

NATIONAL TRANSPORT STRATEGY 2 - DRAFT FOR CONSULTATION

**Strategic Environmental Assessment
Environmental Report**

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Non-Technical Summary

Introduction

Transport Scotland are consulting on the “National Transport Strategy 2 - Draft for Consultation”. Developed following an extensive review process, the draft National Transport Strategy 2 sets out a 20 year Vision which is underpinned by four Priorities of: *‘Promotes equality’*, *‘Takes climate action’*, *‘Helps our economy prosper’* and *‘Improves our Health and Wellbeing’*.

What is the draft National Transport Strategy 2?

The draft Strategy sets out a Strategic Framework for transport in Scotland over the next twenty years. It has been developed through a collaborative and evidence-based review process.

The finalised Strategy will not set a framework for funding or identify infrastructure priorities but will inform the new Strategic Transport Projects Review. It will also inform lower level plans including Regional and Local Transport Strategies, and Development Plans.

The draft Strategy sets out a Vision of:

‘We will have a sustainable, inclusive and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors”

The Vision is underpinned by four Priorities, each with three associated Outcomes. (See below). The draft Strategy sets out to balance social, economic and environmental considerations, with the four Priorities viewed as interlinked to deliver the Vision. Within these priorities, there is an emphasis on promoting equality and taking climate action.

The draft Strategy includes 14 High Level Policies (listed in Table 1 below) and supporting measures (enablers) developed to address the current challenges and opportunities across the transport system and to deliver the draft Vision and Outcomes.

Promotes equality

- Will provide fair access to services we need
- Will be easy to use for all
- Will be affordable for all

Takes climate action

- Will adapt to the effects of climate change
- Will help deliver our net-zero target
- Will promote greener, cleaner choices

Helps our economy prosper

- Will get us where we need to get to
- Will be reliable, efficient and high quality
- Will use beneficial innovation

Improves our health and wellbeing

- Will be safe and secure for all
- Will enable us to make healthy travel choices
- Will help make our communities great places to live

Table 1.

Draft High Level Policies
Continue to improve the reliability, safety and resilience of our transport system
Embed the implications for transport in spatial planning and land use decision making
Integrate policies and infrastructure investment across the transport, energy and digital system
Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally
Provide a high-quality transport system that integrates Scotland and recognises our different geographic needs
Improve the quality and availability of information to enable better transport choices
Embrace transport innovation that positively impacts on our society, environment and economy
Improve and enable the efficient movement of people and goods on our transport system
Provide a transport system that is equally accessible for all*

Improve access to healthcare, employment, education and training opportunities to generate inclusive sustainable economic growth
Support the transport industry in meeting current and future employment and skills needs
Provide a transport system which promotes and facilitates travel choices which help to improve people's health and wellbeing
Reduce the transport sector's emissions to support our national objectives on air quality and climate change
Plan our transport system to cope with the effects of climate change

* all includes everyone across Scotland but particularly those with protected characteristics of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex and sexual orientation and people living in poverty.

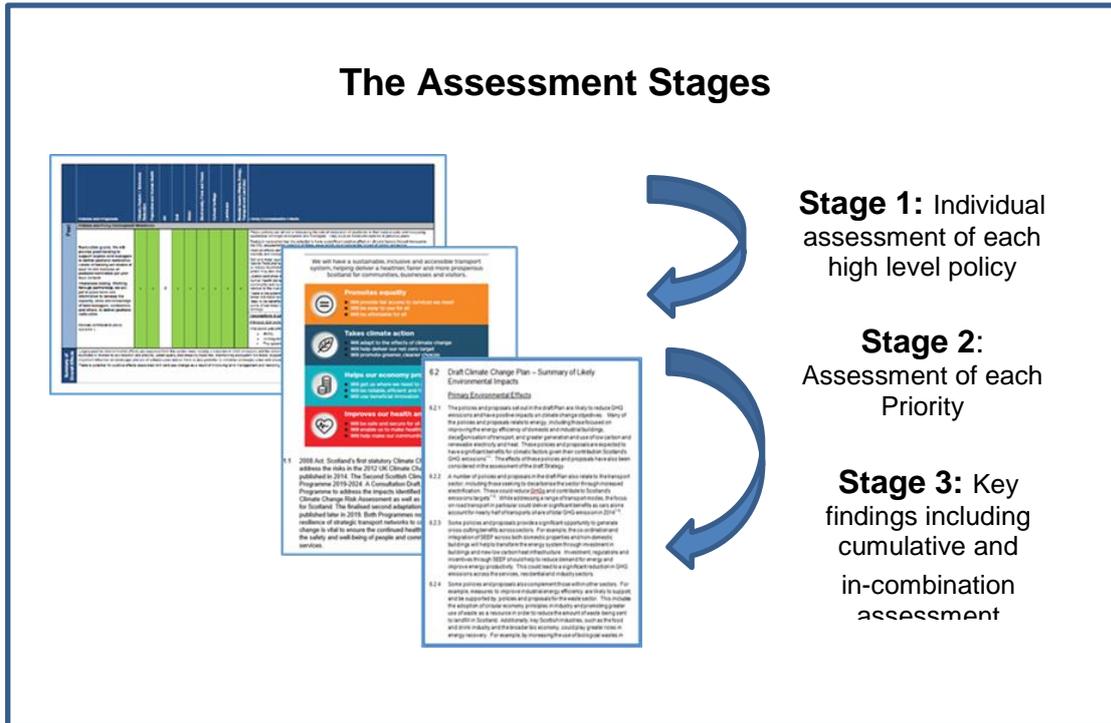
What is Strategic Environmental Assessment and how was it undertaken?

Strategic Environmental Assessment (SEA) is the assessment of the likely significant environmental effects that a public plan, programme or strategy will have on the environment if implemented. Where possible, it proposes how negative effects can be avoided or reduced and identifies opportunities for positive effects to be maximised. SEA provides an opportunity for the public to express their views on the draft strategy and on an Environmental Report setting out the assessment findings. The Environmental Report has been prepared in accordance with the Environmental Assessment (Scotland) Act 2005. The SEA was undertaken in three stages (illustrated below). These were:

- Stage one - considered the likely significant environmental impacts of the draft High Level Policies.
- Stage two - expanded on the findings from Stage one to consider the likely significant environmental effects across the four Priorities (*Promotes Equality, Takes Climate Action, Helps our Economy Prosper and Improves our Health and Wellbeing*).
- Stage three - looked at the potential for in-combination and cumulative impacts of the draft Strategy, including between the four Priorities and in the context of the wide range of objectives, ambitions and requirements set out in wider policy.

Finally, the SEA makes recommendations, for mitigation and enhancement where appropriate.

The Assessment Stages



What is the current state of the environment?

Table 2 summarises the current state of the environment, including key pressures and current trends that could continue in the absence of the draft Strategy.

Table 2.

Climatic factors	- The Scottish Government recognises that there is a global climate emergency and is acting accordingly. Climate Change is already having an impact on weather patterns, increasing air and sea temperatures, and impacting on Scotland's unique biodiversity. Further changes in levels and timing of rainfall, temperatures, and more extreme weather events are expected; all of which have the potential to affect other aspects of the environment. Current proposals for the new Climate Change (Scotland) Bill include strengthening the ambition of climate change targets and reaching net-zero emissions by 2045.
Population and Human Health	- Scotland's population is predicted to increase to around 5.7 million in 2041 - Around 70% of people live in urban areas, covering just 2% of Scotland's land area - Scotland's obesity rates continue to be amongst the highest in the developed world and are a significant public health issue
Air	- Air quality in Scotland has improved considerably over the last few decades, however, air pollution is still generally considered to reduce life expectancy - The impacts of air pollution can be felt more significantly at a local level and "hotspots" can arise from traffic congestion along main travel routes - Scotland's local authorities have established 38 Air Quality Management Areas largely as a result of traffic emissions

Biodiversity	<ul style="list-style-type: none"> - Scotland’s biodiversity receives protection through a range of existing designations and conservation objectives - Many undesignated areas of Scotland also contain a wide range of habitats and species that have important functions and roles - Biodiversity loss has been well documented over the last 50 years, pressures on biodiversity include changes in land use and climate change
Soil	<ul style="list-style-type: none"> - Soil is a non-renewable resource and loss of valued soil has potential for national impacts which will be difficult to reverse. Scotland’s soils play a key role in climate change, acting as “carbon sinks” - There is a link between the health of Scotland’s soils and other environmental topics such as biodiversity, water and air quality - Estimates of soil sealing suggest figures of approximately 1000 hectares a year
Water	<ul style="list-style-type: none"> - In recent decades, significant improvements have been made to water quality in many rivers, canals, and estuaries. Most of Scotland’s seas, coasts, and estuaries are reported to be in good or excellent condition - The construction and use of transport infrastructure can negatively impact on water quality and new structures on land can affect flood defences - Flooding poses the greatest long term climate related risk to infrastructure
Cultural heritage and the historic environment	<ul style="list-style-type: none"> - Scotland’s many and varied historical sites are unique and irreplaceable - Inappropriate development is a key pressure on the historic environment and cultural heritage and increasing levels of congestion, as well as new transport infrastructure, can affect historic assets - Rising sea levels and increased storm events may increase coastal erosion, endangering historic landscapes, structures, buildings and archaeology in the coastal zone
Landscape and visual amenity	<ul style="list-style-type: none"> - Scotland’s diversity and distinctive landscape are a significant part of the country’s natural and cultural heritage - Scotland’s landscapes play a key role in attracting tourism, affording opportunities for business and providing the setting for outdoor recreation - The distinctive landscape setting of many towns and cities is being lost as a result of settlement expansion and the need for associated infrastructure
Material assets	<ul style="list-style-type: none"> - Increases in car, air, rail and ferry passenger numbers, as well as distance cycled, have been reported over the last five years. Over the same time there has been a fall in bus passenger numbers - Over the long term, the volume of car traffic on major roads has more than doubled - Network services for energy, transport, water, and information & communications technology are vital, and failure in any one area can lead to wider disruption across these networks - Technological advances and digital connectivity will increase over the next few years

What are the key environmental issues associated with the transport system?

Transport, including international aviation and shipping, was the largest source of net greenhouse gas emissions in Scotland in 2016. Transport is also thought to account for almost a quarter of Scotland's energy use, with the majority of this due to road transport reliant on fossil fuels. Transport emissions remained relatively steady from 1990 to 2016, with an increase in emissions in 2016 reported to be mainly due to an increase in road transport emissions. Whilst the increased electrification of the transport sector could have significant benefits in reducing greenhouse gas emissions, it could also place pressure on the energy sector and grid infrastructure.

The transport and energy sectors are two of the main sources of air pollution and transport can be a significant source of poor air quality in urban areas. Air pollution can impact on human health, both in the short and long-term, and those with pre-existing health issues may be more vulnerable to poor air quality over long time periods. Air quality is often worse in areas of deprivation and is a health inequality issue. Air pollution can also have wider harmful effects on the environment.

Action to reduce transport emissions can provide benefits for both climate change and air quality

The impacts of climate change are expected to intensify

Just over a third of all car journeys are under two miles and could be made by bicycle or on foot instead. Green infrastructure, such as walking and cycling paths, can help towns and cities become more sustainable, support wildlife and respond to the challenges of climate change, for example, by reducing flood risk. Green infrastructure can also encourage active travel, improve accessibility and connectivity, and can lead to wider benefits for air quality and health through increased physical activity and air quality. Equally, transport and infrastructure can have a negative impact on habitats and species through habitat loss, disturbance and by creating barriers to movement (known as fragmentation).

Scotland's transport system includes road and rail networks, ports and harbours, airports and inland waterways. Noise and visual impacts from transport and infrastructure can lead to negative impacts on population, landscape, cultural heritage, biodiversity and soil. Transport can also impact on water courses, for example, through pollution from construction activities or run off from roads.

The construction and operation of transport infrastructure can impact on the environment

Infrastructure works can increase competition for land and lead to increased pressures on existing land uses. There may also be environmental impacts at the local level from construction activity. At the same time, work to better integrate modes of transport across the system can provide a number of benefits, such as reduced congestion.

Transport is a means to access opportunities and services

How travel is undertaken and by what method is changing. The use of digital technology within the transport system is likely to increase, for example, in travel planning and in the development of autonomous and self-drive vehicles. As the transport system develops, there is a need to consider the differing travel needs of communities across Scotland and to take into account any barriers to using these technologies, for example, due to location, low income or disability. There may also be increased safety and

security risks to services and infrastructure as the transport system becomes increasingly digital.

Rising sea levels, changes in temperatures and extreme weather events as a result of climate change can affect transport operations. Road and rail networks may be more vulnerable to the impacts of a changing climate than air and water transport. Transport hubs and routes located around the coast are also likely to face significant risk from increased flooding and sea level rise. Adaptation is necessary to respond effectively to the predicted impacts of climate change.

Climate change can impact negatively on transport infrastructure

What are the likely environmental effects of the draft National Transport Strategy 2?

The draft Strategy has the potential to significantly reduce greenhouse gas emissions from the transport sector. For example, improved integration between spatial planning and transport considerations, encouraging a shift to more sustainable modes of transport, and support for new technologies are likely to lead to significant benefits for climatic factors. Benefits for climatic factors can arise where focus is given to improving the resilience of the transport system to the impacts of climate change. This is likely to become increasingly vital as the impacts of climate change intensify. Further benefits can arise where consideration is given to vulnerable areas such as coastal infrastructure at significant risk from flooding and rising sea levels.

Positive impacts are likely to arise for population and human health from increased accessibility to goods and services, such as employment and health care, particularly where current barriers to accessibility, such as location, income or age are reduced. However, consideration will need to be given to the potential for increased accessibility and movement of people and goods to lead to the uptake of less sustainable modes of travel. Support for the sustainable travel hierarchy and ensuring the transport system is developed in a way that supports sustainable modes of travel can help to avoid or reduce any potential negative impacts and can benefit the transport system overall.

The draft Strategy also has potential to lead to benefits for population and human health through improved air quality, particularly in urban environments with poor air quality. Action to improve air quality also has the potential to lead to reduced exposure to noise. Encouraging a shift from private vehicle use to active travel, such as walking and cycling, can lead to positive impacts for climatic factors and air quality, and support wider Scottish Government ambitions on good air quality and increasing the uptake of

physical activity with wider associated benefits for physical and mental health. The use of green infrastructure to support active travel can also increase adaptation to climate change and can support community cohesion.

The transport sector as a whole is likely to benefit from a more integrated, multimodal transport system that supports sustainable modes of travel. Reducing the demand for travel and improving efficiencies across the transport system should also help to reduce pressure on existing infrastructure. Additionally, positive impacts are expected to arise through the increased alignment between transport, energy and digital networks.

Where the draft Strategy leads to new infrastructure requirements, this could lead to indirect negative environmental impacts from construction and operation at a local level. Construction impacts may be short-term and be temporary, however impacts from land use change, such as the loss of soil and habitats, can be long-term and permanent. Development can also lead to negative visual impacts and can negatively affect landscape and the setting of sites of cultural importance. The likely significance of these impacts will be influenced by a number of factors, for example, infrastructure requirements may be greater for new technologies. The siting and design of individual projects can also effect the significance of potential impacts at the local level.

How can these environmental effects be effectively managed, mitigated or enhanced?

Once finalised the Strategy will set a Strategic Framework for transport and will influence other relevant plans and strategies, including Regional and Local Transport Strategies and Development Plans and the future Strategic Transport Projects Review. The findings in this Environmental Report can help to inform these plans and future related assessment work which could include further Strategic Environmental Assessments and/or project related assessments. In this way, there is opportunity to enhance the positive effects reported and address and manage negative effects, in particular potential regional or local impacts arising. For example, existing statutory and non-statutory measures are in place to assess the likely environmental impacts arising from development proposals at plan and project level and will be supplemented by statutory requirements such as Environmental Impact Assessment and Habitat Regulations Appraisal. Appropriate design and construction management measures at project level can also help minimise potential adverse impacts to nearby receptors. Any further, more detailed plans, programmes or strategies to give effect to the finalised Strategy would themselves require consideration under the Environmental Assessment (Scotland) Act 2005.

