites
Safety	1	Accidents on the A90(T) and A952 are caused by a number of factors including young and inexperienced drivers and older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives that suit their needs. The option would provide increased public transport accessibility to these groups which has the potential to increase their use of public transport and reduce the overall accident potential on the road network. An overall shift towards public transport from the private car, reducing the volume of traffic on the A90(T) and A952 and hence the accident potential, could lead to: • Increased safety on roads within the study area for all road users including cyclists and pedestrians • A reduction in unpredictable delays due to accidents leading to a lessening of the impact of unpredictability on businesses

Table G.29 : Option 6 Appraisal Summary Table (Table 4 of 6)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Economy	2	Phased reinstatement of a heavy rail or tram/light rail line on existing alignments, would bring economic benefits including: • Compared to predicted 2023 travel times by car, journey times are predicted to be quicker by rail: southbound in the AM between Ellon and Aberdeen (4 minutes quicker by rail), northbound in the PM between Aberdeen and Ellon (17 minutes quicker), Aberdeen and Peterhead (2 and a half minutes quicker) and Aberdeen and Fraserburgh (11 and a half minutes quicker). There are generally slower journey times to/from Peterhead by rail due to the circuitous route required via Maud (21 minutes and 12 minutes slower in the AM northbound and southbound respectively, and over 20 minutes slower southbound in the PM). • Significant improvements in journey time reliability for those who choose to use the service. • An element of modal shift from private car and the bus to tram/rail services • Real opportunity for people to access jobs and services further afield, particularly for those without access to a car. • Additional transport infrastructure will making the area more attractive to investment, as potential businesses and employers recognise that there are facilities in place to access the local and regional labour market. • Supporting the residential and industrial development identified in development plans. While there are a number of significant local economic benefits to be realised by introducing tram/light rail services on the existing alignment, there could also be disbenefits, in particular, the rail line can provide employment options in Aberdeen to those based in the North of the study area, potentially putting a strain on the local labour market. In addition, there is likely to be an impact on the commercial viability of the current bus network due to a shift from bus to tram/rail use.

Table G.30 : Option 6 Appraisal Summary Table (Table 5 of 6)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	2	Moderate benefits in terms of transport integration, providing a new mode of public transport increased frequency of public transport services and improved journey times. Active travel measures will also link with key public transport hubs across the region. There will also be positive benefits relating to directly supporting development north of Aberdeen and providing support to business community by providing new access to areas of employment. There will also be moderate positive benefit in terms of improvements to public transport journey times, integration, inclusion and emissions reductions. The option will support development plans, and shows general consistency with policy documents.
Accessibility & Social Inclusion	2	The introduction of a new railway in the study area would provide an additional travel mode choice in the study area and increase the overall public transport network coverage. The railway would provide direct public transport connections between Fraserburgh, Peterhead, Mintlaw, Ellon and Dyce/Aberdeen, removing the need to interchange in Aberdeen City centre and reducing public transport travel time to Dyce, a key employment hub. As the existing alignment of the Formartine and Buchan Way passes through Dyce there line would link into the Aberdeen to Inverness rail corridor, enabling employment opportunities not only in Dyce/Aberdeen but also in further towns north-west of Dyce i.e. Kintore, Inverurie to be realised. As the proposed route utilises the existing Formartine & Buchan railway line route, it does not provide the most direct link from Aberdeen to either Peterhead or Fraserburgh, although the route is reasonably direct to Ellon. In addition, the route does not provide additional public transport coverage for some of the key existing conurbations towards the south of the study area. The settlements in the south of the area (Balmedie, Blackdog etc.) have large housing allocations in the Aberdeenshire Local Development Plan which would not benefit from the new public transport connection. The introduction of the tram/rail line which is likely to draw public transport demand away from existing bus services could potentially risk the commercial viability of existing bus services in the study are which may be reduced or removed. This would be a significant disbenefit to those who do not live within easy reach of one of the railway stations associated with the new railway line. The overall public transport accessibility in the area may then reduce.

