

# Strategic Transport Projects Review Environmental Report – Non Technical Summary



November 2008



# Strategic Transport Projects Review

## Environmental Report - Non – Technical Summary

### Contents

<b>Introduction</b>	<b>2</b>
<b>Consultation</b>	<b>2</b>
<b>Summary of the Objectives and Content of the Strategic Transport Projects Review</b>	<b>3</b>
<b>Stages of Assessment</b>	<b>4</b>
<b>The Current State of the Scottish Environment and Objectives of the SEA</b>	<b>5</b>
<b>Environmental Protection Objectives</b>	<b>8</b>
<b>Likely Significant Effects on the Environment</b>	<b>9</b>
<b>Treatment of Adverse Environmental Effects</b>	<b>14</b>
<b>Cumulative Effects Assessment</b>	<b>16</b>
<b>Monitoring of Effects</b>	<b>19</b>
<b>Next Stages</b>	<b>20</b>

## Introduction

Transport Scotland is undertaking the Strategic Transport Projects Review (STPR) to make recommendations on a portfolio of land-based transport interventions, for the period 2012 to 2022. These would deliver a strategic transport network which will benefit the whole of Scotland and deliver on the priorities set out in the National Transport Strategy, the National Planning Framework and the Scottish Climate Change Bill.

As part of the STPR, a Strategic Environmental Assessment (SEA) is being carried out, in accordance with the requirements of the Environmental Assessment (Scotland) Act 2005. The purpose of an SEA is to consider the likely environmental effects of certain plans, programmes and strategies proposed by public sector organisations.

This Non -Technical Summary provides an overview of information and findings from the Environmental Report that has been prepared to describe and assess the likely significant environmental effects of the interventions considered in the STPR.

## Consultation

The Environmental Report has been published for consultation. Copies are available on the STPR website ([www.transportscotland.gov.uk/stpr](http://www.transportscotland.gov.uk/stpr)) the Scottish Government's consultation webpage ([www.scotland.gov.uk/consultations/current](http://www.scotland.gov.uk/consultations/current)) or, for inspection only, at Buchanan House.

Consultation responses should be directed in writing to Transport Scotland, either by e-mail or by post to the address shown below. **Responses should be received by 13<sup>th</sup> February 2009.**

To obtain further copies of this non technical summary, or the summary information leaflet for STPR, please contact the e-mail address shown, leaving you details, or leave contact details on the telephone answer service provided. Further information can be found on the STPR website, at the address shown below;

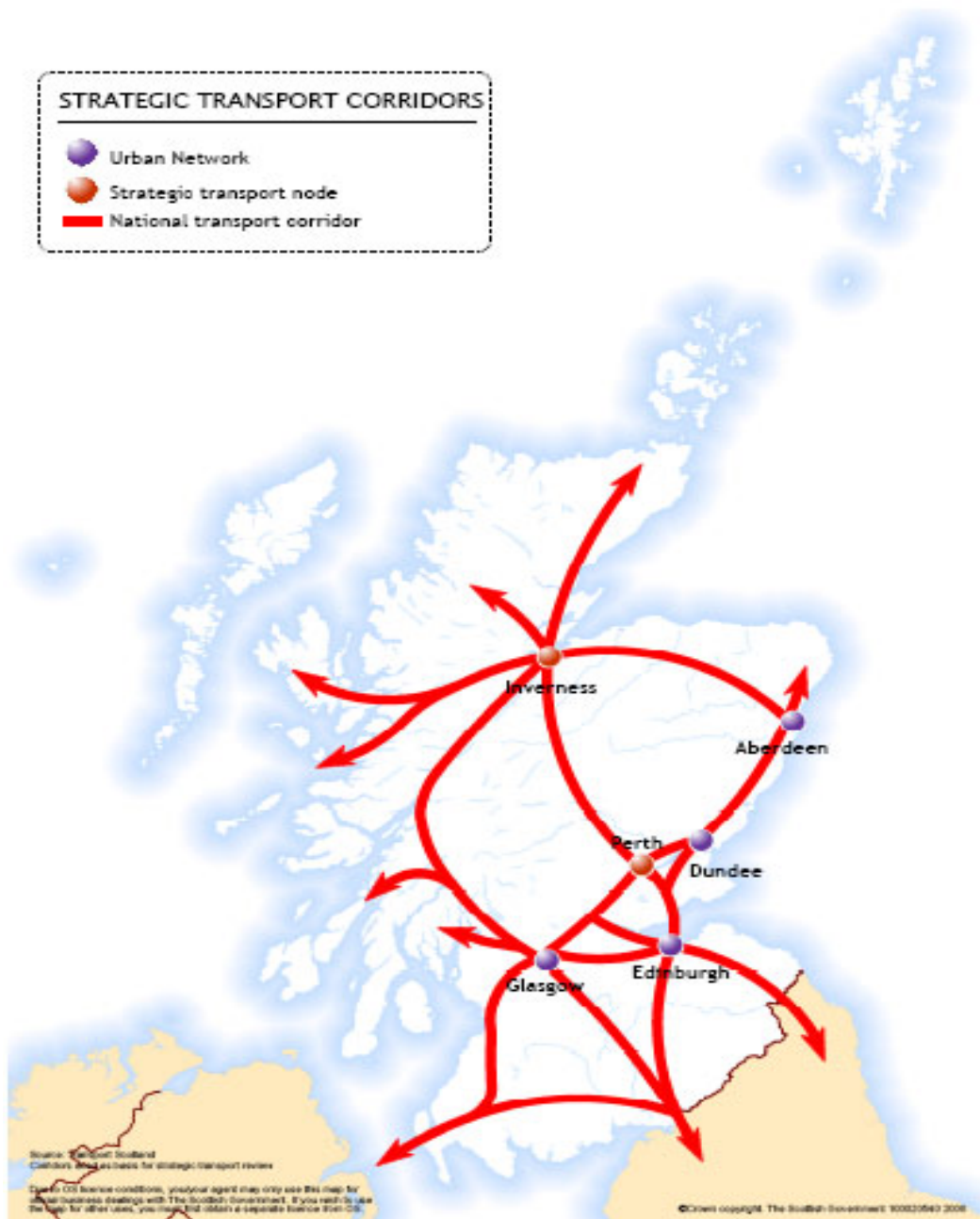
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## Summary of the Objectives and Content of the Strategic Transport Projects Review