Positive effects can be maximised where greater consideration is given to the co-ordination of infrastructure works and planning, at both regional and local level. For example, giving consideration to cross-boundary implications. Further benefits could arise where a co-ordinated approach to the use of green infrastructure to support active travel is taken. Ensuring that infrastructure is maintained and fit for purpose can lead to benefits by prolonging its lifespan, and where possible, the efficient use of existing resources can reduce the use of further finite resources. Further, there is an opportunity

to ensure that infrastructure is future-proofed to accommodate emerging technologies or alternative sources of energy. As the risks from the impacts of climate change increase, measures to support adaptation across all networks are likely to be of particular benefit.

What monitoring is proposed?

A monitoring and evaluation framework will sit alongside the finalised Strategy. The framework will build on data gathered during the development of the draft Strategy and set out headline indicators, to help measure and report on performance. Performance will be reported annually at a national level, and where possible at regional and local level, and will include assessment against the National Performance Framework Outcomes.

In addition to the proposed monitoring and evaluation framework, there are a range of existing national and local programmes developed to monitor environmental status and assess performance against established environmental indicators which can also be used to help monitor the draft Strategy.

A comprehensive monitoring and evaluation framework is also being developed as part of the work in taking forward Scotland's second climate change adaptation programme due to be finalised later in 2019. This will provide an opportunity to identify whether resilience is increasing and ensure that reporting on progress and implementation is evidentially supported.

As greater details of possible actions emerge during the development of the delivery plan, further monitoring proposals may be developed.

What recommendations did the SEA make?

- It is recommended that further consideration is given when implementing the Strategy to opportunities for actions which support a net-zero economy, reflecting the strengthened ambition of climate change targets and in recognition of the global climate emergency.
- It is recommended that where there is potential for the increased uptake of less sustainable modes of transport to arise, this is considered against wider Scottish Government objectives to strengthen the ambition of climate change targets and improve air quality.
- It is recommended that opportunities for greater integration between spatial planning and transport continue to be explored at lower tiers of plan-making and in developing individual project proposals. For example, there has been a commitment to align National Planning Framework 4 with the development of Strategic Transport Projects Review 2 .
- It is recommended that consideration should be given to future proofing and re-use of infrastructure where practicable . Additionally, the use of green infrastructure to support active travel where possible is recommended.

- It is recommended that actions supporting improved air quality and reduced noise are focused on areas where poor air quality and exposure to noise is of known concern.

It is recommended that as the delivery plan is developed, consideration should be given to where further monitoring proposals may be required.

What are the reasonable alternatives to the draft Strategy?

The Environmental Assessment (Scotland) Act 2005 requires that reasonable alternatives to the plan, programme or strategy are assessed. A number of possible options were explored as the draft Strategy was prepared, however these are not considered to be “reasonable alternatives” to delivering the objectives of the Strategy.

The draft Strategy builds on and enhances the policy direction taken in the previous transport strategy published in 2006, which was itself subject to SEA. It sets out to balance social, environmental and economic considerations with the four Priorities viewed as interlinked to achieve the Vision. Within these Priorities, there is an emphasis on promoting equality and taking climate action. This approach supports the wider context in which the draft Strategy has been developed, including the Scottish Government’s ambitions on climate change. Given the wider policy context and legislative landscape within which transport sits, and the supporting role transport plays in the delivery of multiple outcomes, a “do nothing” scenario or a change in focus of the draft Strategy are not considered “reasonable alternatives” to delivering the main objectives of the strategy.

The draft high level Policies and supporting measures that sit within the draft Strategy have been developed through a process of stakeholder engagement. This process also included work to ensure there were no gaps between the policies proposed, the Priorities and Outcomes of the draft Strategy and wider Government policies. The policies can be viewed collectively as a package, and no single draft policy option, or an alternative approach to it, can be viewed as a reasonable means to deliver the overarching objectives of the Strategy.

The development of any subsequent more detailed policies or proposals to implement the Strategy will themselves be subject to consideration under the Environmental Assessment (Scotland) Act 2005.

Next Steps

Public views are now invited on the National Transport Strategy 2 – Draft for Consultation and on this Environmental Report. The consultation runs until **23 October 2019** and there are a number of ways that responses can be submitted. These are:

- Online via the Scottish Government website www.transport.gov.scot/NTS2
- In writing to: NTS 2 ER Consultation, 5th Floor, Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF
- By email to: NTS2@transport.gov.scot

Respondents may find the following questions helpful to provide a focus for their responses to this Environmental Report. Please note that responses do not need to be confined to these questions and more general comments on this Environmental Report and the draft Strategy are also invited.

Questions:

1. What are your views on the accuracy and scope of the information used to describe the SEA environmental baseline set out in the Environmental Report? (Please give details of additional relevant sources)
2. What are your views on the predicted environmental effects as set out in the Environmental Report?
3. What are your views on the proposals for mitigating and monitoring of the environmental effects set out in the Environmental Report?

How will responses be considered?

Following the consultation, a Post-Adoption Statement will be prepared. The Statement will reflect on the views provided on the findings of the assessment and the proposals in the draft Strategy and will explain how the comments received have been taken into account in finalising the Strategy.

1 Introduction

1.1 Background

1.1.1 The National Transport Strategy¹ (NTS), published in 2006 ('the 2006 NTS'), was subject to a refresh in 2016 ('the 2016 refresh'). That refresh considered the 2006 NTS against wider changes, including constitutional, political, economic, social and sectoral changes. The NTS refresh was published in January 2016 and concluded that the 2006 NTS Framework remained valid, however a fuller, collaborative review of the NTS was recommended.

1.1.2 Following an extensive review process led by Transport Scotland, the National Transport Strategy 2 – Draft for Consultation ('draft NTS2') has now been produced. The draft NTS2, sets out a 20 year Vision of "*We will have a sustainable, inclusive and accessible transport system, helping to deliver a healthier, fairer and more prosperous Scotland for communities, business and visitors*". This vision is underpinned by four Priorities, each with three associated Outcomes. These are:

- Promotes equality – will provide fair access to services we need, will be easy to use for all, and will be affordable for all.
- Takes climate action – will adapt to the effects of climate change, will help deliver our net-zero target, and will promote greener, cleaner choices.
- Helps our economy prosper – will get us where we need to get to, will be reliable, efficient and high quality and will use beneficial innovation.
- Improves our health and wellbeing – will be safe and secure for all, will enable us to make healthy travel choices and make our communities great places to live.

1.2 Strategic Environmental Assessment

1.2.1 Strategic Environmental Assessment (SEA) is the assessment of the likely significant environmental effects of a public plan, programme or strategy. The Scottish Government has undertaken a SEA of the draft NTS2 and its findings are set out in this Environmental Report. The SEA was undertaken in accordance with the Environmental Assessment (Scotland) Act 2005 (the '2005 Act') and in parallel with the development of the draft NTS2. This iterative process enabled the SEA to inform and influence the draft NTS2 by embedding the consideration of likely significant environmental impacts into the decision making process.

¹ Scottish Executive (2006) Scotland's National Transport Strategy [online] Available at: <https://www2.gov.scot/Resource/Doc/157751/0042649.pdf> (accessed 05/07/2019)

1.3 Report Structure

1.3.1 This Environmental Report is set out as follows:

Section 1	Provides an introduction to the NTS2 – Draft for Consultation and an overview of the SEA process
Section 2	Sets out information on the development of the draft NTS2.
Section 0	Provides an overview of the wider policy context and explores the relationships with current plans, programmes, and strategies at the EU, UK, and Scottish levels
Section 4	Sets out the proposed approach to undertaking the SEA
Section 5	Provides an overview of the relevant environmental objectives and an indication of the environmental information used to inform the assessment process
Section 6	Sets out the assessment findings, conclusions and recommendations
Section 7	Proposals for monitoring
Section 8	Next steps
Appendix <u>A</u>	Contains an abbreviations list for this Report.
Appendix <u>B</u>	Contains a review of relevant plans, programmes and strategies
Appendix <u>C</u>	Relevant Environmental Protection Objectives and Environmental Baseline Information
Appendix D	Assessment of High Level Policies

2 National Transport Strategy 2 – Draft for Consultation

2.1 Review of the National Transport Strategy

- 2.1.1 The 2006 NTS set a long-term vision for transport policies and a framework for enhancing the transport system in Scotland. Following the 2016 refresh², it was recommended that a full and comprehensive review of the NTS be undertaken.
- 2.1.2 The review of the NTS built on the 2006 Strategy, and its subsequent refresh in 2016, with the aim of developing Scotland's second NTS Strategy (the draft NTS2). The review was aligned with the emerging policy and legislative landscape in Scotland, and considered transport connectivity within Scotland, with the rest of the UK, and internationally. The review process also sought to identify opportunities and to explore ways to address the strategic challenges facing the transport system over the next twenty years, whilst considering the consistent or different needs between rural, coastal, island, city, and urban areas.
- 2.1.3 A collaborative approach was taken to the review, including an extensive programme of engagement built around three core strands of: 1) collaborative working with partners; 2) developing a robust evidence base; and 3) engaging with stakeholders and citizens across Scotland. The review process also included the establishment of a number of thematic working groups under the themes of:
- Enabling Economic Growth;
 - Tackling Inequality,
 - Greener and Healthier; and
 - Delivering Safe and Resilient Transport.
- 2.1.4 Additionally, a Roles and Responsibilities Group was established to consider transport governance. These working groups brought together key stakeholders from across government (at local and national levels), transport providers, third sector organisations, campaigning and special interest groups and transport user groups.
- 2.1.5 Early engagement with stakeholders commenced in December 2016 through an online survey³. The analysis⁴ of survey responses identified a number of key

² Transport Scotland (2016) National Transport Strategy Refresh 2016 [online] Available at: <https://www.transport.gov.scot/media/10310/transport-scotland-national-transport-strategy-january-2016-final-online.pdf> (accessed 05/07/2019)

³ Transport Scotland (undated) Review of National Transport Strategy – Purpose of the National Transport Strategy review [online] Available at: <https://www.transport.gov.scot/our-approach/strategy/national-transport-strategy/#37277> (accessed 04/07/2019)

⁴ Transport Scotland (2017) National Transport Strategy Early Engagement Consultation Survey – Analysis of Responses to the Public Consultation Exercise [online] Available at:

themes that relate to the environment, including on the importance of reducing emissions and the promotion of active travel. In July 2017, Transport Scotland also issued a “Call for Evidence”⁵ to support the policy making process and the “Call for Evidence Summary Report”⁶ was published in January 2018. The Call for Evidence invited submissions from all sectors and a wide range of interested parties, including the academic, public, private, and third sectors. A programme of engagement events was also held across Scotland to ensure that transport users were provided an opportunity to feed into the review.

- 2.1.6 A key function of the review has been to establish clearly defined strategic transport objectives, to enable a subsequent and full update to the Strategic Transport Projects Review (STPR)⁷ following the adoption of the finalised NTS2. The NTS2 will not however set a funding framework or identify specific infrastructure priorities.

<https://www.transport.gov.scot/publication/national-transport-strategy-early-engagement-consultation-survey/> (accessed 04/07/2019)

⁵ Transport Scotland (2017) National Transport Strategy – Call for evidence [online] Available at: <https://www.transport.gov.scot/consultation/national-transport-strategy-call-for-evidence/> (accessed 04/07/2019)

⁶ Transport Scotland (2018) Call for Evidence: Summary Report [online] Available at: <https://www.transport.gov.scot/media/41506/call-for-evidence-summary-report.pdf> (accessed 04/07/2019)

⁷ Transport Scotland (2008) Strategic Transport Projects Review [online] Available at: <https://www.transport.gov.scot/our-approach/strategy/strategic-transport-projects-review/#> (accessed 04/07/2019)

2.2 The Draft NTS2

2.2.1 The draft NTS2 includes a Strategic Framework (Figure 2.1) for transport in Scotland over the next twenty years. The draft Strategy sets out a Vision of:

‘We will have a sustainable, inclusive and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors’

2.2.2 The Vision is underpinned by four Priorities and under each Priority, there are three associated Outcomes. The draft NTS2 sets out to balance social, economic and environmental considerations, with the four Priorities viewed as interlinked to deliver the Vision. Within these priorities, there is an emphasis on promoting equality and taking climate action.



Figure 2.1 Draft NTS2 Vision, Priorities and Outcomes

2.2.3 The Vision is underpinned by four Priorities, each with three associated Outcomes. These are:

Promotes Equality

2.2.4 **Everyone in Scotland will share in the benefits of a modern and accessible transport system.** Transport plays an important part in delivering the fully inclusive society we want – outcomes are as important as opportunities. While we promote equality, our actions will simultaneously tackle inequalities and help reduce poverty, in particular child poverty. Our transport system:

- *Will provide fair access to services we need:* we have a duty to advance equality of opportunity and outcome, including the protected characteristics of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex and sexual orientation. We will ensure that our most disadvantaged communities and individuals have fair access to the transport services they need. The transport system will enable everyone to access a wide range of facilities and services.
- *Will be easy to use for all:* people have different needs and capabilities. Our transport system will recognise these and work to ensure that everyone can use the system with as little effort as possible.
- *Will be affordable for all:* people have different incomes and our transport system will not exclude people from mobility by making it unaffordable. We will target action to deliver the Strategy towards those needing most help.

Takes climate action

2.2.5 People will be able to make travel choices that minimise the long-term impacts on our climate and wellbeing of future generations. We face a global climate emergency. Scotland must transition to a low carbon economy for the benefit of our environment, our people and our future prosperity. Our transport system:

- *Will adapt to the effects of climate change:* in Scotland we are already experiencing the impacts of climate change and we will adapt our transport system to remain resilient and reduce the harmful effects on future generations.
- *Will help deliver our net-zero target:* the Climate Change Bill, currently before the Scottish Parliament, includes an increased ambition to reduce greenhouse gas emissions, with a net-zero emissions target for 2045. Transport is currently the largest contributor to Scottish emissions, this will be tackled through a range of actions including an ambition to phase out the need for new petrol and diesel cars and vans by 2032.
- *Will promote greener, cleaner choices:* over the next 20 years, Scotland will see a continued transformation in transport where sustainable travel

options are people's first choice. We will reinforce the Sustainable Travel Hierarchy to promote and design our transport system so that walking, cycling and public and shared transport are promoted and take precedence ahead of private car use.

Helps our Economy Prosper

2.2.6 Scotland will have a transport system that will help deliver sustainable, inclusive economic growth enabling the whole country to flourish. Transport plays a key role in delivering Scotland's Economic Strategy. It enables firms to have efficient access to suppliers and customers. It allows people fair and affordable access to reach the jobs where they can be most productive and boost household incomes through improving access to employment. Our transport system:

- *Will get us where we need to get to:* network and services will be integrated effectively with spatial and land use planning and economic development, and adapt to changing requirements of people, businesses and visitors.
- *Will be reliable, efficient and high quality:* everyone needs to be confident about how long a journey will take, and that it will be as simple and comfortable to make. We will be able to plan our lives, to get to work on time, access education and training and to deliver goods efficiently and keep businesses running smoothly.
- *Will use beneficial innovation:* new products, services and technologies are developing fast and altering our lives and our places dramatically. We will seize opportunities to improve our transport system and realise economic ambitions.

Improves our Health and Wellbeing

2.2.7 **Scotland's transport system will be safe and enable a healthy and fit nation.** Our transport system needs to be safe and secure and give users trust and confidence that they will reach their destinations without threat. It should also allow people to make active travel choices to improve their health and wellbeing and seek to reduce health inequalities. It should support our Public Health Priorities . Our transport system:

- *Will be safe and secure for all:* the prevention and reduction of incidents on the transport system will continue to be a priority.
- *Will enable us to make healthy travel choices:* active modes will be a preferred method of travel and have a significant positive effect on individual health and wellbeing. This will reduce the social and economic impact of public health problems such as mental health, obesity, type-2 diabetes, and cardio-vascular diseases.

- *Will help make our communities great places to live:* cleaner and greener places and networks will encourage walking and cycling. This will deliver more social interaction, support local businesses and services and create vibrant communities.

2.3 High Level Policies and Enablers

2.3.1 The draft NTS2 also sets out a number of draft High Level Policies and Enablers developed to address the current and emerging challenges in order to achieve the draft NTS2 Vision and Outcomes. Table 2.1 below sets out these draft policies and enablers.