Table G.31 : Option 6 Appraisal Summary Table (Table 6 of 6)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	High	While most of the previous alignment exists, there have are sections which pass through developed land, and a number of overpasses span the route, however significant works will be required to bring it into a useable standard. Despite this, construction involved would be well within the bounds of standard civil engineering experience. There may be many contractors, stakeholders and land owners involved which increases the complexity of delivery and consent risk leading to an overall high risk for deliverability.
Operation	Low	Construction of the rail alignment would be the subject of the usual statutory procedures for rail schemes in Scotland. Transport Scotland/Scottish Government, and Network Rail would be the scheme promoters while ScotRail would assume responsibility for operating services upon construction. Subject to following the correct procedures both Transport Scotland and Network Rail have the necessary powers to promote the schemes, and statutes are in place to allow Transport Scotland to amend the ScotRail franchise to incorporate new services and routes. Operationally, there are a number of challenges which will have to be overcome. Aberdeen Rail Station and the surrounding network is currently operating at capacity and this will increase with improvements being made between Aberdeen and Inverness. There will likely be a requirement for doubling of the tunnels between Dyce and Aberdeen that is likely to be the most expensive and disruptive work required to deliver Buchan line trains into Aberdeen. More signals on the Dyce-Aberdeen line section and another bay platform, or possibly two, may be required at Aberdeen Rail Station.
Affordability	High	The option would be a significant financial undertaking. Heavy rail reinstatement is likely to cost around **£530 million - £1.1billion** and no funds are currently set aside for the schemes implementation by Transport Scotland for investigation or delivery of the scheme. The DfT provides costs for the construction of tramways which notes the average cost per km to be **£12.2 million equating to a cost of £330million to implement a tramway from Dyce to Ellon**. It should however be noted that the majority of these schemes operate within major conurbations and while Option 6 will need to access Aberdeen City centre, the majority of the route will be outside the city which should help to lower costs. **Operating costs are estimated to be around £4.2million per annum** (if a heavy rail line were to run to Ellon, Peterhead and Fraserburgh) and around **£2.2million i**f the heavy rail line ran to Ellon only. **Revenue is estimated to be between £2.5million - £8.8million** for the route if it extended to Fraserburgh & Peterhead, and between **£1.3million - £5.6million** if the route ran only as far north as Ellon (dependent on the assumed transfer to Ellon station).
Public Acceptability	Low	There is a large level of support for the option with campaigns currently supported by local politicians, Rail Future Scotland and the local media in the North East. It is evident through engagement that the public also back these campaigns. It is likely there will be large amounts of public support for this option. There may however be concerns that simply placing a tram/rail line on the previous alignment does not support new large developments in the area which will not be served by the rail line. Additionally, any loss of bus services as a result of loss of commercial viability would directly impact on bus users who were unable to easily access a tram/rail stop/station and as such may not fully support the proposals.

Table G.32 : Option 7 Appraisal Summary Table (Table 1 of 7)

Proposal Details		**Option Scoring Summary**						
Name and address of authority promoting the proposal:	Nestrans, 27 - 29 King Street, Aberdeen, AB24 5AA	**Transport Planning Objectives**						
		Objective	1	2	3	4	5	6
		Score	2	2	1	3	3	2
Principal contact promoting the proposal:	Rab Dickson	**STAG Criteria**						
Proposal Name	**Option 7: Phased implementation of a new railway alignment, via the Bridge of Don, including examining options for light rail or tram**	Criteria	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	
		Score	-3	1	2	2	2	
Proposal Description	Phased implementation of a new railway alignment, via the Bridge of Don, including examining options for light rail or tram from: • Aberdeen to Ellon • Ellon to Peterhead • Ellon to Fraserburgh	**Implementation**						
		Criteria	Feasibility	Operation	Affordability	Public Acceptability		
		Risk Rating	High	Low	High	Low		
Background Information								
Geographic Context	The study area is located in the North-East of Scotland and covers a board corridor from central Aberdeen to Fraserburgh, and encompasses the towns of Peterhead, Ellon and Dyce. The area contains a mix of landscapes, from the urbanised city region area of Aberdeen to the smaller towns of Ellon, Peterhead and Fraserburgh, to the more rural nature of much of Aberdeenshire. The A90(T) trunk road routes north to south linking Fraserburgh, Peterhead, Ellon and Aberdeen, and linking south to Dundee, Perth and the central belt.							
Social Context	The Scottish Government Scottish Indices of Multiple Deprivation (SIMD) highlights concentrated pockets of deprivation in Aberdeen City, Peterhead and Fraserburgh. The study area has lower levels of car ownership than the remainder of the region, albeit higher than the Scottish average with car ownership levels particularly low in Peterhead and Fraserburgh. There is a north-south divide in the study area, with a lower economic rate, educational attainment, and recent lower growth in the northern sections compared to the regional figures.							
Economic Context	The study area is an important centre for energy, agriculture and fishing which are relatively transport intensive, with a high dependence on the movement of goods, predominantly undertaken by road. While there has been recent overall employment growth this has lagged behind the wider performance of the Aberdeen City and Shire region, with growth driven predominantly by growth in the south, immediately north of Aberdeen. Recent uncertainty in the oil & gas sector is now a key challenge for the region. The Energetica project presents a significant future economic opportunity.							