The STPR has been conducted to review the strengths and weaknesses of the Scotland's strategic road and rail network. It aims to improve the network through identifying and prioritising road, rail and other interventions of national significance. The following diagram indicates the corridors, urban networks and strategic transport nodes covered by the STPR. The diagram is illustrative and does not represent a plan of the network in detail.



The interventions identified through this Review are intended to make a significant contribution to delivering the Government's Purpose and contribute to the three key strategic outcomes identified in the National Transport Strategy (NTS) as being essential for the Government's vision for the future of transport in Scotland. These are:

- To improve journey times and connections;
- To reduce transport related emissions; and
- To improve the quality, accessibility and affordability of transport.

The interventions have been assessed against the criteria in the Scottish Transport Appraisal Guidance (STAG), which measures the deliverability and feasibility of proposed interventions against a wide range of policy objectives, including transport and economic policy.

### **Stages of Assessment**

SEA is a systematic method for considering the likely environmental effects of a programme, such as that developed through the STPR, and aims to integrate environmental factors into policy preparation and decision-making. It also has an important role to play in increasing public participation and facilitating openness and transparency in decision-making. The key steps of the SEA that have been undertaken so far are:

- **Scoping** – Deciding on the scope and level of detail of the Environmental Report, and the consultation period for the report (statutory consultees comprise Scottish Natural Heritage, Historic Scotland and the Scottish Environment Protection Agency). Health Scotland is also treated as a consultee for this SEA; and
- **Environmental Assessment** – Publication of Environmental Report on the likely significant environmental effects of implementing the STPR for consultation.

Following the consultation period, Scottish Ministers will review the consultation responses and decide whether to make changes before adopting the STPR programme. Further information on the next steps is described at the end of this non technical summary.

## **The Current State of the Scottish Environment and Objectives of the SEA**

Information on Scotland's environmental characteristics has been gathered to help inform the SEA. Conclusions on the current state of the environment are summarised below. This information has informed the development of specific environmental objectives so that the impact of STPR on the current and future environment can be properly assessed. The current environmental baseline information is summarised below. It is presented more fully in Appendix 3 of the Environmental Report.

### **Biodiversity, Flora and Fauna**

Scotland has a rich natural heritage, with many areas and features recognised and safeguarded for their special qualities. Over 20 per cent of the land area of Scotland is protected by natural heritage designations of international, national or local significance. A number of new sites are also expected to be designated over time.

Designations of international significance include Ramsar sites and, in addition to these, the Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), which together form the Natura 2000 network. In addition to these internationally recognised sites, National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs) are designated for their national significance for biodiversity.

### **Population**

Scotland's population is predicted to continue to increase towards 5.33 million in 2021. The age structure of the population is also changing, with fewer younger people and a greater number of older people living in Scotland. Migration may assist to offset this and contribute towards overall population growth.

Transport systems have a significant effect on the quality of life for all people and the communities where they live. The availability, affordability and quality of transport systems affect a person's ability to access employment opportunities and key services. In Scotland, there continues to be a high level of reliance on travel by private car, particularly in rural areas where there is often less choice of public transport.

### **Noise**

Noise pollution from transport can have a harmful effect on the quality of life of those exposed to it, for example through annoyance and sleep loss. In Scotland, transport related noise is primarily experienced in urban areas where there are higher concentrations both of people and traffic infrastructure (e.g. roads and railways).