Table 2.1 High Level Policies and Policy Enablers

Policy	Enabler
Continue to improve the reliability, safety and resilience of our transport system	Increase safety of the transport system and meet casualty reduction targets
	Increase resilience of Scotland’s transport system from disruption and promote a culture of shared responsibility
	Implement measures that will improve perceived and actual security of Scotland’s transport system
	Increase the use of asset management across the transport system
Embed the implications for transport in spatial planning and land use decision making	Ensure greater integration between transport, spatial planning, and how land is used
	Ensure that transport assets and services adopt the Place Principle
	Ensure the transport system is embedded in regional decision making
Integrate policies and infrastructure investment across the transport, energy and digital system	Ensure that local, national and regional policies offer an integrated approach across all aspects of infrastructure investment including the transport, digital, and energy system
Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally	Optimise accessibility and connectivity within business-business and business-consumer markets by all modes of transport
	Ensure gateways to and from domestic and international markets are resilient and integrated into the wider transport networks to encourage people to live, study, visit and invest in Scotland

	Support measures to improve sustainable surface access to Scotland's airports and sea ports
Provide a high-quality transport system that integrates Scotland and recognises our different geographic needs	Ensure that infrastructure hubs and links form an accessible integrated system that improves the end-to-end journey for people and freight
	Minimise the connectivity and cost disadvantages faced by island communities and those in remote and rural areas
	Safeguard the provision of lifeline transport services and connections
Improve the quality and availability of information to enable better transport choices	Support improvements and innovations that enable all to make informed travel choices
	Support seamless journeys providing the necessary infrastructure, information and interchange facilities to connect all modes of transport
	Ensure that appropriate real-time information is provided to allow all transport users to respond to extreme weather and incidents
Embrace transport innovation that positively impacts on our society, environment and economy	Support Scotland to become a market leader in the development and early adoption of beneficial transport innovations
Improve and enable the efficient movement of people and goods on our transport system	Ensure the Scottish transport system efficiently manages needs of people and freight
	Promote the use of space-efficient transport
Provide a transport system that is equally accessible for all* * all includes everyone across Scotland but particularly those with protected characteristics of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex and sexual orientation and people living in poverty.	Ensure transport in Scotland is accessible for all
	Identify and remove barriers to public transport connectivity and accessibility within Scotland
	Reduce the negative impacts which transport has on the safety, health and wellbeing of people
	Continue to support the implementation of the recommendations from, and the development of, Scotland's Accessible Travel Framework
Improve access to healthcare, employment, education and training opportunities to	Ensure sustainable labour market accessibility to employment locations
	Ensure sustainable access to education and training facilities

generate inclusive sustainable economic growth	Improve sustainable access to healthcare facilities for staff, patients and visitors
Support the transport industry in meeting current and future employment and skills needs	To meet the changing employment and skills demands of the transport industry and upskill workers
	Support initiatives that promote the attraction and retention of an appropriately skilled workforce across the transport sector
Provide a transport system which promotes and facilitates travel choices which help to improve people's health and wellbeing	Promote and facilitate active travel choices across mainland Scotland and islands
	Integrate active travel options with public transport services
	Support transport's role in improving peoples' health and wellbeing
Reduce the transport sector's emissions to support our national objectives on air quality and climate change	Facilitate a shift to more sustainable modes of transport for people and commercial transport
	Reduce emissions generated by the transport system to improve air quality
	Reduce emissions generated by the transport system to mitigate climate change
	Support management of demand to encourage more sustainable transport choices
Plan our transport system to cope with the effects of climate change	Increase resilience of Scotland's transport system to climate change related disruption
	Ensure the transport system adapts to the projected climate change impacts

3 Relationship with other Plans, Programmes, and Strategies and Environmental Objectives

3.1 Introduction

- 3.1.1 The 2005 Act requires the Environmental Report to outline the relationships between the draft NTS2 and other relevant plans, programmes, and strategies. It is also a requirement of the 2005 Act that relevant environmental protection objectives at the international, European or national level be identified.
- 3.1.2 The following sections of this report provide an overview of the policy context and the overarching objectives considered most relevant to the draft NTS2.
- 3.1.3 A wider overview of related plans, programmes, and strategies and their objectives is set out in Appendix B of this report. This has been developed to ensure that their objectives and ambitions are set out early in the assessment to ensure they are appropriately reflected in the SEA process.

3.2 The Policy Context

- 3.2.1 Scotland's Economic Strategy⁸ sets out an overarching framework for a more productive, cohesive and fairer Scotland. The Economic Strategy forms the strategic plan for existing and all future Scottish Government policy. In addition to setting goals for sustainable economic growth, the Economic Strategy also sets out ambitions for investment in Scotland's infrastructure. This includes to prioritise investment to ensure that Scotland protects and nurtures its natural resources and captures the opportunities offered by the transition to a more resource efficient, lower carbon economy.
- 3.2.2 The above ambitions reflect those set out in Delivering for today, investing for tomorrow: the Government's programme for Scotland 2018-2019⁹ including the importance of transport investment in enabling sustainable economic growth. The Programme for Scotland sets out a number of transport related actions, including investment in new ultra low emission vehicles and charging points to build on the ambition set out the previous year to phase out the need for new petrol and diesel cars and vans by 2032. The introduction of a Transport (Scotland) Bill¹⁰ is also noted in Delivering for today, investing in tomorrow. It is understood that the Bill will enable the creation and enforcement of low emissions zones.

⁸ Scottish Government (2015) Scotland's Economic Strategy [online] Available at: <https://beta.gov.scot/publications/scotlands-economic-strategy/> (accessed 04/07/2019)

⁹ Scottish Government (2018) Delivering for today, investing for tomorrow: the Government's programme for Scotland 2018-2019 [online] Available at: <https://www.gov.scot/publications/delivering-today-investing-tomorrow-governments-programme-scotland-2018-19/> (accessed 04/07/2019)

¹⁰ Transport (Scotland) Bill (introduced 2018) [online] Available at: <https://www.parliament.scot/parliamentarybusiness/CurrentCommittees/108853.aspx> (accessed 04/07/2019)

- 3.2.3 The Infrastructure Investment Plan 2015¹¹ set out priorities for investment and a long term strategy for the development of public infrastructure in Scotland. It outlined why and how the Scottish Government invests, and what it intends to invest in up to 2040 by sector. It draws on the strategic direction for our infrastructure investment decisions set out in the Programme for Government and Scotland's Economic Strategy and sets out four guiding principles to assist with decisions on the prioritisation of projects: delivering sustainable economic growth through increasing competitiveness and tackling inequality; managing the transition to a more resource efficient, lower carbon economy; supporting delivery of efficient and high quality public services; and supporting employment and opportunity across Scotland.
- 3.2.4 The Climate Change (Scotland) Act 2009 (the 2009 Act)¹² set the statutory framework for GHG emissions reductions in Scotland, with targets for reductions of 80% by 2050, with an interim 2020 target of 42%. These targets are more ambitious than those for the UK as a whole, or the EU.
- 3.2.5 In March 2017, the Committee on Climate Change (CCC) published their advice on the potential level of ambition for new Scottish climate change targets¹³. This advice informed the development of the 'Consultation on proposals for a new Climate Change Bill¹⁴'. This Consultation Paper set out a range of proposals for updating the 2009 Act, including increasing the level of ambition of the 2050 target to a reduction in greenhouse gas emissions of at least 90% from the baseline. The Climate Change (Emissions Reduction Targets) (Scotland) Bill¹⁵ was introduced into Parliament on 23 May 2018 with headline targets for reducing all greenhouse gases from baselines of 56% reduction for 2020, 66% for 2030, 78% for 2040, and 90% for 2050. Further advice was published by the CCC on 2 May 2019¹⁶. This recommended that the Scottish Government could achieve net-zero emissions of all greenhouse gases by 2045, if the UK has a target of net-zero emissions by 2050. In response, the Scottish Government put forward amendments to the Climate Change Bill to update the Bill targets to 70% by 2030, 90% by 2040 and net-zero emissions by 2045. These were accepted by the Scottish Parliament's Environment, Climate



¹¹ Scottish Government (2015) Infrastructure Investment Plan 2015 [online] Available at: <https://beta.gov.scot/publications/infrastructure-investment-plan-2015/> (accessed 04/07/2019)

¹² Scottish Government (2012) Climate Change (Scotland) Act 2009 [online] Available at: <http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/climatechangeact> (accessed 04/07/2019)

¹³ Committee on Climate Change (2017) Advice on the new Scottish Climate Change Bill [online] Available at: <https://www.theccc.org.uk/publication/advice-on-the-new-scottish-climate-change-bill/> (accessed 04/07/2019)

¹⁴ Scottish Government (2017) Climate Change Bill: Consultation Paper [online] Available at: <https://www.gov.scot/publications/climate-change-bill-consultation-paper/> (accessed 04/07/2019)

¹⁵ The Scottish Parliament (2018) Climate Change (Emissions Reduction Targets) (Scotland) Bill [online] Available at: <https://www.parliament.scot/parliamentarybusiness/Bills/108483.aspx> (accessed 04/07/2019)

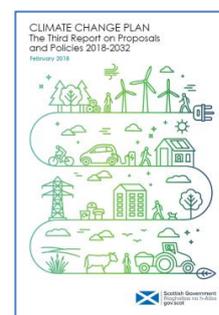
¹⁶ Committee on Climate Change (2019) Net Zero The UK's Contribution to stopping global warming May 2019 [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf> (accessed 04/07/2019)

Change and Land Reform Committee at Stage 2 reading of the Bill on 18 June. The Bill also includes a requirement for Ministers to seek regular advice as to whether the targets are still appropriate.

- 3.2.6 Developed in 2009, the Climate Change Delivery Plan¹⁷ set out the high level measures required in each sector to meet Scotland's statutory climate change targets, looking forward to 2020 and beyond. This has been taken forward following the 2009 Act through the development of a series of Reports on Policies and Proposals (RPPs). RPP¹⁸ and RPP¹⁹ collated the sectoral policies and proposals for the period 2010 to 2027 to meet the statutory targets set by the 2009 Act. These included ambitions to decarbonise transport and reduce energy use.



- 3.2.7 The Climate Change Plan: the Third Report on Policies and Proposals 2018-2032²⁰, published on 28 February 2018, builds on the previous RPP reports, takes forward these ambitions and explores opportunities to further reduce Scotland's greenhouse gas emissions between now and 2032. The Climate Change Plan sets out Scotland's ambitious approach to mitigating the effects of climate change across a range of sectors, including transport and sets out the path to a low carbon economy. The Scottish Government has committed to updating the Climate Change Plan within 6 months of the Climate Change Bill receiving Royal Assent. The Scottish Energy Strategy: The future of energy in Scotland²¹ was informed by the development of the Climate Change Plan.



- 3.2.8 Section 53 of the 2009 Act placed a duty on Ministers to produce an adaptation programme to address the risks identified for Scotland under Section 56 of the 2008 Act. Scotland's first statutory Climate Change Adaption Programme to address the risks in the 2012 UK Climate Change Risk Assessment²². was

¹⁷ Scottish Government (2009) Climate Change Delivery Plan: Meeting Scotland's Statutory Climate Change Targets [online] Available at: <http://www.gov.scot/Resource/Doc/276273/0082934.pdf> (accessed 04/07/2019)

¹⁸ Scottish Government (2011) Low Carbon Scotland - Meeting the Emissions Reduction Targets 2010-2022 [online] Available at: <http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/lowcarbon/rpp> (04/07/2019)

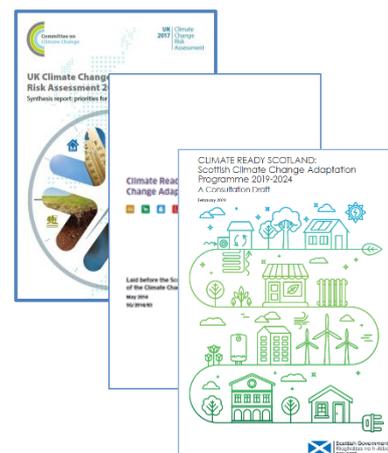
¹⁹ ibid

²⁰ Scottish Government (2018) Climate Change Plan: the Third Report on Proposals and Policies 2018-2032 (RPP3) [online] Available at: <https://beta.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/> (accessed 04/07/2019)

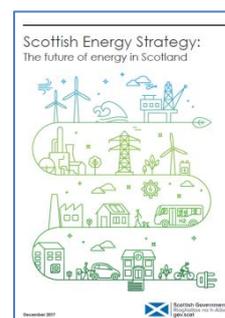
²¹ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://beta.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 04/07/2019)

²² Defra (2012) UK Climate Change Risk Assessment: Government report [online] Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report> (accessed 04/07/2019)

published in 2014²³. The Second Scottish Climate Change Adaption Programme 2019-2024: A Consultation Draft²⁴, builds on the work of the first Programme to address the impacts identified for Scotland by the 2017 UK Climate Change Risk Assessment²⁵ as well as the Evidence Report Summary for Scotland²⁶. The finalised second adaptation programme is due to be published later in 2019. Both Programmes note that adaptation and resilience of strategic transport networks to cope with the effects of climate change is vital to ensure the continued health of the Scottish economy and the safety and well-being of people and communities accessing lifeline services.



- 3.2.9 In November 2016 the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement came into force²⁷. The Agreement sets out goals to limit global warming to well below 2°C, and to pursue further efforts to limit it to 1.5°C. The Agreement also covers a range of other issues such as mitigation through reducing emissions, adaptation and loss and damage.
- 3.2.10 The Scottish Energy Strategy: The future of energy in Scotland draws together existing Scottish energy policies and new ambitions within a single overarching Strategy, and sets a long term vision for the energy system in Scotland. This vision is guided by three core principles: A Whole System View; An Inclusive Energy Transition; and A Smarter Model of Local Energy Efficiency. The Strategy notes that future transport needs will be met substantially through electricity or alternative fuels, presenting new infrastructure challenges and new patterns of behaviour for users. It also sets out a new 2030 “all-energy” target for the equivalent of 50% of Scotland’s heat, transport and electricity consumption to be supplied from renewable sources.



²³ Scottish Government (2014) Climate Ready Scotland: Scottish Climate Change Adaptation Programme [online] Available at: <http://www.scotland.gov.uk/Publications/2014/05/4669> (accessed 04/07/2019)

²⁴ Scottish Government (2019) Climate Ready Scotland: Scottish climate change adaption programme 2019-2024: A consultative draft [online] Available at: <https://www.gov.scot/publications/climate-ready-scotland-scottish-climate-change-adaptation-programme-2019-2024-consultation-draft/pages/2/> (accessed 04/07/2019)

²⁵ Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 05/07/2019)

²⁶ Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report - Summary for Scotland [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Scotland-National-Summary.pdf> (accessed 05/07/2019)

²⁷ UNFCCC (2016) The Paris Agreement [online] Available at: http://unfccc.int/paris_agreement/items/9485.php (accessed 04/07/2019)

3.2.11 National Planning Framework (NPF3)²⁸ and Scottish Planning Policy (SPP)²⁹ set out Scotland’s ambitions as: a successful, sustainable place; a low carbon place; a natural, resilient place; and a connected place. NPF3, which is the spatial expression of Government’s Economic Strategy, sets out a long-term vision for development and investment across Scotland over the next 20 to 30 years. Within “A Connected Place” it is recognised that “Scotland’s location and unique geography mean that connections, within our country and with the rest of the world, are crucial”. Consideration is given to the diverse and differing needs of urban, rural, coastal and island locations.



3.2.12 NPF3 and SPP set out the key role that planning plays in delivering on the commitments set out in the Scottish Government’s low carbon ambitions, supporting a transition to a low carbon economy and highlighting the role of planning in protecting and making efficient use of Scotland’s existing resources and environmental assets.

3.2.13 The Scottish Government introduced the Planning (Scotland) Bill³⁰ into the Scottish Parliament on 4 December 2017. The Bill set out proposed high level changes to the overall framework under which planning operates. The Bill passed Stage 3 on 20 June 2019 and is currently awaiting Royal Assent. The detail of how provisions would work in practice will be contained within secondary legislation and guidance and Scottish Ministers are now commencing work to prepare the next NPF (NPF4). The Bill set out several changes to the scope and status of the NPF and SPP, including that they will be integrated, have statutory status as part of the development plan. The development of NPF4 will be aligned with work focusing on transport issues, including the development of the second STPR (STPR2).