Table G.33 : Option 7 Appraisal Summary Table (Table 2 of 7)

Summary of option appraisal against Transport Planning Objectives			
Objective		Score	Performance against Transport Planning Objective:
1	Reduce journey times between North-East communities and the Aberdeen conurbation	2	While detailed modelling has not yet been undertaken, estimates show that introduction of a heavy rail route would lead to journey time savings for those who choose to use the service, dependant on time of day/direction of travel. The new route option will be aligned directly between the main conurbations in the study area and Aberdeen. Should the heavy rail or tram/light rail route reinstatement result in modal shift from the private car, there may be a reduction in vehicles on the road which could provide minor journey time improvements for current road users.
2	Increase journey time reliability and predictability between North-East communities and the Aberdeen conurbation	2	The introduction of heavy rail or tram/light rail services would improve journey time reliability and predictability for those who use the new service, which will not be subject to any delay, unreliability or unpredictability faced on the road network.
3	Reduce accidents on the A90(T) and A952	1	The introduction of heavy rail or tram/light rail services may have a minor impact upon road accidents if significant modal shift from road based modes to the new public transport service is achieved.
4	Increase strategic travel choice between North-East communities and the Aberdeen conurbation	3	Reinstatement of tram/light rail services on existing alignments would provide a new mode of travel for users whose origin and destination is serviced by the route. This would result in significant benefits in terms of increasing strategic travel choice between North East communities and the Aberdeen conurbation. Given the more direct alignment of the proposed route the benefit is likely to be felt by a greater number of people.
5	Increase direct public transport connectivity between North-East communities and the main trip attractors within the Aberdeen conurbation	3	Reinstatement of hevay rail or tram/light rail services on existing alignments would provide a new, direct mode of travel for users whose origin and destination is serviced by the route, increasing direct public transport connectivity between North-East communities and the Aberdeen conurbation.
6	Increase mode share for non-car based modes between North-East communities and the Aberdeen conurbation	2	Reinstatement of heavy rail or tram/light rail services on existing alignments would provide a new, attractive direct mode of travel which is not currently available. Evidence from across the UK shows that the introduction of rail services can attract users from existing modes and also attract new users. As such, it would be expected that this option would generate modal shift from road based modes, particularly given the well documented issues on the road network. Any modal shift would be expected to be greater for heavy rail implementation given the faster journey times achieveable.