## **Human Health**

There are harmful health effects from transport including air pollution and traffic accidents. However there can also be beneficial effects; the promotion of travel by methods such as walking and cycling can contribute towards a healthier lifestyle.

Air pollution resulting from transport has been linked to an increase in levels of heart and respiratory illnesses. In general, however, air quality levels in Scotland are good and set to improve. This does not disguise the fact, however, that, particularly within the cities, air quality management is required to tackle levels of pollutants that are above or close to safe levels.

Road Traffic incidents are also important in terms of human safety. The number of all traffic accidents resulting in injury has reduced over recent years, although the more common types of accident are changing; for example the number of motorway accidents has increased by 25 per cent. There are also local variations between accident levels, and the severity of injuries.

Transport Scotland's Strategic Road Safety Plan (2007) highlights that targets set in 2000 aimed at reducing the number of casualties on Scotland's roads by 2010 are currently being achieved, although there is a need for further work to ensure that progress continues.

## **Water**

Water quality is improving in Scotland, with a reduction in the length of poor or seriously polluted rivers in the country of 34 per cent. Water quality problems, however, do remain in some areas and the main water bodies affected include the River Clyde, Union Canal, River Kelvin, River Almond, River Eden and White Cart Water.

Transport can be a significant source of water pollution, potentially affecting rivers, lochs, estuaries and coastal areas. Pollution can arise from construction over or near water and from the run off of transport associated chemicals, oils and debris into drainage systems.

Flooding can cause significant damage to property, and affects the operation of the transport network. It is estimated that almost 100,000 properties in Scotland lie within areas susceptible to flooding, and that flooding will become more frequent in the future as a result of climate change.

## **Soils and Geology**

Agriculture and forestry are important land uses in Scotland, and their productiveness relies on good quality soils. The most productive agricultural land can be found in the Southern, Central and Eastern parts of the country with farming in the North and West primarily restricted to sheep and cattle grazing. Approximately 17 per cent of the land area of Scotland is used for forestry of both native and non-native species.

Scotland also has a diverse geology, and many features are designated as Sites of Special Scientific Interest (SSSIs).

## **Air Quality**

In general, air quality in Scotland is good. The North West is remote from air pollutant problems and, as would be expected, the more densely populated central belt has the highest concentrations of poor air quality. The major influence on local air quality in these areas is as a result of traffic emissions. This links to issues of human health. Many local authorities have designated areas and set out action plans where air quality requires improvement (Air Quality Management Areas).

## **Climatic Factors**

The main human influence on the global climate is the emission of greenhouse gases including carbon dioxide (CO<sub>2</sub>) methane and nitrous oxide. CO<sub>2</sub> accounts for the greatest proportion of greenhouse gases in the UK. Road transport emissions contribute to around 17 per cent of greenhouse gas emissions in Scotland.

The effect of climate change includes rising temperatures, increased rainfall, less snow, increased storms and high winds. There are harmful consequences for our environment, including increased flood risk, and loss of species and habitats.

## **Material Assets**

Scotland's natural resources are its material assets. These mineral resources and aggregates are used for purposes such as fuel (e.g. coal), and construction (e.g. sand, gravel, rock). However, the quantity of the resources is limited and once used, cannot be replaced. Transport infrastructure, such as the trunk road system and public transport infrastructure is also an important material asset, and relies on the availability of other natural resources for its construction and operation.

Demand on Scotland's road and rail networks, both for passenger and freight travel, continues to increase. Improvements to the network, including new or replacement infrastructure, will also require the use of more aggregate materials. A relatively small proportion of the aggregate materials used in construction are from secondary or recycled sources, although it is expected that the proportion of use of these materials will increase.

## **Cultural Heritage**

Scotland's history and culture is reflected in its many listed buildings, conservation areas, scheduled monuments and other built heritage and archaeological features, and a number of sites, such as the Antonine Wall, Edinburgh Old and New Towns, and New Lanark are designated as World Heritage Sites due to their international interest and significance.

Many other features are proposed and expected to be designated and safeguarded for their cultural heritage value in the future.

Transport can affect cultural heritage in a number of ways. Transport related air pollution in urban areas can increase the erosion rates of listed buildings. The success of cultural attractions is largely dependent on their accessibility. In addition, the construction of new transport infrastructure in urban or rural areas has the potential to result in the loss or damage of cultural heritage features.



## **Landscape and Visual**

Scotland's landscape is diverse, ranging between lowland farming areas, mountains, moorland, woodland, coastal and urban. Its landscape and scenery is distinctive, and many areas are recognised and safeguarded for their landscape and scenic value. At a national level, approximately 13 per cent of the country is designated as a National Scenic Area (NSA). In recent years, two areas have been designated as National Parks; Loch Lomond and the Trossachs, and the Cairngorms, where additional levels of protection exist to safeguard the character of these areas.

The introduction of new transport infrastructure can have a potentially significant effect on the scenic qualities of the landscape.