3.2.14 Scottish Ministers are required to produce a Land Use Strategy that is revised every five years or less setting out policies and proposals for meeting Minister’s objectives for sustainable land use. Getting the best from our land: A Land Use Strategy for Scotland 2016-2021³¹ was published in 2016, and continued the policy direction set out in the first Strategy. The significance of the interaction between how land use used and transport is recognised in SPP.

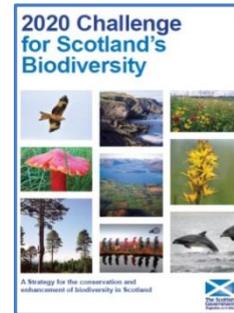
²⁸ Scottish Government (2014) Ambition, Opportunity, Place – Scotland’s Third National Planning Framework [online] Available at: <https://beta.gov.scot/publications/national-planning-framework-3/> (accessed 05/07/2019)

²⁹ Scottish Government (2014) Scottish Planning Policy [online] Available at: <https://beta.gov.scot/publications/scottish-planning-policy/> (accessed 04/07/2019)

³⁰ The Scottish Parliament (2017) Planning (Scotland) Bill [online] Available at: <https://www.parliament.scot/parliamentarybusiness/Bills/106768.aspx> (accessed 04/07/2019)

³¹ Scottish Government (2016) Getting the Best from our Land: A Land Use Strategy for Scotland 2016 – 2021 [online] Available at: <http://www.gov.scot/Topics/Environment/Countryside/Landusestrategy> (accessed 05/07/2019)

3.2.15 The Scottish Government’s 2020 Challenge for Scotland’s Biodiversity³² is Scotland’s response to the 20 Aichi Targets set by the United Nations Convention on Biological Diversity³³, as well as the European Union’s Biodiversity Strategy for 2020³⁴. The 2020 Challenge supplements the 2004 Scottish Biodiversity Strategy³⁵ “It’s in Your Hands”. The provision of good quality green space, parks and paths, and the multiple benefits this can have for biodiversity and quality of life for the people of Scotland is noted in the 2020 Challenge, the aims of which are to:



- Protect and restore biodiversity on land and in our seas, and to support healthier ecosystems;
- Connect people with the natural world, for their health and wellbeing and to involve them more in the decisions about their environment; and
- Maximise the benefit for Scotland of a diverse natural environment and the services it provides, contributing to sustainable economic growth.

3.2.16 Realising Scotland’s full potential in a digital world: A Digital Strategy for Scotland³⁶ sets out a vision for Scotland as a vibrant, inclusive, open and outward looking digital nation. The role of digital connectivity and transport services is recognised and the Strategy sets out an aim to develop intelligent transport systems (ITS) which will increase capacity and support the further development of smart integrated ticketing across buses, trains, trams and ferries throughout the country.

3.2.17 Cleaner Air for Scotland – The Road to a Healthier Future³⁷ draws together Scottish Government policies which impact on air quality in a single framework, and sets out a series of actions for delivering further improvements to air quality. It sets out the multiple benefits of reducing air pollution, in addition to action that can be taken in the transport sector to reduce emissions, such as supporting the role of low and zero emissions fuels and technologies, promoting active



³² Scottish Government (2013) 2020 Challenge for Scotland’s Biodiversity – A Strategy for the conservation and enhancement of biodiversity in Scotland [online] Available at: <https://www.gov.scot/publications/2020-challenge-scotlands-biodiversity-strategy-conservation-enhancement-biodiversity-scotland/> (accessed 05/07/2019)

³³ United Nations Convention on Biological Diversity [undated] Aichi Biodiversity Targets. Available at: <https://www.cbd.int/sp/targets/> (accessed 05/07/2019)

³⁴ European Commission (2011) Our life insurance, our natural capital: an EU biodiversity strategy to 2020 [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:52011DC0244> (accessed 05/07/2019)

³⁵ Scottish Government (2004) Scotland’s Biodiversity: It’s In Your Hands – A strategy for the conservation and enhancement of biodiversity in Scotland [online] Available at: <https://www2.gov.scot/Publications/2004/05/19366/37239> (accessed 05/07/2019)

³⁶ Scottish Government (2017) Realising Scotland’s full potential in a digital world: a digital strategy for Scotland [online] Available at: <https://beta.gov.scot/publications/realising-scotlands-full-potential-digital-world-digital-strategy-scotland/> (accessed 05/07/2019)

³⁷ Scottish Government (2015) Cleaner air for Scotland: the road to a healthier future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

travel. Actions include the development of a National Low Emissions Framework and creation of Low Emissions Zones. An independent review of the air quality strategy is currently being undertaken³⁸ with a view to assessing progress on implementation and identifying priorities for further action. The review will be completed later in 2019.

- 3.2.18 A Healthier Future: Scotland's Diet and Healthy Weight Delivery Plan was published in July 2018³⁹. The document focuses primarily on diet and healthy weight interventions but also notes the importance of being physically active and references other relevant policy areas such as those to promote active travel. This includes reference to A More Active Scotland: Scotland's Physical Activity Delivery Plan⁴⁰ which sets out a commitment to increase active travel and recreational walking through a number of initiatives, such as using the Smarter Choices Smarter Places⁴¹ and other behaviour change programmes, to encourage more journeys to be undertaken foot and pedal cycle. A commitment to double investment in active travel infrastructure in 2018-2019 from £40 million to £80 million, is also set out.
- 3.2.19 A Connected Scotland: our strategy for tackling social isolation and loneliness and building stronger social connections⁴², was published December 2018. The importance of the connection between transport provision and social connection is noted in the Strategy. The strategy also notes that a lack of transportation options and access barriers can contribute to social isolation and loneliness, particularly among older and disabled people and rural communities. Priorities include supporting infrastructure, including the transport network, to foster connections and create opportunities for people to connect through the promotion of physical activity, including active travel,
- 3.2.20 Developing an Environment Strategy for Scotland: Discussion Paper⁴³ was open to public consultation from 29 June to 24 August 2018, taking forward the commitment in the 2017/18 Programme for Government⁴⁴ to develop a strategic approach on environmental policy and enhance our environment, safeguard

³⁸ Scottish Government (2018) Tackling air pollution: Review of Clean Air for Scotland announced [online] Available at: <https://www.gov.scot/news/tackling-air-pollution/> (accessed 05/07/2019)

³⁹ Scottish Government (2018) A healthier future: Scotland's diet and healthy weight delivery plan [online] Available at: <https://www.gov.scot/publications/healthier-future-scotlands-diet-healthy-weight-delivery-plan/pages/3/> (accessed 05/07/2019)

⁴⁰ Scottish Government (2018) Active Scotland Delivery Plan [online] Available at: <https://www.gov.scot/publications/active-scotland-delivery-plan/pages/3/> (accessed 05/07/2019)

⁴¹ Transport Scotland [undated] Smarter Choices, Smarter Places [online] Available at: <https://www.transport.gov.scot/our-approach/active-travel/smarter-choices-smarter-places/#> (accessed 05/07/2019)

⁴² Scottish Government (2018) A Connected Scotland: our strategy for tackling social isolation and loneliness and building stronger social communities [online] Available at: <https://www.gov.scot/publications/connected-scotland-strategy-tackling-social-isolation-loneliness-building-stronger-social-connections/> (accessed 05/07/2019)

⁴³ Scottish Government (2018) Developing an environmental strategy for Scotland: discussion paper [online] Available at: <https://www.gov.scot/publications/developing-environment-strategy-scotland-discussion-paper/> (accessed 05/07/2019)

⁴⁴ Scottish Government (2017) A nation with ambition: the Government's Programme for Scotland 2017-2018 [online] Available at: <https://www.gov.scot/publications/nation-ambition-governments-programme-scotland-2017-18/> (accessed 05/07/2019)

natural capital, and continue Scotland’s leading role in addressing environmental challenges. Its draft Vision of “one planet prosperity” is underpinned by seven draft outcomes, including ‘Everyone can access, enjoy and connect with nature’. An analysis of responses⁴⁵ was published in February 2019 and Scottish Government will continue to work with stakeholders such as public bodies to take forward the development of an Environment Strategy for Scotland.

⁴⁵ Scottish Government (2019) Developing an environment strategy for Scotland: analysis of responses to online discussion [online] Available at: <https://www.gov.scot/publications/analysis-report-responses-online-discussion-developing-environment-strategy-scotland/> (accessed 05/07/2019)

4 The Approach to the Assessment

4.1 Scoping the SEA

4.1.1 The draft NTS2 is considered to fall under Section 5(3) of the 2005 Act and as such, it is considered that a SEA is required. The SEA process began with the submission of a Scoping Report to the SEA Gateway in March 2018. The Scoping Report set out initial information on the likelihood of significant environmental effects from the draft NTS2 and the proposed evidence that would be used to inform the assessment process. Given the wide scope and high level nature of the draft NTS2, it was proposed at scoping stage that all the SEA topics, required to be considered by the 2005 Act, should be scoped into the SEA process. These are set out in Table 4.1.

Table 4.1 Proposed Scoping in/out of SEA topics

SEA topic	Scoped In
Biodiversity, flora and fauna	✓
Population and human health (including noise and vibration)	✓
Soil	✓
Water	✓
Air	✓
Climatic factors	✓
Cultural heritage and the historic environment	✓
Landscape and visual impacts	✓
Material assets	✓

Relationship between this SEA and Previous Assessments

4.1.2 A considerable amount of work has already been undertaken to explore the environmental effects of the policies, programmes, and strategies of relevance when considering the draft NTS2. In particular, the SEAs of the 2006 National Transport Strategy⁴⁶, and the SEAs of the draft Climate Change Plan: the draft Third Report on Policies and Proposals 2017-2032 and the draft Scottish Energy Strategy: The Future of Energy in Scotland⁴⁷ and 2008 Scottish Climate Change Bill⁴⁸. Also of relevance is the SEA work undertaken on other relevant

⁴⁶ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

⁴⁷ Scottish Government (2017) Draft Climate Change and Energy Strategies: joint strategic environmental assessments [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

⁴⁸ Scottish Government (2008) Strategic Environmental Assessment (SEA) of the Scottish Climate Change Bill: Consultation Proposals: Environmental Report [online] Available at: <http://www.gov.scot/Publications/2008/12/03145652/0> (accessed 05/07/2019)

plans, programmes, and strategies such as Places, People and Planning – Position Statement⁴⁹, NPF3 and SPP, Getting the best from our land: Scotland’s Land Use Strategy 2016-2021 and the Climate Ready Scotland: Scottish Climate Change Adaptation Programme. The approach taken during this SEA and the findings, as reported, build on, rather than duplicate, existing sources of information and the impacts identified previously.

4.2 Assessment Methodology

4.2.1 The assessment of the draft NTS2 was undertaken in three stages. This is illustrated in Figure 4.1.

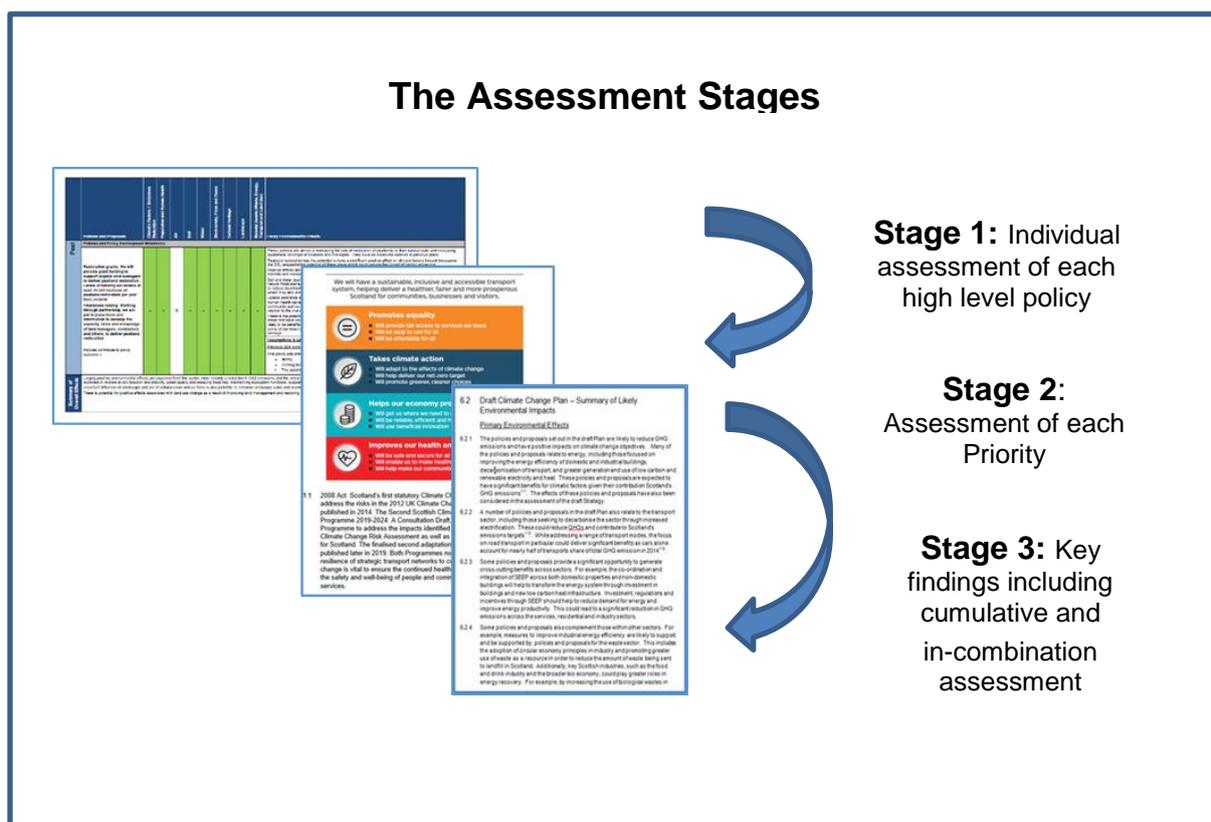


Figure 4.1 The Assessment Stages

4.2.2 The first stage considered the environmental impacts that could arise from the high level policies. The potential impacts from each of the 14 High Level Policies were considered against the SEA topics scoped into the assessment. Recommendations were also developed, based on the findings of the assessment, and these are presented alongside the findings of this first stage of the assessment process in Appendix D.

⁴⁹ Scottish Government (2017) Review of the Scottish Planning Systems – Planning Bill – Strategic Environmental Assessment Environmental Report [online] Available at: <http://www.gov.scot/Publications/2017/06/1061/downloads> (accessed 05/07/2019)

- 4.2.3 The second stage of the assessment expanded on Stage one to consider the potential impacts across the four Priorities of: *Promotes Equality, Takes Climate Action, Helps our Economy Prosper and Improves our Health and Wellbeing*. The assessment at this stage also sought to identify the environmental challenges and opportunities that could arise from Scotland's transport sector in relation to these. For example, steps to mitigate GHG emissions can support improved air quality, with further benefits to human health. Furthermore, this is likely to benefit *Takes Climate Action* and *Improves our Health and Wellbeing*. Conversely, any increase in less sustainable modes of transport is likely to present a challenge in terms of *Takes Climate Action*. The findings of this stage of the assessment are presented in narrative form within Section 6 of this report.
- 4.2.4 The same approach was applied to the third stage of assessment, which explored the potential for cumulative and in-combination effects of the draft NTS2 in the context of the wide range of objectives, ambitions and requirements set out in wider policy. The findings from the third stage of the assessment are written in a narrative format (see Section 6), and include the consideration of primary and secondary effects.
- 4.2.5 A series of questions were devised to focus on potential environmental effects that could arise from the implementation of the draft NTS2. These questions were used to focus the assessment on the primary environmental issues that were identified as the assessment was undertaken, and covered all environmental topic areas scoped into the assessment. The use of questions also aided the consideration of potential cumulative and in-combination effects likely to arise.

The consideration of spatial implications

- 4.2.6 It is recognised that many of the potential environmental impacts are likely to be site specific and project related, such as those that could have an impact on air quality or may influence the enhancement or development of new infrastructure. Given the high level nature of the draft NTS2, it has not been possible for the SEA to provide a detailed assessment of these potential impacts, for example, the significance of potential environmental impacts associated with the construction of a new road. This SEA has however sought to identify and highlight potential issues that may arise in order that lower level plans of relevance, such as transport plans or programmes, and can use the initial strategic findings as a reference point to identify and consider local effects.