Table G.34 : Option 7 Appraisal Summary Table (Table 3 of 7)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Environment	-3	Railway operations are predicted to result in mode shift from road to rail with minor benefits predicted for traffic noise, global and local air quality and physical fitness. Moderate to major adverse impacts are also predicted taking account of mitigation due to: • Increased noise for nearby sensitive receptors along the road/rail corridors (and near stations) • Increased concentrations of local air pollutants (from diesel trains only) for sensitive line side receptors • Changes in hydrology from permanent development of land and from river crossings including in areas of flood risk • Land take (including prime agricultural land) from agricultural production and effects on farm unit viability • Changes in landscape character in the road/railway corridors and visual intrusion of the development for sensitive views /receptors • Habitat loss/fragmentation, impacts on species and potential indirect effects on some designated nature conservation sites • Effects on areas of as yet unrealised archaeology and potentially affecting the setting of some designated sites adjacent to the routes
Safety	1	Accidents on the A90(T) and A952 are caused by a number of factors including young, inexperienced and older drivers who rely on the car for travel due to the rural nature of their residence with a lack of public transport alternatives. The option would provide increased public transport accessibility to these groups which has the potential to increase their use of public transport and reduce the overall accident potential on the road network. Overall shift towards rail travel from private car could lead to: • Increased safety on roads within the study area for all road users including cyclists and pedestrians • A reduction in unpredictable delays due to accidents leading to a lessening of the impact of unpredictability on businesses

Table G.35 : Option 7 Appraisal Summary Table (Table 4 of 7)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Economy	2	Benefits will be gained through the following: • Journey time reductions and realiability improvements. The alignment provides direct links to the main business and population centres along the route and can be routed to provide the most direct line available. • Journey time improvements as rail services are predicted to operate faster that current journeys by road between Aberdeen, and Ellon and Fraserburgh dependant on the time of day/direction of travel. Compared to predicted 2023 travel times by car, journey times are predicted to be quicker by rail: **northbound** in the AM, between Ellon and Aberdeen (over 6 minutes quicker by rail), between Peterhead and Aberdeen (3 and a half minutes quicker), and between Fraserburgh and Aberdeen (1 and a half minutes quicker if a branch line from Ellon were in operation, but 10 minutes slower if an extended route from Peterhead were introduced). Rail journey time are also predcited to be quicker than by car in 2023: **southbound** in the AM, between Aberdeen and Ellon (nearly 20 minutes quicker by rail), between Peterhead and Aberdeen (18 minutes quicker by rail), and between Fraserburgh and Aberdeen (over 17 minutes by rail quicker if a branch line from Ellon were in operation, and around 6 minutes quicker if an extended route from Peterhead were introduced). • Modal shift from the private car and bus to rail would occur, along with newly generated tram/rail journeys. This may be maximised as the route can pass through more key employment and residential locations. • Provides increased access to jobs and essential services for all • Additional transport infrastructure will make the area more attractive to investment as the businesses as potential employers recognise there is increased connectivity in place to access the local and regional labour market. • Provision of a tram/rail service on a new alignment will also support residential and industrial development identified in LDPs as it can be routed where it will best serve future needs. There could also be disbenefits including the tram/rail line providing employment options in Aberdeen, potentially putting a strain on the local labour market. In addition, there is likely to be an impact on the commercial viability of the current bus network.

Table G.36 : Option 7 Appraisal Summary Table (Table 5 of 7)

Summary of option appraisal against STAG Criteria		
Criteria	Score	Performance against STAG Criteria
Integration	2	Moderate benefits in terms of transport integration, providing a new mode of public transport increased frequency of public transport services and improved journey times, all linked into the existing public transport network. Active travel measures will also link with key public transport hubs across the region. There will be positive benefits relating to directly supporting development north of Aberdeen, calling at major residential development locations, and providing support to business community by providing new access to areas of employment. Moderate positive benefit likely to be realised through supporting development plans, and general consistency with policy documents
Accessibility & Social Inclusion	2	The introduction of a new heavy rail or tram/rail line in the study area would provide an additional travel mode choice in the study area and increase the overall public transport network coverage. The railway would provide direct public transport connections between Fraserburgh, Peterhead, Mintlaw, Ellon and Bridge of Don/Aberdeen, removing the need to interchange in Aberdeen City centre. Increased public transport coverage would benefit those with no access to a car, young people and the elderly for whom driving is not an option, and the unemployed who would have increased access with reduced travel time to job opportunities in Bridge of Don, Aberdeen and further afield. The proposed line however would not serve the Dyce area where there is a high concentration of employment. The Dyce area would not benefit from any improved public transport accessibility. Fraserburgh and Peterhead are recognised as the region's regeneration priority within the Aberdeen City & Shire Strategic Development Plan and pockets of deprivation are noted in both towns in the Scottish Index of Multiple Deprivation. Those resident in the two towns as well as in other smaller conurbations in the northern section of the study area will benefit most from increased travel choice and accessibility both within the study area and to/from Aberdeen. The package of active travel measures associated with the option would provide for active travel access to the railway stations themselves which may increase access to local services within the urban conurbations where a railway station was provided. These connections are already served by the existing bus network although the assumption is that the rail line would provide a quicker connection. The introduction of the rail line which is likely to draw public transport demand away from existing bus services could potentially risk the commercial viability of existing bus services in the study area which may be reduced or removed. This would be a significant disbenefit to those who do not live within easy reach of one of the railway stations associated with the new railway line. Overall public transport accessibility in the area may then reduce.