## **Environmental Protection Objectives**

The SEA has developed a series of strategic environmental assessment objectives for the STPR. Many of these objectives have been developed from and take into account objectives in the SEAs undertaken for the National Transport Strategy, and for the Regional Transport Strategies.

Strategic environmental objectives for the STPR are to:

- Protect the biodiversity of Scotland and minimise any harmful impact on its natural heritage, such as sites safeguarded for nature conservation, or valued species and habitats;
- Improve the environment of all communities, and reduce the harmful effects of transport, e.g. severing links between communities, visual intrusion, noise and pollution;
- Contribute towards the improvement of health in Scotland through the promotion of measures to reduce traffic related pollution and improve safety, and encourage healthier forms of travel such as cycling;
- Improving the ecological quality of water by protecting it from the harmful side effects of transport such as construction pollution and contamination from road drainage systems;
- Reduce and manage the potential of flood risk to land and transport infrastructure;
- Safeguard the quality of Scotland's soil and geology resources and minimise the effects of transport;
- Improve national and local air quality through the reduction of transport related air polluting emissions;
- Reduce national levels of carbon emissions from transport to contribute towards climate change targets;

- Make prudent use of natural resources such as minerals and aggregates in the improvement of transport infrastructure;
- Minimise waste by re-using and recycling materials where possible in the construction of transport infrastructure;
- Safeguard cultural heritage features and their settings, e.g. listed buildings, conservation areas from harmful impacts of transport and new infrastructure; and
- Safeguard the character and diversity of the Scottish landscape and minimise impacts on areas of valuable landscape.

## **Likely Significant Effects on the Environment**

### **Summary of Assessment Methods**

Following the assessment of the current state of the environment, the assessment defined a series of environmental criteria against which all of the interventions could be assessed. This consisted of a review of the wider policies and objectives that are relevant to STPR, and the development of environmental objectives specific to it.

The assessment process was undertaken in two stages; firstly, to conduct a high level review of all of the proposed interventions. This review was assessed by Transport Scotland, alongside other criteria such as cost effectiveness and technical feasibility, to identify those interventions which should progress to the second stage, and a more detailed environmental assessment.

At the first stage, where interventions were identified as having a potential adverse environmental impact, alternatives were proposed that would have an improved effect, and these were considered by Transport Scotland in the list of interventions to progress to the second, more detailed appraisal.

The effects of each transport intervention proposed were measured against criteria for each environmental topic, and an overall score to identify the significance of the environmental impact, and whether it would be beneficial, neutral or adverse.

### **Dealing with Uncertainty**

STPR is a strategic programme and does not contain specific details of many interventions, for example the exact routeing of a new road or detail of the construction methods of a new railway. These circumstances lead to a degree of uncertainty in the environmental assessments of some of the interventions. Where this was the case, the SEA took a reasonable worst case scenario approach to ensure that the environmental effects were not understated.

This sometimes limited detail also meant that the scenario modelling software used to generate future noise, air and climatic baseline data ran with a degree of uncertainty. Results have therefore been subject to expert review to ensure robustness.

Modelling has been used to predict future baseline information where possible; however where data was unavailable for a number of baseline purposes, for instance, the estimation of the number of residential properties within 50 metres of a rail line, qualitative techniques based on expert judgement have been utilised.

### **Key Findings**

The Strategic Environmental Assessment has assessed the likely consequences of delivering a range those interventions the STPR has identified as being most likely to support the Scottish Government’s Purpose. These are set out in STPR Report 3 and are summarised in the annexes of STPR Report 4.

Overall, the assessment has demonstrated that the majority of the interventions will provide strategic environmental benefits. Of the remainder, 9 interventions were assessed as having adverse effects, while 8 interventions were assessed as having a neutral effect overall and 1 intervention was considered to have an uncertain effect overall.

The tables below summarise these findings, presenting first interventions with overall benefits, then adverse effects and lastly, neutral or uncertain effects.. The Intervention references and titles are taken from STPR Report 3 Appendix D and STPR Report 3 Appendix E.

### **Summary Environmental Assessment – Interventions with Benefits**

<b>Intervention Ref (taken from STPR Report 3)</b>	<b>Intervention Title</b>	<b>Overall Environmental Effect</b>
D1	Delivery of the Strategic Road Safety Plan	Major National long term benefits
D2	Maintaining and Safely operating Scotland’s Rail Network	Major National long term benefits
D3 part 1	Targeted Programme of Measures to Reduce Accident Severity on the A9 North of Inverness	Moderate Regional benefits
D3 part 2	Targeted Programme of Measures to Reduce Accident Severity on the A9 and A835 between Inverness and Ullapool	Minor to Moderate long term Regional benefits
D3 part 3	Targeted Programme of Measures to Reduce Accident Severity between Inverness, Fort William, Mallaig and Skye (A82, A87, A830, A887)	Minor to Moderate long term Regional benefits
D3 part 4	Targeted Programme of Measures to Reduce Accident Severity on the A96 between Aberdeen and Inverness	Minor to Moderate long term Regional benefits
D3 part 5	Route Management between: Aberdeen and North East Scotland (A90); Edinburgh and Dundee (A92); Ayrshire and Dumfries (A76); Edinburgh and North West England (A68/A7); Edinburgh and North East England (A1), the A83, A85, A828	Major National long term benefits