4.3 Consideration of Reasonable Alternatives

- 4.3.1 The 2005 Act requires that the likely significant environmental effects of any reasonable alternatives to a plan, programme, or strategy, taking into account its objectives and geographical scope, are assessed and reported on as part of the SEA process. This section outlines a number of possible options that have been considered as the consultation document has been prepared, and establishes why these are not considered “reasonable alternatives” to delivering the main objectives of the policy.
- 4.3.2 As discussed in Section 2, the draft NTS2 sets out a Strategic Framework for transport in Scotland over the next twenty years. In doing so, the draft NTS2 builds on the 2006 NTS and the 2016 Refresh, with the latter concluding that while the 2006 NTS framework remained valid, a full review was required. It is considered that the draft NTS2 Priorities of: *Promotes Equality, Takes Climate Action, Helps our Economy Prosper, and Improves our Health and Wellbeing* build on and enhance the policy direction of that taken by the 2006 NTS which was itself subject to SEA. Further, the proposed draft Strategic Outcomes have been developed through a iterative process of extensive stakeholder engagement as part of the NTS review process.
- 4.3.3 The draft NTS2 sets out to balance social, economic and environmental considerations with the four Priorities viewed as interlinked to deliver the Vision. Within these priorities, there is an emphasis on promoting equality and taking climate action. This approach aligns with the wider policy and legislative context in which the draft NTS2 was developed, including Scottish Government policy and ambitions on climate change adaption and mitigation, sustainable economic development, improving physical and mental wellbeing and tackling inequalities. The importance of policy cohesion was also set out in the recent National Outcomes consultation, which was part of a broader review of the National Performance Framework. Given the wider policy context and emerging legislative landscape within which transport sits, and the enabling role it plays in the delivery of multiple outcomes, it is considered that a **“Do nothing” scenario** or a fundamental **change in focus of the draft NTS2**, could not be considered as “reasonable alternatives” to delivering the main objectives of the policy.
- 4.3.4 The draft High Level policies that sit underneath the draft NTS2 Vision and Objectives have been developed through extensive collaboration comprising key stakeholders and delivery partners. Early SEA work also fed into this process. Analysis was also undertaken to identify any potential gaps between the proposed policies, the draft Strategic Framework and wider Government policies, which concluded that no gaps were identified. Further, it is considered that the policies should be viewed collectively as a package intended to meet the draft Strategic Outcomes. As such, it is considered that no single draft policy option, or an alternative approach to it, can be viewed as a reasonable means to deliver the overarching objectives of the draft NTS2. Taking into

account all of the above we do not consider that there are any reasonable alternatives to the draft Strategy.

- 4.3.5 The development of any subsequent policy or proposals that set out action or measures to meet the Strategy will themselves be subject to consideration under the 2005 Act.

5 The Environmental Baseline

5.1 Purpose of this Section

5.1.1 The 2005 Act requires that the Environmental Report includes a description of the relevant aspects of the current state of the environment and its likely evolution without implementation of the draft NTS2. This is set out in Appendix C. Section 5 sets out a high level summary of the relevant environmental tensions and opportunities that can arise from the transport system.

5.2 What are the key environmental issues associated with the transport system?

5.2.1 Transport, including international aviation and shipping, was the largest source of net greenhouse gas emissions in Scotland in 2016. Transport is also thought to account for almost a quarter of Scotland's energy use, with the majority of this due to road transport reliant on fossil fuels. Whilst the increased electrification of the transport sector could have significant benefits in reducing greenhouse gas emissions, it could also place pressure on the energy sector and grid infrastructure.

5.2.2 The transport and energy sectors are two of the main sources of air pollution and transport can be a significant source of poor air quality in urban areas. Air pollution can impact on human health, both in the short and long-term, and those with pre-existing health issues may be more vulnerable to poor air quality over long time periods. Air quality is often worse in areas of deprivation and is a health inequality issue. Air pollution can also have wider harmful effects on the environment. Whilst air quality has improved over the last few decades, air quality has been identified as a problem in some towns and cities.

Action to reduce transport emissions can provide benefits for both climate change and air quality

The impacts of climate change are expected to intensify

5.2.3 Just over a third of all car journeys are under two miles and could be made by bicycle or on foot. Green infrastructure, such as walking and cycling paths, can help towns and cities become more sustainable, support wildlife and respond to the challenges of climate change, for example, by reducing flood risk. Green infrastructure can also encourage active travel, improve accessibility and connectivity, and can lead to wider benefits for health through increased physical activity and air quality. Equally, transport and infrastructure can have a negative impact on habitats and species through habitat loss, disturbance and by creating barriers to movement (known as fragmentation).

5.2.4 Scotland's transport system includes road and rail networks, ports and harbours, airports and inland waterways. Noise and visual impacts from transport and infrastructure can lead to negative impacts on population, landscape, cultural heritage, biodiversity and soil. Transport can also impact on water courses, for example, through pollution from construction activities or run-off from roads.

5.2.5 Infrastructure works can increase competition for land and lead to increased pressures on existing land uses. There may also be environmental impacts at the local level from construction activity. At the same time, work to better integrate modes of transport across the system can provide a number of benefits, such as reduced congestion.

The construction and operation of transport infrastructure can impact on the environment

5.2.6 How travel is undertaken and by what method is changing. The use of digital technology within the transport system is likely to increase, for example, in travel planning and in the development of autonomous and self-drive vehicles. As the transport system develops, there is a need to consider the differing travel needs of communities across Scotland and to take into account any barriers to using these technologies, for example, due to location, low income or disability. There may also be increased safety and security risks to services and infrastructure as the transport system becomes increasingly digital.

Transport is a means to access opportunities and services

5.2.7 Rising sea levels, changes in temperatures and extreme weather events as a result of climate change can affect transport operations. Road and rail networks may be more vulnerable to the impacts of a changing climate than air and water transport. Transport hubs and routes located around the coast are also likely to face significant risk from increased flooding and sea level rise. Adaptation is necessary to respond effectively to the predicted impacts of climate change.

Climate change can impact negatively on transport infrastructure

6 Findings of the Assessment

6.1 Introduction

6.1.1 As discussed in Section 4, the assessment has been undertaken in three stages and the following section sets out the findings of all three assessment stages. These were:

- Stage one - considered the likely significant environmental impacts that could arise from the draft High Level Policies.
- Stage two - expanded on the findings from Stage one to consider the potential impacts across the four Priorities of: Promotes Equality, Takes Climate Action, Helps our Economy Prosper and Improves our Health and Wellbeing.
- Stage three - looked at the potential for in-combination and cumulative impacts of the draft Strategy, including between the four Priorities and in the context of the wide range of objectives, ambitions and requirements set out in wider policy.

6.2 Assessment findings; draft High Level Policies (Stage 1)

6.2.1 The first stage assessed the 14 High Level Policies in the draft NTS2, which are intended collectively to achieve the draft NTS2 Vision and Outcomes. The detailed assessment findings of this stage are in Appendix D and have been summarised below.

6.2.2 The following key has been used:



Significant effects are significant positive overall for the environmental topic



Significant effects are significant mixed overall for the environmental topic



Significant effects are negative overall for the environmental topic

Summary of Stage One assessment findings

Greater integration of spatial planning and transport considerations, demand management and improving efficiencies across the transport system has the potential to significantly reduce GHG emissions **(climatic factors)**. Many of the policies should also lead to greater resilience and will support climate change adaptation **(climatic factors, population and human health)**.

Overall Significant Impacts



Climatic Factors, Air Quality, Population and Human Health and Material assets

Many of the policies have the potential to improve **air quality** and reduce exposure to noise, particularly in urban areas and locations where air quality issues currently exist (such as Air Quality Management Areas), with associated benefits for **human health**. High level policies which support the increased uptake of active travel and help to create conditions that encourage walking and cycling can lead to reduced GHG emissions and improved air quality, with associated benefits from increased uptake of physical activity **(climatic factors, air quality and population and human health)**. The use of green infrastructure can also lead to multiple benefits, providing support for habitats and species, improved air quality and increased community cohesion **(biodiversity, air quality and population and human health)**. Increased access to goods and services, especially vital services such as health care, can lead to benefits for **population and human health**, particularly where a focus is given to reducing barriers for individuals or communities with specific needs. However, there is the potential that the increased movement of goods and people could lead to the uptake of less sustainable modes of travel, with negative impacts for **climatic factors** and **air quality**. Support for the sustainable travel hierarchy and ensuring the transport system is developed in a way that supports sustainable modes of travel can help to avoid or reduce any potential negative impacts and can benefit the transport system overall **(material assets)**.

Positive impacts can also arise where greater integration is proposed across wider systems, such as energy and digital, and support the transition to a decarbonised transport system **(climatic factors, material assets)**. Benefits are also likely to arise where a focus is given to ensuring infrastructure is fit for purpose and is maintained **(material assets)**. There may also be an opportunity to future-proof infrastructure, including through the use of green infrastructure, to support continued climate change mitigation and adaptation **(climatic factors and material assets)**.

Where policies lead to the need for upgrades to, or require new infrastructure there may be associated adverse impacts from construction and operation. This could include secondary negative impacts such as disturbance and displacement to biodiversity and lead to localised adverse impacts on soil, water, landscape, and cultural heritage. Local level consideration would need to be given to the potential implications that may arise through the siting, construction and development of any individual infrastructure proposals. Existing mechanisms such as, Environmental Impact Assessment (EIA) and relevant consenting conditions at the project level prior to work being undertaken can reduce the potential for negative impacts.

6.3 Assessment findings - the four Priorities (Stages 2&3)

- 6.3.1 The second stage of the assessment built on the Stage one assessment findings and expanded on these to consider the overarching likely significant environmental effects across all four Priorities of: Promotes equality, Takes Climate Action, Helps our Economy Prosper and Improves our Health and Wellbeing.
- 6.3.2 The second stage of the assessment also considered the environmental challenges and opportunities across the transport system in relation to the package of policies and four Priorities. For example, steps to mitigate GHG emissions and support air quality, should lead to positive impacts for the priorities of “Takes Climate Action” and “Improves our Health and Wellbeing”. Conversely, any increase in less sustainable modes of transport may be of relevance to the priority of “Helps our Economy Prosper”, but has the potential to impact negatively on “Takes Climate Action”.
- 6.3.3 The following narrative sets out the findings of this second stage of the assessment under each Priority, as well as the cumulative and in-combination effects between the four Priorities and in the context of wider policy objectives, ambitions (Stage three).



- 6.3.4 Travel offers the means to access jobs, education, shops, leisure and other essential services such as health services. This can affect quality of life and the lack of mobility and access is inextricably linked to social disadvantage and exclusion⁵⁰. Promotion of an inclusive transport system, that offers fair and equitable access to goods and services for all, including vital services such as health care, is likely to lead to positive benefits for population and human health. The benefits of increased accessibility are likely to be realised to a greater extent where focus is given to reducing barriers for individuals or communities who are disadvantage for example, due to affordability, disability or location.
- 6.3.5 Transport needs vary across the country, and private car travel continues to be the dominant mode of transport⁵¹, particularly in remote and rural areas⁵². A

⁵⁰ NHS Scotland (2018) Scottish Health and Inequality Impact Assessment Network (SHIAN) Report Health and Transport: A Guide 2018 [online] Available at: <https://www.scotphn.net/wp-content/uploads/2015/11/Transport-Guide-2018-Final-Formatted.pdf> (accessed 05/07/2019)

⁵¹ ibid

⁵² ibid

lack of integrated transport infrastructure in remote and rural areas can be a barrier to accessing goods and services, including important healthcare services⁵³. Where consideration is given to ensuring the transport network recognises differing geographical needs, benefits for population and human health should arise from improved access to goods and services. This is likely to be of particular relevance where the remoteness of some locations means that good connectivity is vital, for example, island communities. Additional benefits should also arise for material assets where a focus is given to increasing the resilience of the transport system from the risks posed by climate change and maintaining access to lifeline services.

- 6.3.6 The integration of the transport system to better support the differing needs of users can also lead to reduced GHG emissions and improved air quality, with associated benefits for population and human health, and material assets. The benefits of this are likely to be further maximised where support is given to the sustainable travel hierarchy, including the promotion of active travel and public transport. Further, where a focus is given to improving the accessibility or safety of more sustainable modes of transport, benefits may arise from increased uptake. Greater integration between land use and transport should also help to increase accessibility and minimise barriers to uptake. For example, features of a neighbourhood environment can impact on active travel and higher rates of walking are found in “walkable” neighbourhoods that have good pedestrian connectivity, land use mix and proximity to key destinations⁵⁴. This also has the potential to lead to long term behaviour change, further benefiting climatic factors, air quality and population and human health, in addition to wider societal benefits through increased opportunity for social interaction.
- 6.3.7 Barriers to accessing the transport network extend beyond the physical act of getting to transport hubs or entering and exiting vehicles. A lack of information regarding timetables and public transport routes, particularly when there are competing operators, can also act as a barrier⁵⁵. Benefits for population and human health should arise from increased accessibility where consideration is given to improve the clarity and ways in which information is presented on travel choices. This could be particularly beneficial where the provision of transport planning information is focused towards those who may have difficulties in using public transport. Wider societal benefits may also be gained from increased accessibility if measures seek to address issues of social isolation. The provision of travel information in adverse weather conditions will benefit all, however this is also likely to be of particular importance for

⁵³ NHS Scotland (undated) Improve access to care for remote and rural areas [online] Available at: <http://www.shiftingthebalance.scot.nhs.uk/improvement-framework/improve-access-to-care-for-remote-and-rural-areas/> (accessed 05/07/2019)

⁵⁴ NHS Scotland (2018) Scottish Health and Inequality Impact Assessment Network (SHIAN) Report Health and Transport: A Guide 2018 [online] Available at: <https://www.scotphn.net/wp-content/uploads/2015/11/Transport-Guide-2018-Final-Formatted.pdf> (accessed 05/07/2019)

⁵⁵ *ibid*

individuals and communities less able to prepare for, respond to and recover from extreme weather events, for example, in areas of severe deprivation.

- 6.3.8 How people travel is evolving and digitisation is anticipated to play an increasing role in transport. In the near future, concepts such as shared mobility, mobility as a service and autonomous vehicles are likely to significantly influence the transport sector, increasing mobility options for a wider range of the population, particularly in urban environments⁵⁶. Technical developments have the potential to reduce the number of less sustainable journeys being undertaken, benefiting climatic factors, air quality and population and human health. However, consideration may need to be given to where members of society could potentially be negatively impacted from barriers to using these technologies, for example, due to location, low income or disability.
- 6.3.9 Income is also strongly related to travel behaviour and those with low incomes travel much less than those with higher incomes⁵⁷. For example, access to services such as employment and education can be hindered by financial and locational constraints, public transport availability and barriers to accessibility⁵⁸. This can perpetuate existing disadvantage and exclusion⁵⁹. Particular benefits for population and human health are therefore likely to arise where affordability is addressed. Further, there is evidence that those on low incomes, living in deprived neighbourhoods, are more adversely affected by the impacts of transport than those living in more affluent neighbourhoods⁶⁰. These differences include an increased risk of road traffic injury, increased concerns about personal security and higher exposure to ozone and particulate matter⁶¹. There is an opportunity to consider how action to decarbonise the transport sector can be targeted in order to minimise the risk of negative impacts that disproportionately affect vulnerable groups.