Table G.37 : Option 7 Appraisal Summary Table (Table 6 of 7)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Feasibility	High	The proposed alignment passes through mixed areas of developed, agricultural and residential land, in addition to areas of proposed development. Despite this, construction involved would be well within the bounds of standard civil engineering experience. While there will be technical challenges, due to alignment and land availability, (particularly in the urban Aberdeen area and the requirement to cross the River Don), it is not anticipated that major technical issues would be presented. There may be many contractors, stakeholders and land owners which increases the complexity of delivery and consent risk leading to an overall high risk for deliverability.
Operation	Low	Construction of the rail alignment would be the subject of the usual statutory procedures for rail schemes in Scotland. Transport Scotland/Scottish Government, and Network Rail would be the scheme promoters while ScotRail would assume responsibility for operating services upon construction. Should a tramway be taken forward, a promoter would need to be identified, this could be Transport Scotland, Nestrans or following the Edinburgh Trams example, a separate agency could be set up. Trams could bypass capacity issues on the rail network but would have to be routed through city centre streets. Operationally, there are a number of challenges which will have to be overcome to properly integrate with the current rail network. Aberdeen Rail Station and the surrounding network is currently operating at capacity and this will increase with improvements being made between Aberdeen and Inverness. Mitigation will have to be undertaken in conjunction with timetabling to release capacity and ensure suitable slots are available for services to link into the network. In terms of a light rail option, trams could bypass capacity issues on the rail network but would have to be routed through city centre streets. This option is tried and tested, but will have to be designed in conjunction with proposals for Aberdeen City Centre Masterplan.

Table G.38 : Option 7 Appraisal Summary Table (Table 7 of 7)

Summary of option implementability		
Criteria	Risk Rating	Appraisal Summary
Affordability	High	The option would be a significant financial undertaking with costs differing as to whether heavy rail or tram/light rail were introduced. Heavy rail implementation is likely to cost between **£490million and £1.2billion dependant on whether a continuous route or branch line route were introduced. If the line extended only as far north as Ellon the capital cost is estimated at between £160 - £330million.** No funds are currently set aside for the schemes implementation by Transport Scotland for investigation or delivery of the scheme. The DfT provides costs for the construction of tramways which notes the average cost per km to be £12.2 million, equating to **£320million** to implement a tramway from Aberdeen to Ellon. It should however be noted that the majority of these schemes operate within major conurbations and while Option 7 will need to access Aberdeen City centre, the majority of the route will be outside the city which should help to lower costs. **Operating costs are estimated to be around £3.7million per annum (branch line) and £4.5million (continuous line)** (if a heavy rail line were to run to Ellon, Peterhead and Fraserburgh) and around **£2.0million** if the rail line ran to Ellon only. Revenue is estimated to be between **£2.0million - £10.9million (branch lines from Ellon), £1.9million - £10.4million (continuous line)** and **between £0.8- £5.6million per annum** if the line only extended as far north as Ellon (depedent on the assumed transfer of patornage from stations further north).
Public Acceptability	Low	There is currently a large level of support for a rail or light rail based option with campaigns currently supported by local politicians, Rail Future Scotland and the local media in the North East. The public also seem to back these campaigns. We are confident there will be large amounts of public support for this option. Should a tram option be pursued, there may be concerns during construction due to on street works within Aberdeen however we do not foresee these to be large.