Intervention Ref (taken from STPR Report 3)	Intervention Title	Overall Environmental Effect
D4	Targeted Programme of Measures to improve the Trans European Network linkage to Loch Ryan port facilities	Minor Local long term Benefits
D5	Targeted Programme of Measures to improve road standards between Glasgow and Oban/Fort William (A82)	Neutral to Moderate long term Local benefits
D6	Using Intelligent Transport Systems on Parts of the Road Network to Enhance Capacity and Operations	Major long term Regional benefits
D7	Further Electrification of the Strategic Rail Network	Moderate long term Regional benefits
D8	Enhancing Rail System Capacity through Targeted Improvements	Major National long term benefits
D9	National Integrated Ticketing Scheme	Moderate National long term benefits
D10	Reconfiguration of the National Rail Timetable	Minor National long term benefits
D11	(Strategic) Park-&-Ride/Park-&-Choose Strategy	Moderate long term Regional Benefits
D19 option 1	Dundee Northern Relief Road: Bypass Scenario	Minor Local long term benefits
D23	Rail Enhancements in the East of Scotland	Moderate Local long term benefits
D25 (part 1)	West of Scotland Strategic Rail Enhancements: Glasgow Tunnel proposals	Moderate long term Local benefits
D27	Rail Enhancements between Inverclyde/Ayrshire and Glasgow	Moderate long term Regional benefits
D28	Upgrade Edinburgh Haymarket Public Transport Interchange	Moderate long term Local benefits
D29	Enhancements to Railfreight between Glasgow and the Border via West Coast Mainline	Minor long term Regional benefits
D30	Light Rapid Transit connections between Fife and Edinburgh	Minor or Moderate long term Local benefits
E1	Suburban Rail Services Across Dundee	Minor or Moderate long term Local benefits

Intervention Ref (taken from STPR Report 3)	Intervention Title	Overall Environmental Effect
E5	New Busway between Glasgow City Centre, Clydebank and Glasgow Airport	Moderate long term Local benefits
E8	New Rail Line between Perth and Inverkeithing	Moderate long term Regional benefits
E13	New LRT Line to SE Edinburgh	Minor or Moderate long term Local benefits
E14	Augment Far North Rail Line Rail Services with Express Coach Facilities	Minor long term Local and Regional benefits
E15	Reopen Rail Freight Connection to Greenock Port	Minor long term Local benefits
E18	Suburban Rail Services Across Aberdeen	Minor long term Local benefits
E19	Glasgow Subway Upgrade and Modernisation	Minor long term Local benefits
E20	New Motorway Link between the M73 and Coatbridge	Minor long term Local benefits

### Summary Environmental Assessment – Interventions with Adverse Effects

Intervention Ref (taken from STPR Report 3)	Intervention Title (taken from STPR Report 3)	Overall Environmental Effect
D14 Part 1	A9 upgrading from Dunblane to Inverness	Moderate to Major short and long term Local and Regional Adverse
D14 part 2	A9 upgrading from Blair Atholl to Inverness	Moderate to Major short and long term Local and Regional Adverse
D16	Upgrade A96 to Dual Carriageway between Inverness and Nairn	Moderate long term, Local, Adverse
E2	Co-locate Dundee Bus Station with Rail Station	Minor long term Local Adverse
E6	Inverness Southern Bypass from the A9 to A82	Moderate long term Local Adverse

Intervention Ref (taken from STPR Report 3)	Intervention Title (taken from STPR Report 3)	Overall Environmental Effect
E9	Railfreight connections to the Port of Rosyth	Minor or Moderate long term Local Adverse
E10	Improved Road Links to Edinburgh Airport	Minor long term Local Adverse
E11	Improvements to the Trunk Road Network in Inverclyde	Minor or Moderate long term Local Adverse
E16	Extension of Glasgow Southern Orbital from East Kilbride to M73/M74	Minor or Moderate long term Local Adverse

### Summary Environmental Assessment – Interventions with Neutral and Uncertain Effects

Intervention Ref (taken from STPR Report 3)	Intervention Title (taken from STPR Report 3)	Overall Environmental Effect
D15	Rail Enhancements on the Highland Mainline between Perth and Inverness	Neutral
D17	Rail Service Enhancements between Aberdeen and Inverness	Neutral
D18	Rail Enhancements between Aberdeen and the Central Belt	Neutral
D19 (part 2)	Dundee Northern Relief Road: A90 Upgrades Scenario	Neutral
D21	Grangemouth Road and Rail Access Upgrades	Neutral
D25	West of Scotland Strategic Rail Enhancements: Glasgow Central East	Neutral
D31	Inverkeithing to Halbeath Rail Line	Neutral
E7	Rail Freight Enhancements between Mossend, Grangemouth and Aberdeen/Inverness	Neutral
D25	West of Scotland Strategic Rail Enhancements: metro	Uncertain

In describing the overall effects, common themes emerged regarding the potential for interventions to affect different environmental components. These themes are presented below:

**Biodiversity:** Interventions in close proximity to Natura 2000 sites could affect site integrity. This is considered via Appropriate Assessment, which is presented in Appendix 8 of the Environmental Report.