⁵⁶ SWECO (undated) Transport Revolution – The future of accessible public transport in urban areas [online] Available at: <https://www.swecourbaninsight.com/urban-move/transport-revolution-the-future-of-accessible-public-transport-in-urban-areas/> (accessed 05/07/2019)

⁵⁷ University College London (2014) Transport and Poverty: A review of the evidence [online] Available at: https://www.researchgate.net/publication/278783829_Transport_and_Poverty_A_review_of_the_evidence (accessed 05/07/2019)

⁵⁸ ibid

⁵⁹ ibid

⁶⁰ ibid

⁶¹ ibid



Takes climate action

- Will adapt to the effects of climate change
- Will help deliver our net-zero target
- Will promote greener, cleaner choices

- 6.3.10 Climate projections indicate that the climate trends observed over the last century will not only continue but also intensify over the coming decades⁶². The ability of Scotland's transport network to adapt and be resilient to the risks posed by climate change will become increasingly vital. Flooding is likely to pose the greatest long-term risk to infrastructure performance, however risks from heat, water scarcity and slope instability caused by severe weather could also be significant⁶³. Benefits may arise for climatic factors and material assets, where focus is given to ensuring that the transport network is resilient to the impacts of climate change. For example, by ensuring existing infrastructure is fit for purpose and that its lifespan is prolonged through improvements in its repair and maintenance. There is also an opportunity to maximise these benefits by ensuring that where possible, new infrastructure or upgrades to existing infrastructure are designed to enable greater flexibility for future changes in the transport system, such as alternative modes of transport and sources of energy.
- 6.3.11 The benefits of action taken to increase the resilience of the network is likely to be of particular relevance for transport hubs and routes located around the coast at significant risk of increased flooding and rising sea levels. Road and rail are considered to be particularly vulnerable to the impacts of climate change and some stretches of the Scottish coastline are reported as actively eroding, exposing these networks⁶⁴. The interface between the coast and land can be complex and there is an opportunity to support greater alignment between transport and marine planning. There is however in some areas uncertainty on the ownership of coastal land and sea defences be a barrier to greater integration..
- 6.3.12 The support services underlying energy, transport, water and information & communication technology networks, and the infrastructure that supports these systems, are closely linked⁶⁵. This can mean that failure in any one area can

⁶² Adaptation Scotland (2018) Climate trends and projections [online] Available at: <https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections> (accessed 05/07/2019)

⁶³ Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report - Summary for Scotland [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Scotland-National-Summary.pdf> (accessed 05/07/2019)

⁶⁴ *ibid*

⁶⁵ Adaptation Scotland (undated) 15 Key consequences of climate change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climatereadyplaces/impacts/> (accessed 05/07/2019)

lead to wider disruption across these networks⁶⁶. Potential benefits should arise for not only material assets, but population and human health, through increasing resilience across these networks. For example, through the increased alignment between transport, digital and energy networks. Particular benefits could also arise where consideration is given to differing transport needs. For example, the remoteness and isolation of some of Scotland's islands means that transport links by sea and air, both to other islands and/or to the mainland are essential⁶⁷. Climate change resilience and adaptation must be a key consideration given the lifeline nature of many of these services, with the potential to further benefit the SEA topics of climatic factors, material assets and population and human health.

- 6.3.13 The Scottish Government recognises that there is a global climate emergency and is acting accordingly. The Climate Change (Scotland) Bill proposes a legally binding target of net-zero emissions by 2045 and increases the ambition of the 2030 and 2040 targets to 70% and 90% respectively. The transport sector is one of the main contributors to GHG emissions with a reported increase in transport emissions between 2015 and 2016⁶⁸. Transport is estimated to account for 25% of all Scotland's total energy use, the majority of this arising from road transport provided for by fossil fuels⁶⁹. A reduction in GHG emissions can arise where support is given to increasing efficiencies in the movement of people and goods, for example, through mass transit or modal shift. Benefits can be maximised where a focus is given to the road sector. Further benefits can also arise for air quality, as well as for population and human health through reduced exposure to noise. and will be of particular relevance in areas where these issues are currently experienced to a greater extent, such as, urban locations.
- 6.3.14 The decarbonisation of the transport sector, for example, through electrification, is likely to deliver significant benefits in terms of climatic factors⁷⁰. Consideration may however need to be given to where modal shift or increased electrification could place additional pressures on other networks. For example, the increased electrification of transport on a large scale is expected to place pressure on the electricity network through increased demand⁷¹. The increased digitisation of the transport sector can increase efficiency in the movement of

⁶⁶ Adaptation Scotland (undated) 15 Key consequences of climate change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climatereadyplaces/impacts/> (accessed 05/07/2019)

⁶⁷ Scottish Government (2014) Empowering Scotland's Island Communities [online] Available at: <https://beta.gov.scot/publications/empowering-scotlands-island-communities/pages/7/> (accessed 05/07/2019)

⁶⁸ Scottish Government (2018) Scottish Greenhouse Gas Emissions 2016 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2016/pages/3/> (accessed 05/07/2019)

⁶⁹ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://beta.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

⁷⁰ Scottish Government (2017) Draft Climate Change and Energy Strategies: joint strategic environmental assessments [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

⁷¹ Scottish Government (2018) Energy in Scotland [online] Available at: <https://www2.gov.scot/Resource/0054/00541605.pdf> (accessed 05/07/2018)

people and goods, including via new and alternative modes of transport, with associated benefits anticipated for climatic factors, air quality and population and human health. Taking an integrated approach to the consideration of infrastructure across transport, digital and energy is likely to become increasingly important to support a shift to more sustainable modes of transport. Support for innovation and technology will also be of key importance, for example, low carbon technologies and alternative fuels, to ensure continued mitigation and adaptation to climate change.

- 6.3.15 Giving consideration to differing geographical and accessibility needs and planning development in a way that aligns with infrastructure can also help reduce the length and number of journeys undertaken, make places safer, increase accessibility, and support the uptake of more sustainable modes of transport, such as active travel. This has the potential to lead to reduced GHG emissions, with further benefits for air quality, and for population and human health including through reduced exposure to noise. Finally, there may be benefits where action is focused towards rural and remote areas with a greater dependency on private car use. For example, through supporting active travel in the rural environment, even if residents must drive to get to it⁷².
- 6.3.16 New infrastructure, or upgrades to the existing transport network may be required to support improved connectivity and a move towards decarbonisation. Where possible, support should be given to ensure that the transport network is developed in a way that improves integration and supports sustainable modes of transport, with potential benefits for climatic factors, air quality, population and human health. Early consideration to future-proofing infrastructure or identifying opportunities to accommodate new emerging technologies can support climate change mitigation and adaptation. Promoting the use of green infrastructure for active travel, such as walking and cycling paths, could also support climate change adaptation and can lead to wider societal benefits, for example, increased community cohesion, as well as to improved air quality and benefits for population and human health through increased physical and mental well-being.

⁷² Active Living Research (2015) Promoting active living in rural communities [online] Available at: https://activelivingresearch.org/sites/default/files/ALR_Brief_RuralCommunities_Sept2015.pdf (accessed 05/07/2019)



Helps our economy prosper

- Will get us where we need to get to
- Will be reliable, efficient and high quality
- Will use beneficial innovation

- 6.3.17 Improved connections facilitate accessibility within and between places, within Scotland and beyond, and support economic growth and an inclusive society⁷³. Scottish Planning Policy (SPP) sets out that the planning system should support patterns of development which reduce the need to travel, enable the integration of transport modes, support sustainable modes of travel, and facilitate the movement of freight by rail or water⁷⁴. This has the potential to lead to reduced GHG emissions, the significance of which is noted in SPP which states that “Planning can play an important role in improving connectivity and promoting more sustainable modes of transport and travel as part of the transition to a low carbon economy”. Further, as SPP is integrated with the National Planning Framework 4 (NPF4) and reviewed, the global climate emergency will be a key driver of future policy. Improved connectivity and more sustainable modes of transport can also lead to benefits for air quality with associated benefits for population and human health. This will be of particular relevance in areas where current air quality issues are experienced.
- 6.3.18 Wider benefits for material assets are also likely to arise where support is given to the integration of transport infrastructure that facilitates different transport modes and gives consideration to cross-boundary implications. Benefits for population and human health can also arise where greater consideration is given to improving accessibility to education and employment opportunities and to important public services, such as health services. The benefits of this are likely to be felt to a greater extent where action is focused toward those who currently experience barriers to accessibility, for example, due to financial and locational constraints.
- 6.3.19 Whilst vital to the movement of people and goods, key infrastructure hubs and international gateways, such as airports and ports, often support modes of transport that can significantly contribute to GHG emissions and air pollution⁷⁵. Congestion and air quality can be a particular issue in and around Scotland’s key transport hubs. Due to several common sources, most notably road traffic in urban areas, there is also a close relationship between air quality and

⁷³ Scottish Government (2014) Scottish Planning Policy [online] Available at: <https://beta.gov.scot/publications/scottish-planning-policy/> (accessed 05/07/2019)

⁷⁴ ibid

⁷⁵ The Scottish Parliament (2016) SPICe Briefing, Air Quality in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-35_Air_Quality_in_Scotland.pdf (accessed 05/07/2019)

environmental noise⁷⁶ which can have a negative impact on human health. Where support is given to improving surface access to key hubs, including encouraging the uptake of more sustainable modes of transport, there is the potential for reduced impacts for climatic factors, air quality and population and human health.

- 6.3.20 Improving the efficiency and resilience of the transport network, for example by consolidating the movement of goods and people can help to reduce GHG emissions, improve air quality and reduce exposure to noise. Particular benefits are likely to arise where a focus is given to encouraging a modal shift, for example from road to rail., Currently the majority of freight transportation is undertaken by road⁷⁷ with heavy vehicles giving rise to higher emissions - including noise - than other vehicles. For much of the country, the potential for using rail is not available and road freight is the only option⁷⁸. However, where available, rail can play an important role in supporting rural areas with a higher dependency on private car use, providing both lifeline services for local populations as well as acting as a gateway for visitors⁷⁹. Scotland's islands face particular challenges and their remoteness means that connectivity of all kinds is vital, including links by sea and air, both between islands and to the mainland⁸⁰.
- 6.3.21 Consideration will need be given to the potential for any large scale modal shift to place additional pressure on other networks should the appropriate infrastructure not be in place to accommodate these changes. Similarly, there is potential for increased electrification and uptake of technologies such as intelligent mobility and vehicle automation to add pressure on other networks. For example, the increased electrification of transport on a large scale is likely to place extra pressure on the electricity system, and on the network's ability to generate, store and deliver the capacity necessary to meet peaks in electricity demand⁸¹. Grid management will be critical to the adoption of electric vehicles and electric mobility, for example, anticipating demand and ensuring that infrastructure is adapted to support it in advance⁸². There will also be a need to

⁷⁶ The Scottish Government (2015) Cleaner Air Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

⁷⁷ Transport Scotland (2018) Scottish Transport Statistics No. 36 2017 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-36-2017-edition/> (accessed 05/07/2019)

⁷⁸ Transport Scotland (2016) Delivering the goods – Scotland's rail freight strategy [online] Available at: <https://www.transport.gov.scot/publication/delivering-the-goods-scotlands-rail-freight-strategy/> (accessed 05/07/2019)

⁷⁹ Rail Delivery Group (2017) Scotland's rail infrastructure: the rail industry's advice for 2019 onwards [online] Available at: <https://www.raildeliverygroup.com/component/arkhive/?task=file.download&id=469771815> (accessed 05/07/2019)

⁸⁰ Scottish Government (2014) Empowering Scotland's Island Communities [online] Available at: <https://beta.gov.scot/publications/empowering-scotlands-island-communities/pages/7/> (accessed 05/07/2019)

⁸¹ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://beta.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

⁸² University of Oxford, the Oxford Institute of Energy Studies (2018) Disruptive change in the Transport Sector: Eight Key Takeaways [online] Available at: <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/Disruptive-Change-in-the-Transport-Sector-8-Takeaways.pdf> (accessed 05/07/2019)

ensure that the digital network is able to support the transition to a decarbonised transport sector through increased digitisation. Where consideration is given across transport, energy and digital sectors to support this transition, overall benefits should arise for material assets. Where this leads to new infrastructure development there may be associated negative impacts at a local level from construction and operation.

- 6.3.22 The digitalisation of the transport system and Intelligent Transport Systems (ITS) and innovation in new technologies can support the move to more connected, cooperative and potentially more autonomous vehicles and the concept of Mobility as a Service⁸³. On-demand services, self-driving cars and other new technologies are set to become increasingly transformational in how and in what way transport choices are made. For example, Mobility as a Service or smart mobility strives to integrate all modes of transport providing a vision of a seamless end to end journey. This can help reduce GHG emissions through improved efficiencies, reduced congestion and fewer journeys being undertaken. Additional benefits can include improved air quality and noise levels with associated benefits for population and human health.



- 6.3.23 Where consideration is given to managing any risks arising from the increased digitisation of the transport system can help to avoid or mitigate any adverse effects. The collection and storage of data will increase as more devices become connected online, leading to associated risks to the security and safety of automated systems, such as connected and automated vehicles. Early consideration to the security risks to services and infrastructure will become increasingly vital, and is likely to benefit not only population and human health, but also material assets.
- 6.3.24 Positive impacts are likely to arise for population and human health where a focus is given to the safety of the transport system, such as seeking to reduce the risk of accidents and fatalities and improving safety for all users. In particular, benefits can arise where consideration is given to reducing the risk of road accidents, as the majority of casualties reported in 2017 were car users⁸⁴. Increased safety and resilience of the network can also lead to reduced

⁸³ Transport Scotland (2017) Scotland's Trunk Road and Motorway Network - Future Intelligent Transport Systems Strategy 2017 [online] Available at: <https://www.transport.gov.scot/media/40406/its-strategy-2017-final.pdf> (accessed 05/07/2019)

⁸⁴ Transport Scotland (2017) Key Reported Road Casualties Scotland 2017 [online] Available: <https://www.transport.gov.scot/media/42306/sct04185220761.pdf> (accessed 05/07/2019)

disruption and congestion, leading to benefits for climatic factors, air quality and population and human health. Positive impacts for material assets are also considered likely where action is taken to improve the management of assets, for example, through repair and maintenance. There may also be an opportunity for wider positive impacts where prioritisation is given to the maintenance of infrastructure in vulnerable areas, such as sites where there is an increased risk of flooding.

- 6.3.25 Increasing resilience and reducing disruption across the network and improving the clarity and provision of information regarding weather warnings, has the potential to lead to further benefits for population and human health, helping individuals and communities make safer travel choices or prepare for extreme weather events. This is likely to be of particular importance for individuals and communities less able to prepare for, respond to, and recover from such events, for example, in areas of severe deprivation. Wider benefits can also arise for climatic factors and air quality through reduced risk of congestion and disruption.
- 6.3.26 Improving cycling and walking networks can promote active travel. Approximately 34% of all car journeys in Scotland are less than two miles in length and could be covered by bicycle or on foot⁸⁵. The increased uptake of alternative and more sustainable modes of transport, such as active travel, can lead to multiple benefits, including improved physical and mental health. For example, journeys by bicycle or on foot can improve health by helping reduce the risk of conditions such as; obesity, diabetes, coronary heart disease and strokes⁸⁶. This is of particular relevance as obesity rates in Scotland are a significant and increasing public health issue⁸⁷. Active travel can also reduce emissions, improve air quality and help to reduce road traffic accidents⁸⁸. The benefits of this could be realised to a greater extent by targeting action towards areas with high levels of deprivation or existing poor air quality, as well as to those most susceptible to the impacts of atmospheric pollution. For example, the elderly, children, and those with pre-existing health issues.
- 6.3.27 There is a range of factors that can impact on individuals' levels of exercise, and these include the availability of built environment and transport systems that encourage active living and regular physical activity⁸⁹. Designing neighbourhoods well can better enable people to walk and cycle to

⁸⁵ Transport Scotland (undated) Walking and cycling [online] Available at: <https://www.transport.gov.scot/our-approach/active-travel/walking-and-cycling/#42959> (accessed 05/07/2019)

⁸⁶ UK Health Alliance on Climate Change (2016) A Breath of Fresh Air, Addressing Climate Change and Air Pollution Together for Health [online] Available at: <http://www.ukhealthalliance.org/wp-content/uploads/2016/10/UK-Health-Alliance-A-Breath-of-Fresh-Air-Final-Report.pdf> (accessed 05/07/2019)

⁸⁷ NHS Health Scotland (2018) Diet and obesity [online] Available at: <http://www.healthscotland.scot/health-topics/diet-and-obesity/obesity> (accessed 05/07/2019)

⁸⁸ UK Health Alliance on Climate Change (2016) A Breath of Fresh Air, Addressing Climate Change and Air Pollution Together for Health [online] Available at: <http://www.ukhealthalliance.org/wp-content/uploads/2016/10/UK-Health-Alliance-A-Breath-of-Fresh-Air-Final-Report.pdf> (accessed 05/07/2019)

⁸⁹ Global Action Plan (2017) Air pollution and children [online] Available at: <https://www.cleanairday.org.uk/air-pollution-and-children> (accessed 05/07/2019)

destinations, and physical activity has been shown to increase in neighbourhoods with many places to go, such as shops and other facilities⁹⁰. Greater integration between spatial planning and transport considerations can lead to the development of a more integrated, multi-modal transport system that supports sustainable modes of transport suitable for a wide range of users. Additionally, where greater community engagement is achieved within the planning process, further benefits can arise from local transport systems that meet the needs of multiple users. This can in turn lead to wider social benefits, such as improved community cohesion, through increased accessibility and social inclusion. Wider positive impacts are also considered likely to arise for climatic factors and air quality through helping to ensure that the car is not the first choice of transport, in keeping with the sustainable transport hierarchy.

- 6.3.28 There is also a close relationship between air quality and noise, with transport a significant source of both. Noise is considered the second largest environmental cause of health problems, with the impact of air quality from particulate matter considered the most detrimental⁹¹. Improving the efficiency and integration of the transport network can lead to positive impacts for population and human health through reduced exposure to noise and improved air quality. This is likely to be of particular relevance in urban areas where the impacts of noise and air pollutants are experienced to a greater extent⁹². Further benefits for climatic factors should also arise from a reduction in GHG emissions.
- 6.3.29 Further benefits are likely to arise where consideration is given to recognising the differing geographical transport needs including in remote and rural Scotland. At the same time, improving air quality and reducing exposure to noise in urban locations can lead to increased levels of social interaction⁹³. The use of green infrastructure to support active travel can lead to multiple benefits. These include habitat creation and enhancement and improved air quality. Green infrastructure can also support climate change adaptation and lead to wider societal benefits, such as, increased community cohesion.

⁹⁰ National Children's Bureau (2012) Environmental inequalities and their impact on the health outcomes of children and young people: Policy and evidence briefing [online] Available at: <https://www.ncb.org.uk/sites/default/files/field/attachment/Environmental%20Inequalities.pdf> (accessed 05/07/2019)

⁹¹ European Commissions (2016) Noise, health effects of noise [online] Available at: http://ec.europa.eu/environment/noise/health_effects_en.htm (accessed 05/07/2019)

⁹² Scotland's Environment (undated) Scotland's noise, part of Scotland's environment [online] Available at: <https://noise.environment.gov.scot/index.html> (accessed 05/07/2019)

⁹³ WHO (2018) Health, environment and sustainable development [online] Available at: <http://www.who.int/sustainable-development/transport/health-risks/noise/en/> (accessed 05/07/2019)

6.4 Summary of the Assessment Findings

6.4.1 The third stage of the assessment process considered the potential cumulative and in-combination effects likely to arise from the draft NTS2 and has been informed by the previous two assessment stages. The findings are set out below.

Question 1: what are the overall likely significant environmental effects of the draft NTS2?

6.4.2 There is the potential for significant benefits for climatic factors where a focus is given to reducing the transport sector's contribution to GHG emissions. For example, encouraging a shift to more sustainable modes of transport, increasing efficiencies and support for new technologies will be important in meeting net-zero emissions of GHG by 2045.

6.4.3 Demand for transport is derived from land use and transport provision in turn influences patterns of land use⁹⁴. Where greater integration is given to spatial planning and transport considerations, benefits are also likely to arise for climatic factors. The future review of NPF4, as well as the development of STPR2 offers the opportunity to further align spatial planning and transport matters. Further benefits for population and human health can also arise at a local level where greater community engagement in the planning process is encouraged.

6.4.4 Increased accessibility of the transport system, and in turn, access to goods and services such as employment and healthcare, can also lead to benefits for population and human health. There is opportunity to reduce barriers to accessibility due to location, income, disability or age. However, consideration will need to be given to the potential for increased uptake of less sustainable modes of transport with implications for climatic factors, air quality and population and human health. Additionally, increased surface transport movement around key infrastructure hubs can lead to poor air quality and noise exposure at local level.

6.4.5 The decarbonisation of the transport sector has the potential to make a significant contribution to improving air quality in Scotland, with benefits for population and human health. Benefits are likely to be experienced to a greater extent where air quality issues currently exist, for example in urban areas, and where action is focused towards those at greatest risk. There is a close relationship between air quality and noise, with transport a significant source of both and action taken to improve air quality has the potential to also benefit population and human health through reduced exposure to noise. Additionally, measures aimed at encouraging a shift from private vehicle use to active travel,

⁹⁴ Transport Scotland (2011) Development Planning and Management Transport Appraisal Guidance [online] Available at: <https://www.transport.gov.scot/media/33792/j184585.pdf> (accessed 05/07/2019)

such as walking and cycling, are likely to have health benefits where they lead to increased physical activity and improved mental wellbeing.

6.4.6 With the adverse and unpredictable impacts of climate change expected to intensify, the ability of the transport system to adapt to these challenges will be increasingly vital. Particular benefits for population and human health are likely where a focus is given to vulnerable areas or communities and maintaining access to vital goods and services.

6.4.7 Ensuring the existing network is fit for purpose and its lifespan prolonged can benefit climatic factors, population and human health and material assets. Benefits can also arise through action to increase the alignment between transport, energy and digital networks to support a modal shift and uptake of new technologies. Reducing travel demand and improving efficiencies across the network can also help to reduce pressure on the network as a whole.

Question 2: what are the likely indirect or secondary environmental effects?

6.4.8 The draft NTS2 sets the context for how new development and transport infrastructure services are to be considered through STPR2. The construction and operation of infrastructure can lead to adverse impacts at local level. Such effects can include increased noise, dust and vibration, loss of soil and soil erosion and water pollution. Development can also lead to negative visual impacts and can adversely affect landscape and the setting of sites of cultural importance. Where impacts arise from construction these should be short-term and temporary, however impacts from land use change, such as the loss of soil and habitats, can be long-term and permanent. Inappropriately sited development could lead to increased risk of flooding, whilst conversely, flooding poses the greatest long-term climate-related risk to infrastructure performance.

6.4.9 The likely significance of effects arising will be influenced by a number of factors. For example, infrastructure requirements may be greater for relatively new energy technologies with impacts likely to be dependent on the individual technology and the scale of implementation. The siting and design of individual projects can also effect the significance of potential impacts. Given the level of uncertainty regarding factors such as location or scale of implementation at this stage, it is not possible to provide detailed assessment findings. The impact of individual development proposals would however be considered at the local level including through the planning system. Finally, consideration should be given to ensuring that new infrastructure is designed and built to be more adaptable, resource efficient and responsive to greater numbers of people with diverse needs⁹⁵

6.4.10 The emergence of new technologies and expansion of existing ones has the potential to offer substantial benefits including more efficient use of infrastructure and reduced emissions. However, such changes could increase

⁹⁵ Institution of Civil Engineers (2018) State of the Nation 2018: Infrastructure Investment [online] Available at: <https://www.ice.org.uk/news-and-insight/latest-ice-news/ice-launches-2018-state-of-the-nation-investment> (accessed 05/07/2019)

pressure on wider networks and could require upgraded or new, infrastructure. For example, grid management will be critical to the adoption of electric vehicles and to support electric mobility⁹⁶.

- 6.4.11 Climate change has been identified as a primary pressure on many environmental receptors including soil, water and biodiversity. As such, secondary benefits are likely to arise where the implementation of the draft NTS2 leads to a reduction in GHG emissions.

Question 3: how can these likely adverse effects be managed, mitigated or enhanced?

- 6.4.12 The potential for adverse secondary environmental effects has been noted, in particular, from the development of new or upgraded infrastructure at local level. The potential for such impacts would continue to be assessed at individual project level and, where appropriate, mitigated through the relevant statutory consenting procedures. Where appropriate, this will be supplemented by, where relevant, statutory environmental assessment obligations (e.g. EIA and Habitats Regulations Appraisal (HRA)), and via site controls and Environmental Management Plans. The development of any further, more detailed plans, programmes or strategies would themselves require consideration under the Environmental Assessment (Scotland) Act 2005.
- 6.4.13 Where greater consideration is given to the co-ordination of transport infrastructure and planning, at both regional and local scales, there is the potential to maximise positive effects. For example, the integration of transport infrastructure in a way that supports multi-modal use and giving consideration of cross-boundary implications. Additionally, where a co-ordinated approach to green infrastructure is recognised in infrastructure planning to facilitate greater levels of active travel, benefits can arise across a number of environmental topics and the capacity of the environment to adapt to climate change can be increased.
- 6.4.14 Ensuring that infrastructure is maintained and fit for purpose can help to maximise benefits through helping to ensure its lifespan is prolonged. The efficient use of existing resources in the construction of new transport infrastructure where possible can also help reduce the use of finite resources. Support for demand management measures and increasing efficiency across the network should also lead to reduced pressure on existing infrastructure. These approaches are reflected in the sustainable investment and sustainable travel hierarchies. Where possible, early consideration of possible pressures on wider networks and anticipation of increased demand, for example from modal shift or update of new technologies, can help manage any potential negative impacts associated with this.

⁹⁶ University of Oxford, the Oxford Institute of Energy Studies (2018) Disruptive change in the Transport Sector: Eight Key Takeaways [online] Available at: <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/Disruptive-Change-in-the-Transport-Sector-8-Takeaways.pdf> (accessed 05/07/2019)

6.4.15 While individual infrastructure networks and sectors each have specific challenges, they should not be viewed in isolation and as infrastructure continues to evolve and adapt, the increasing importance of digital technology, connectivity and of whole-system approaches will serve to deepen these interdependencies⁹⁷. As the risks from the impacts of climate change increase, measures to improve resilience and support adaptation across all networks are likely to be of particular benefit, particularly with regard to life-line services.

Question 4: how can this assessment be taken into account at regional and local level?

- 6.4.16 Many of the environmental impacts that have the potential to arise from the draft NTS2 are likely to be site specific and relate to individual projects. It is therefore not possible for this SEA to provide a detailed assessment of these potential impacts given the uncertainty of factors such as location or exact nature of any activity. Further, where more detailed plans or programmes are prepared to take forward the objectives of the draft NTS2, these will themselves be subject to consideration under the 2005 Act.
- 6.4.17 As discussed previously, once finalised and published, the NTS2 will not set a funding framework or identify specific infrastructure priorities, rather, it will establish clearly defined strategic transport objectives to enable the subsequent development of STPR2. STPR2 will itself be subject to the requirements of the 2005 Act. Given the relationship between the NTS2 in establishing clearly defined strategic transport objectives for STPR2, the findings in this Environmental Report can help to inform future related assessment work. Individual projects are also likely to be subject to Scottish Transport Appraisal Guidance (STAG) methodology and/or EIA, where relevant.
- 6.4.18 Once finalised, the NTS2 will also set a context within which Regional Transport Partnerships will develop Regional Transport Strategies. Additionally, the development of Local Transport Strategies within each Local Authority should also feed into the development process for Regional Transport Strategies. Finally this assessment, in particular where the potential for regional or local implications has been highlighted, can also inform the development of transport strategies at regional and local level. Such strategies will themselves be subject to the 2005 Act.

⁹⁷ Institution of Civil Engineers (2018) State of the Nation 2018: Infrastructure Investment [online] Available at: <https://www.ice.org.uk/news-and-insight/latest-ice-news/ice-launches-2018-state-of-the-nation-investment> (accessed 05/07/2019)

6.5 Assessment conclusions and recommendations for mitigation and enhancement

- 6.5.1 The policies and measures set out in the draft NTS2 is likely to lead to significant GHG emissions reductions. It is recommended that further consideration is given when implementing the NTS2 to opportunities for actions which support a net-zero economy, reflecting the strengthened ambition of climate change targets and in recognition of the global climate emergency. It is also recommended that where there is potential for the increased uptake of less sustainable modes of transport to arise, this is considered against wider Scottish Government objectives to strengthen the ambition of climate change targets and improve air quality.
- 6.5.2 The SEA supports the approach taken within the draft NTS2 to improve the integration between spatial planning and transport considerations and promote an integrated approach across transport, digital and energy sectors. A number of benefits were identified as having the potential to arise as a result, including significant reductions in GHG emissions and benefits for material assets though greater consideration of network interdependences. It is recommended that opportunities for greater integration continue to be explored at lower tiers of plan-making and in developing individual project proposals. For example, there has been a commitment to align NPF4 with the development of STPR2..
- 6.5.3 The assessment also identified benefits for climatic factors, air quality and population and human health from the focus given within the draft NTS2 to building resilience and supporting climate change adaptation. This approach, and the identification of opportunities to maximise these benefits are supported. For example, future proofing infrastructure, giving consideration to wider network interdependencies and the use of green infrastructure to support active travel.
- 6.5.4 Significant benefits for air quality, and in turn, population and human health have been identified in the assessment. The SEA also notes the potential for additional benefits to arise for population and human health from reduced exposure to noise. There is scope to maximise these benefits through a focus on areas where poor air quality and exposure to noise is of known concern. The SEA also supports actions that can lead to multiple benefits, for example, active travel can lead to improved air quality, reduced environmental noise and congestion. Additionally, the increased uptake of active travel can lead to benefits for population and human health and can support wider health objectives on the importance of being physically active.
- 6.5.5 Potential benefits for population and human health are also considered likely to arise where a focus is given to identifying and reducing the barriers to accessibility with potential for wider societal benefits, such as community cohesion and reduced social isolation.

- 6.5.6 The draft NTS2 will inform STPR2. In line with the sustainable investment hierarchy, this may lead to new infrastructure requirements and whilst overall benefits for material assets are considered likely, upgrades to, or new infrastructure could lead to secondary and localised impacts, for example, for topic areas such as cultural heritage, biodiversity, landscape and soil. The SEA supports measures in the draft NTS2 to maintain existing assets and recommends the reuse of infrastructure where practicable. Individual development proposals would continue to be subject to the usual consideration through the development management process, supplemented where appropriate by EIA, HRA, and via site controls and Environmental Management Plans.
- 6.5.7 The SEA supports the development of a monitoring and evaluation framework which will provide an opportunity to measure and report annually on performance at national, and where possible, regional and local level. As the delivery plan is developed, consideration should be given to where further monitoring proposals may be required.

7 Monitoring

- 7.1.1 The importance of monitoring the effects of the draft NTS2 is recognised and it is proposed that a monitoring and evaluation framework will be developed to sit alongside the finalised Strategy. The framework will build on the data gathered and headline indicators, under each Priority, have been proposed. For example: *the modal share of transport; emissions of greenhouse gases by transport in Scotland; and, transport causalities and accidents*. The finalised monitoring and evaluation framework will provide an opportunity to measure and report annually on performance at a national, and where possible, regional and local level. This will include assessment against the National Performance Framework Outcomes⁹⁸.
- 7.1.2 In addition to the above framework, there are a wide range of existing programmes in place at the national and local level to monitor environmental status and assess performance against established environmental indicators, many of which are of relevance to the draft NTS2. For example, Scottish State of the Environment Reports are produced every three years⁹⁹.
- 7.1.3 Scottish greenhouse gas emissions data is published as part of the Scottish Government statistics series and includes information on international aviation and shipping. The Carbon Account for Transport, produced annually, also provides Scotland's greenhouse gas emissions for transport. Additionally, data on greenhouse gas emissions is also considered in a number of relevant plans, including the Climate Change Plan which is itself accompanied by an annual monitoring framework with implementation indicators to help keep track of where things are going well in regards to policies to achieve the climate change targets and where changes in approach may become necessary. A comprehensive monitoring and evaluation framework is also being developed as part of work in taking forward the Scotland's second climate change adaptation programme due to be finalised later in 2019. This will provide an opportunity to identify whether resilience is increasing and ensure that reporting on progress and implementation is evidentially supported.
- 7.1.4 Transport Scotland¹⁰⁰ also publish annual statistics on data such as road transport vehicles, air and water transport and rail services. Other statistics of relevance are likely to include energy statistics, such as the Annual Compendium of Scottish Energy Statistics¹⁰¹ that report on information such as energy consumption from transport. Additionally, the Energy in Scotland series

⁹⁸ Scottish Government (2019) National Performance Framework [online] Available at: <https://nationalperformance.gov.scot/what-it> (accessed 05/07/2019)

⁹⁹ Scottish Government (2014) Scotland's State of the Environment Report, 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

¹⁰⁰ Transport Scotland (2019) Scottish Transport Statistics [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/> (accessed 05/07/2019)

¹⁰¹ Scottish Government (2019) Annual Compendium of Scottish Energy Statistics [online] Available at: <https://www2.gov.scot/Topics/Statistics/Browse/Business/Energy/ACSES> (accessed 05/07/2019)

reports on changes to Scotland's energy mix, and provides information on how energy is both generated and consumed¹⁰².