**Population:** Interventions to tackle congestion could isolate some communities and reduce economic input from stop-off traffic.

**Noise:** Building of new transport infrastructure could increase the number of residential properties exposed to noise, both during construction and operation.

**Water:** Water bodies could be affected by any construction works carried out near to or over them.

**Soils and Geology:** Land-take from the construction of new infrastructure could affect soils, and cuttings for road and rail have the potential to alter geology.

**Cultural Heritage:** Proximity of interventions to designated cultural heritage sites could affect their integrity and setting.

**Landscape:** Construction of new infrastructure could affect townscapes, designated landscape areas such as country parks, and undesignated rural landscapes.

**Material Assets:** The construction of new roads and rail lines does not make use of existing infrastructure and requires the use of new resources.

## **Treatment of Adverse Environmental Effects**

Where potentially adverse impacts have been identified, the SEA contributed to the development of measures to reduce the potential environmental effects of interventions. These include:

- Avoiding sensitive and important ecological and geologically designated sites;
- Shielding people from nuisance such as noise;
- Ensuring consideration of public access to essential services;
- Exploring the potential for energy saving transport techniques;
- Conforming to important water regulations;
- Designing and siting new infrastructure sensitively in areas of landscape and cultural value, and;
- Maximising the use of secondary and recycled materials for construction activities.

Where this happened, the environmental effects of each STPR intervention were re-assessed taking into account the implementation of such measures. This was then used to identify residual impacts (impacts that would remain).

This process concluded that three STPR interventions still had the potential to create adverse effects on the environmental parameter of biodiversity. These were the 'A9 Upgrading from Dunblane to Inverness (Phase 1)', the 'A9 upgrading from Blair Atholl to Inverness (Phase 2)', and 'Rail Enhancements between Aberdeen and the Central Belt'. Whilst the intervention 'Rail Enhancements between Aberdeen and the Central Belt' has not been assessed as having an overall adverse effect, it was considered that the intervention would adversely affect biodiversity in its own right.

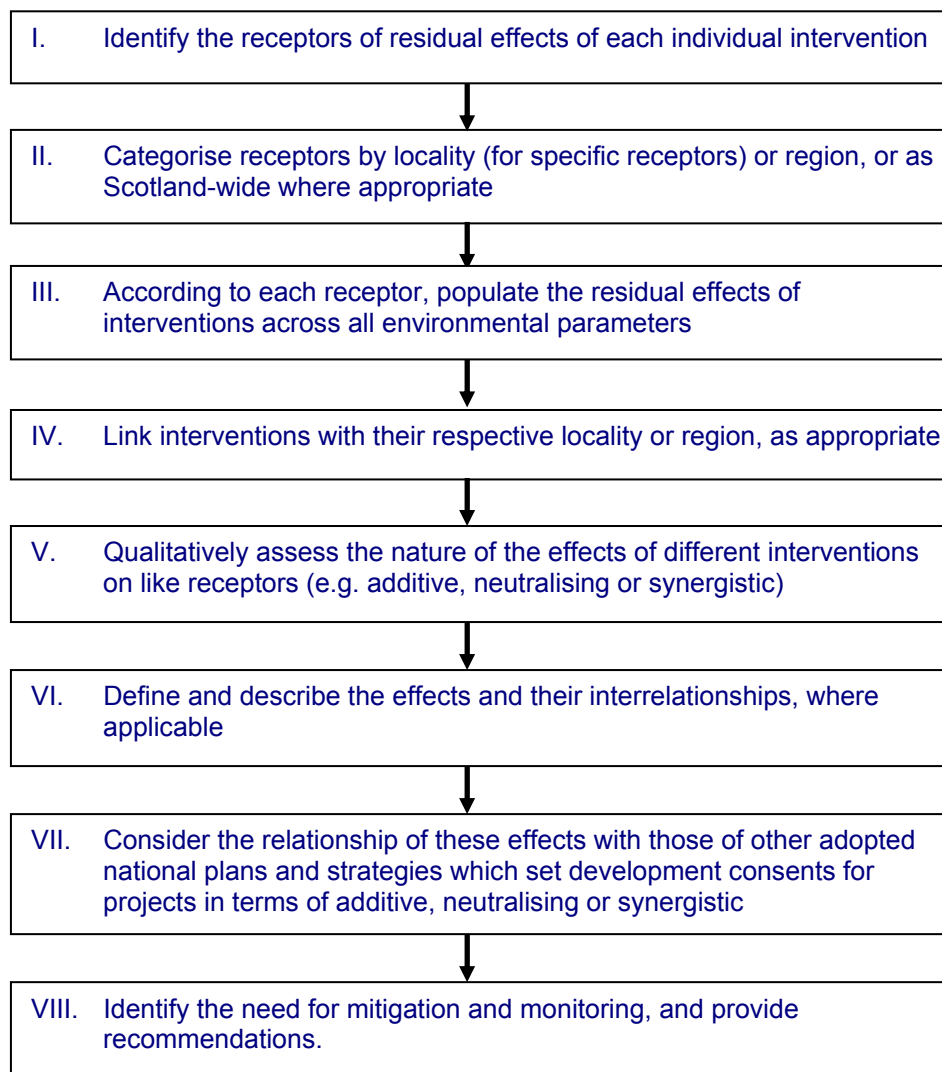
In addition to the SEA, an Appropriate Assessment has been carried out for all of the interventions identified as supporting the Scottish Government's Purpose. For the three interventions suggested as having residual impacts, an alternative solution has been identified which, at a strategic level, does offer potential to mitigate potential impacts upon designated biodiversity sites affected. In each case, therefore, it has been possible to conclude that the intervention may be delivered, subject to future monitoring and development.



## Cumulative Effects Assessment

The SEA Directive requires an analysis of "...the likely significant effects on the environment... These effects should include secondary, cumulative, synergistic... effects". The aim of cumulative effects assessment is to identify, describe and evaluate cumulative effects, enabling them to be avoided, minimised or enhanced as appropriate.

The cumulative effects assessment of the STPR was built from the results of the assessment of the net beneficial effects and residual adverse effects of the individual interventions described earlier. The procedure undertaken is summarised in the flowchart.



**Flowchart of Cumulative Effects Assessment Process<sup>1</sup>**

<sup>1</sup> Adapted from: Department for Transport (2004), *Transport Analysis Guidance Unit 2.11: Strategic Environmental Assessment for Transport Plans and Programmes. Appendix 5: Cumulative Effects Assessment*. Available at: [http://www.webtag.org.uk/webdocuments/2\\_Project\\_Manager/11\\_SEA/appendix.htm#5](http://www.webtag.org.uk/webdocuments/2_Project_Manager/11_SEA/appendix.htm#5)

Any beneficial or residual effects of interventions identified (including insignificant effects) were reviewed in order to identify the general receptors of these potential effects, normally expressed as areas or localities of various types of receptor such as landscape character areas and residents of conurbations. It was possible in some instances to identify specific receptors such as a particular SSSI. These receptors were then categorised as far as possible by locality or region, or as Scotland-wide.

The regions were defined as north of Scotland, east of Scotland and West of Scotland and to the south. Also as appropriate to strategic assessment, regional and national receptors of cumulative effects could only be expressed as environmental parameters, indicators or types of receptor. Following an iterative process, the residual effects of interventions were then linked with the receptors identified in order to identify which interventions were acting in combination.

Next, a review was conducted of the National Transport Strategy (NTS) and National Planning Framework 2 (NPF2) and their environmental assessments in order to identify further cumulative effects which focussed on:

- Any significant contributions to adverse effects of the STPR (potentially adverse situations);
- Relevant opportunities for offsetting adverse effects of STPR through relevant objectives or specific enhancements in relevant geographical areas; and
- Relevant opportunities for enhancing the benefits of STPR.

Finally, the need for mitigation and monitoring was reviewed, and recommendations made as appropriate to the potential cumulative effects.

The cumulative effects assessment has identified key receptors and effects on the local and regional environment. Receptors that have not been identified where not anticipated to have key cumulative effects. A number of the key findings are noted here.

### **Key Findings of Cumulative Effects Assessment**

#### **Inverness, Nairn, Perth, Aberdeen, Edinburgh, Fife, Perth, Dundee, Glasgow**

##### Local Receptors: Residents, Organisation and visitors

Residents, organisations and visitors would generally experience cumulative moderate accessibility benefits, which can be particularly important for access to essential services and employment opportunities. They would also experience cumulative minor to moderate air quality improvements and health benefits, the latter resulting both from the improvements to air quality and from road safety improvements and modal shift (as it was considered that encouragement public transport use would increase opportunities for walking and cycling). Particular moderate benefits could occur to AQMAs within Perth, Aberdeen, Dundee and Glasgow. However, there could be localised community severance as a result of certain road improvement schemes, which can adversely affect accessibility and levels of walking and cycling.

Residents, organisations and visitors would also experience localised adverse noise effects, being cumulative in this case across different phases of road improvements, with the potential for combined effects resulting from new infrastructure on noise sensitive receptors (including those within Candidate Noise Management Areas, particularly within Glasgow).

Regional Receptors: Landscapes, Cultural Heritage Resources and Biodiversity

Regional landscapes character areas, including High Plateau Moorlands and Lowland Plateau and Plains, could be cumulatively minor adversely affected, particularly through new infrastructure requirements and new overhead power lines. This could also have indirect effects on the residents and visitors to these sites. Mitigation to avoid landscapes where possible could minimise adverse effects on regionally important landscape areas and joint-working is encouraged to avoid, and then minimise, any cumulative effects.

Regionally important cultural heritage features could also be minor adversely affected by Interventions within the region, largely through effects on setting and in-direct effects from noise. Indirect effects on the residents and visitors to these sites could result. Mitigation measures, including avoidance of sites, could minimise cumulative effects where adverse effects occur. Where adverse effects cannot be avoided, measures to potentially support cultural heritage enhancements in the region could be implemented.

Designated SSSIs and undesignated biodiversity sites, species and habitats were predicted to be cumulatively adversely affected, although it would be required that such effects be avoided, minimised or compensated for at the project level. Joint-working is encouraged to avoid, and then minimise, any cumulative effects.

**Scotland-wide Cumulative Effects**

Environmental Parameters: Climatic Factors, Air Quality and Human Health

Cumulatively, minor benefits were envisaged. The STPR was predicted to result in a reduction in road-based transport carbon emissions of between 100,000 and 150,000 tonnes CO<sub>2</sub> (e) per year. Given an estimated 9.7 Mt of CO<sub>2</sub> attributable to road transport in Scotland in 2005, this would be a reduction of around one per cent. Electrification of the rail network could reduce levels of rail-based carbon emissions.

This predicted reduction of traffic related emissions would be of importance on a national scale in terms of local air quality. Minor benefits were envisaged to national air quality through the cumulative effects of the interventions, this could benefit from strategic road improvements, as well as modal shift from private vehicles to public transport.

Aligning with accessibility benefits, there are potential health benefits across a number of community types, due to factors such as modal shift (as it was considered that encouragement public transport use would increase opportunities for countryside recreation) as well as secondary benefits relative to reduced traffic noise and air quality and road safety improvements. Overall minor benefits were predicted for the health of the population.

## Conclusion

In conclusion, delivery of the interventions emerging from STPR would cumulatively bring a number of benefits to the local and regional areas of Scotland, as well as nationwide benefits. In particular, STPR would enhance accessibility throughout Scotland, linking key urban centres and communities. The health of Scotland could also be enhanced through air quality improvements and a reduction in the frequency and severity of accidents. The combination of interventions would however, also give rise to cumulative adverse effects on biodiversity, water, soils and geology, cultural heritage, and landscape resources largely as a result of those interventions that require new infrastructure. There would be opportunities to mitigate potential adverse effects by minimising individual adverse project effects in accordance with specific project assessments and employing good design and build practices such as minimising waste and recycling and recovering resources efficiently.

## Monitoring of Effects

The purpose of SEA monitoring should be to ensure that mitigation is effective and that any early or unexpected effects are recognised and addressed so that appropriate remedial action can be taken. Environmental monitoring is important to inform future transport programmes and it should be viewed as an ongoing learning process.

Each intervention will have bespoke monitoring strategies designed for them at the project design stage. The SEA highlights environmental indicators to be monitored at this stage and relevant sources of data. The following sources of data have been identified to assist the monitoring of STPR effects on different environmental components:

**Biodiversity:** UK and Local Biodiversity Action Plans and Local Biodiversity Action Plans; Joint Nature Conservation Committee (JNCC); Scottish Natural Heritage (SNH)

**Population:** General Register Office for Scotland

**Noise:** Strategic Noise Maps and Action Plans

**Human Health:** Scottish Health Survey; Scottish Transport Statistics; Scottish Census Data; Office of National Statistics

**Soils and Geology:** Scottish Soil Monitoring Network; The Macaulay Institute; SNH

**Water:** Scottish Environment Protection Agency

**Air:** UK Air Quality Monitoring Archive

**Climatic Factors:** UK Climate Impacts Programme (UKCIP08)

**Material Assets:** The Waste and Resources Action Programme (WRAP)

**Cultural Heritage:** Historic Scotland

**Landscape:** SNH

## **Next Stages**

This Non-Technical Summary and accompanying Environmental Report are available for public and statutory consultation for an eight week period commencing in late 2008. Upon completion of the consultation period relevant comments will be reviewed and responded to. It is anticipated that amendments could be required to the STPR report.

Following the incorporation of consultation responses, an SEA Post-Adoption Statement and Monitoring Strategy will be published in early 2009. This Post-Adoption Statement will document how the SEA has taken account of all consultation comments and how environmental implications have been taken into account in the STPR decision-making process. It will also provide detail on the strategy employed to monitor the environmental effects of STPR interventions.