- 7.1.5 Monitoring and reporting of air quality currently takes place at 98 monitoring sites throughout Scotland and in some instances, includes real time monitoring data¹⁰³. Key performance indicators aligned to Cleaner Air for Scotland: The Road to a Healthier Future¹⁰⁴ are also monitored.
- 7.1.6 Many of these programmes can help to identify effects arising from the broad range of environmental issues that have been covered in this assessment. It is also likely that as a more detailed delivery plan is developed, further monitoring proposals may be developed.

¹⁰² The Scottish Government (2016) Energy in Scotland 2016 [online] Available at: <http://www.gov.scot/Resource/0050/00501041.pdf> (accessed 05/07/2019)

¹⁰³ Air Quality in Scotland (2019) Air Quality in Scotland: Latest pollution map [online] Available at: <http://www.scottishairquality.scot/> (accessed 05/07/2019)

¹⁰⁴ The Scottish Government (2015) Cleaner Air for Scotland: The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Resource/0048/00488493.pdf> (accessed 05/07/2019)

8 Next Steps

8.1 Commenting on the Environmental Report and draft NTS2

8.1.1 Public views are now invited on the National Transport Strategy 2 – Draft for Consultation and on this Environmental Report. The consultation runs until 23 October 2019 and there are a number of ways that responses can be submitted. These are:

- Online via the Scottish Government website www.transport.gov.scot/NTS2
- In writing to: NTS2 Consultation, 5th Floor, Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF
- By email to: NTS2@transport.gov.scot

8.2 Suggested Questions

8.2.1 Respondents may find the following questions helpful to provide a focus for their responses to this Environmental Report. Please note that responses do not need to be confined to these questions, and more general comments on this Environmental Report and the draft NTS2 are also invited.

Questions:

1. What are your views on the accuracy and scope of the information used to describe the SEA environmental baseline set out in the Environmental Report? (Please give details of additional relevant sources)
2. What are your views on the predicted environmental effects as set out in the Environmental Report?
3. What are your views on the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report?

8.3 Analysis and Use of Responses

8.3.1 Following the consultation, a Post-Adoption Statement will be prepared. The Statement will reflect on the views provided on the findings of the assessment and the proposals in the draft NTS2 and will explain how the comments received have been taken into account in finalising the Strategy.

Appendix A Abbreviations

AQMA	Air Quality Management Area
CCC	Committee on Climate Change
CAFS	Cleaner Air for Scotland
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
EC	European Commission
EIA	Environmental Impact Assessment
ETS	Emissions Trading Scheme
EU	European Union
GHG	Greenhouse Gas
HES	Historic Environment Scotland
HGVs	Heavy Goods Vehicles
HLOS	High Level Output Specification
HRA	Habitats Regulations Appraisal
IPCC	Intergovernmental Panel on Climate Change
ITS	Intelligent Transport System
KM	Kilometres
LGVs	Light Goods Vehicles
MPA	Marine Protected Areas
MtCO ₂ e	Carbon dioxide equivalent
NPF3	National Planning Framework 3
NPF4	National Planning Framework 4
NH ₃	Ammonia
N ₂ O	Nitrous oxide
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NSAs	National Scenic Areas
NTS	National Transport Strategy
NTS2	National Transport Strategy 2
NMVOCs	Non-methane Organic Compounds
O ₃	Ozone
PM _x	Particular Matter

PM ₁₀	Particulate Matter of Diameter Less Than or Equal to 10 microns (µm)
RBMP	River Basin Management Plan
RPP	Low Carbon Scotland: Meeting our Emissions Reduction Targets 2010 – 2022: Report on Proposals and Policies
RPP2	Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013 – 2027: The Second Report on Proposals and Policies
SAC	Special Area(s) of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SIMD	Scottish Index of Multiple Deprivation
SNH	Scottish Natural Heritage
SO ₂	Sulphur dioxide
SPA	Special Protection Area
SPP	Scottish Planning Policy
STAG	Scottish Transport Appraisal Guidance
STPR	Strategic Transport Project Review
STPR2	The second Strategic Transport Project Review
SSSI	Site(s) of Special Scientific Interest
The 2005 Act	The Environmental Assessment (Scotland) Act 2005
The 2009 Act	Climate Change (Scotland) Act 2009
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
VOCs	Volatile Organic Compounds
WEWS	Water Environment and Water Services (Scotland) Act 2003
WFD	Water Framework Directive

Appendix B Broader PPS review

Source	Key environmental objectives
Climatic Factors	
<p>Climate Change (Scotland) Act 2009 (“the 2009 Act”) <i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The 2009 Act creates the statutory framework for GHG emissions reductions in Scotland and requires regular reporting of progress to be undertaken. The 2009 Act also requires that plans (currently known as RPPs) for meeting targets are set out every five years.</p>
<p>Climate Change Delivery Plan: Meeting Scotland’s Statutory Climate Change Targets (2009) <i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>Sets out key challenges arising from climate change, and identifies key sectors for reducing emissions, including electricity demand and supply, heat demand and supply, transport, rural land use, and waste. The plan aims to achieve 4 transformational outcomes:</p> <ul style="list-style-type: none"> • A largely decarbonised electricity generation sector by 2030; • A largely decarbonised heat sector by 2050 with significant progress by 2030; • Almost complete decarbonisation of road transport by 2050, with significant progress by 2030; and • A comprehensive approach to ensure that carbon is factored into land use decisions.
<p>The Climate Change Plan: the draft Third Report on Policies and Proposals 2018-2032 (2018) <i>Also discussed as part of the immediate policy context in section 3.2.</i></p>	<p>The third Report on Policies and Proposals (RPPs) produced to meet the requirements of the 2009 Act. The Plan sets out actions that will be taken and considered to ensure commitments to climate change targets are met, building on progress to date. The Plan focuses on a range of sectors, such as electricity and transport, which are key sources of emissions. The Scottish Government has committed to updating the Climate Change Plan within 6 months of the Climate Change Bill receiving Royal Assent.</p>
<p>Scottish Climate Change Adaptation Programme (2014) and Climate Ready Scotland Scotland’s Climate Change Adaption Programme: 2019-2024: A consultation draft <i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The Scottish Climate Change Adaptation Programme provides an overarching framework for adaptation to climate change, setting out Scottish Ministers’ objectives in relation to adaptation to climate change and their policies and proposals for meeting those objectives, as required by the 2009 Act. The second iteration of the Programme, which builds on the progress of the first programme, is an outcome based programme and is due to be published in 2019.</p>

<p>United Framework Convention on Climate Change (UNFCCC) Paris Agreement</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The Paris Agreement is the first ever legally binding global climate change deal. Adopted by 195 countries, the agreement came into force in November 2016.</p>
<p>Proposed new Climate Change (Scotland) Bill</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The Committee on Climate Change (CCC) provided advice to the Scottish Government including on possible changes to the target framework. The Bill, introduced in May 2018, set targets based on actual emissions and increases the 2050 target to 90% emissions reductions from the baseline, as well as sets interim targets of 56% for 2020, 66% for 2030 and 78% for 2040. Following further advice from the CCC on 2 May, the Government has put forward amendments to the Bill to update the Bill targets to 70% by 2030, 90% by 2040 and net-zero emissions by 2045. The Parliament's Environment, Climate Change and Land Reform Committee voted in favour of these targets at Stage 2 on 18 June.</p>

Implications:

- The transport sector is a significant contributor to GHG emissions.
- The SEA should assess the extent to which the draft NTS2 supports both climate change mitigation and adaptation.

Related SEA topics: Climate change impacts are likely to have a direct or indirect impact on the other SEA topics such as population and human health and air quality.

Population and Human Health including noise and vibration

<p>Air Quality Standards (Scotland) Regulations 2010, transposing the EU Ambient Air Quality Directive (2008/50/EC).</p>	<p>These set limits and targets for a number of airborne pollutants with implications for human health, including carbon monoxide, oxides of nitrogen, sulphur dioxide, and particulates.</p>
<p>Air Quality (Scotland) Regulations 2000, Air Quality (Scotland) Amendment Regulations 2002 and Air Quality (Scotland) Amendment Regulations 2016</p>	<p>Set objectives for a number of airborne pollutants with implications for human health under the Environment Act 1995.</p>
<p>The Pollution Prevention and Control (Scotland) Regulations 2012</p>	<p>These aim to prevent or reduce damage to air, water and land arising from industrial processes, potentially preventing or reducing adverse human health impacts caused by exposure to industrial-related discharges.</p>
<p>Environmental Noise Directive (2002/49/EC)</p>	<p>Noise is recognised as a statutory nuisance and the Directive sets out measures relating to noise pollution and disturbance from vibration. Protection is</p>

	also afforded within the Environmental Protection Action 1990 and Environmental Noise (Scotland) Regulations 2006, at the UK and national level, respectively. The Directive introduced methods for mapping noise, plans to address it and requirements for making information available to the public.
Land Reform (Scotland) Act 2003	Set out in three parts, the Act includes provisions for access to the outdoors for recreational and educational purposes, amongst others. It also sets out the statutory duties, responsibilities and powers of local authorities and national park authorities in relation to the provision and promotion of rights of access.
National Planning Framework 3 (NPF3)/Scottish Planning Policy (SPP) <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	Within “A successful, sustainable place” discussion centres on the key role our natural and cultural assets, both urban and rural, play in supporting sustainable growth, maintaining their distinctiveness and promoting the quality of life and benefits that are attained from them. NPF3 also sets out the important role that planning can play in improving connectivity, promoting more sustainable patterns of transport and travel as part of the transition to a low carbon economy. This also links with the ambitions of “a natural, resilient place” through the role that green infrastructure can play in delivering this; for example, the Central Green Scotland Network, a designated National Development in the NPF3. Scottish Ministers are now commencing work on the next National Planning Framework (NPF4). The development of NPF4 will be aligned with work focusing on transport issues, including the development of the second Strategic Transport Projects Review (STPR2).
A Healthier Future – Scotland’s Diet & Healthy Weight Delivery Plan <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	The delivery plan sets out a range of actions that seek to improve the health of Scotland’s population, including through the promotion of increasing levels of physical activity.
A More Active Scotland: Scotland’s Physical Activity Delivery Plan <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	The Plan sets out a commitment to increase physical activity in Scotland. Focus is given to the supporting an increased uptake in active travel, including a commitment to invest in active travel infrastructure.
A Connected Scotland: our strategy for tackling social isolation and	The Scottish Government’s first national strategy to tackle social isolation and loneliness and build stronger connections. The role of the transport network in building social connections and

loneliness and building stronger social connections <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	importance of physical activity is noted in the Strategy.
A long-term vision for active travel in Scotland 2030 (2014)	Aims to encourage more people to walk and cycle for shorter everyday journeys. Focus on areas such as infrastructure, transport integration, cultural and behaviour change, community ownership and planning.
Cleaner Air for Scotland – The Road to a Healthier Future (2015) <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	Notes the importance of clean air for health and wellbeing, and sets out information on the sources of air pollution and the impacts on health that these can have, in addition to setting out series of actions that seek to improve air quality. The close relationship between air pollution and environmental noise is also noted.

Implications:

- Population and human health is afforded protection by a range of policies either directly or indirectly, and commitments include improving mental and physical health, in addition to wellbeing. There are numerous on-going commitments to improving mental and physical health and wellbeing.
- The draft NTS2 could play a key role in proving benefits, for example, through reduced air pollution and improving access to sustainable transport options, including through the promotion of active travel. The SEA should explore the extent to which these objectives are being met, including identifying opportunities for wider benefits to be achieved.
- Noise and other nuisances are also a focus for legislation which also includes action aimed to reduce the contribution of noise to community and individual health and wellbeing problems. The SEA could play a role in highlighting how the draft NTS2 may contribute to noise issues, either temporarily or permanently.

Related SEA topics: Many of the issues that affect population and human health have direct or indirect impacts on other SEA topics such as air quality.

Air Quality

EC Ambient Air Quality Directive (2008/50/EC)	This Directive is transposed via the Air Quality Standards (Scotland) Regulations 2010 and these set limits and targets for a number of airborne pollutants including carbon monoxide, oxides of nitrogen, sulphur dioxide, and particulates. The Regulations also satisfy the mandate of the EC's 4 th Air Quality Daughter Directive (2004/107/EC), which applies limits to ambient concentrations of certain heavy metals and polycyclic aromatic hydrocarbons.
Air Quality Strategy for England, Scotland, Wales and Northern Ireland	Areas in which measured levels of airborne pollutants exceed the objectives set out in the Air Quality Strategy are designated as Air Quality

	Management Areas (AQMAs). Local authorities have a duty to develop and implement Air Quality Action Plans in these locations in order to raise air quality to an acceptable level.
Air Quality (Scotland) Regulations 2000, Air Quality (Scotland) Regulations 2002 and Air Quality (Scotland) Regulations 2016	Set objectives for a number of airborne pollutants with implications for human health under the Environment Act 1995.
Local Air Quality Management Policy Guidance 2016	Explains the objectives for improving air quality and provides a framework for activities in Local Air Quality Management Areas.
Cleaner Air for Scotland – The Road to a Healthier Future (2015) <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	Notes the importance of clean air for health, wellbeing and the environment and sets out a series of actions and frameworks to improve air quality in Scotland.
The Pollution Prevention and Control (Scotland) Regulations 2012	Allows for the regulation and monitoring of certain industrial activities that can generate airborne pollution.

Implications:

- The transport sector can have a significant impact on air quality.
- The SEA should assess the extent to which the draft NTS2 could influence air quality, positively or negatively, taking into account the often complex relationship between air pollution and climate change.
- The assessment should include particular focus on areas where pollution is already concentrated (Local Air Quality Management Areas) highlighting where possible, the need for more detailed assessment at the regional and local level where appropriate.

Related SEA topics: Air quality can directly or indirectly impact on other SEA topics, such as biodiversity and population and human health.

Biodiversity, flora, and fauna

Council Directive 79/409/EEC on the conservation of wild birds / Directive 2009/147/EC (codified version)	Relates to the long term conservation of all species of naturally occurring birds in the wild state across European Member States. Applies to factors with potential to affect birds including human activity leading to the destruction and pollution of habitats. Allows for designation of special protection areas, as part of a coherent ecological network, known as Natura 2000 network.
Council Directive 92/43/EEC the conservation of natural habitats and of wild fauna and flora	Aims to promote the maintenance of biodiversity as part of sustainable development. Allows for designation of special areas of conservation, as part of a coherent ecological network known as Natura 2000 network. Notes that land-use planning and development policies should encourage the

	management of features of the landscape which are of major importance for wild fauna and flora. Also requires an appropriate assessment to be made of any plan or programme likely to have a significant effect on the conservation objectives of a designated site.
United Nations Aichi Targets	Includes a number of strategic goals: address biodiversity loss through mainstreaming, reduce direct pressures on biodiversity and promote sustainable use, improve biodiversity by safeguarding ecosystems, species and genetic diversity, and enhance the benefit to all from biodiversity and ecosystem services. Also aims to enhance participatory planning, knowledge management and capacity building.
Wildlife and Countryside Act 1981	Core legislation on biodiversity across the UK which explains the various levels of protection afforded to birds, animals and plants. Provides the legal framework within which activities that impact on protected species constitute an offence, and makes available powers of enforcement. Applies to the terrestrial environment and inshore waters. This legislation has been amended in part by the Nature Conservation (Scotland) Act 2004.
Nature Conservation (Scotland) Act 2004	Introduced the duty for public bodies to further the conservation of biodiversity, and the requirement for a Scottish Biodiversity Strategy. Also sets the framework designating sites of special scientific interest (SSSIs).
Conservation (Natural habitats &c.) Amendment (Scotland) Regulations 2007	Part IVA sets out the requirement for the appropriate assessment of land use plans. This is required where a land use plan is likely to have a significant effect on a European site and is not directly connected with or necessary to the management of the site. The assessment should be undertaken prior to the plan being given effect and should include consultation with the appropriate nature conservation body (SNH). Notes that the opinion of the general public should be taken into account, if appropriate.
Wildlife and Natural Environment (Scotland) Act 2011	Draws together and updates legislation on nature conservation. Focuses on a series of key measures relating to certain land management activities.
UK Biodiversity Action Plan	Emphasises the importance of biodiversity and notes the impact of human development and the use of land on the health of ecosystems. Includes the overall goal of conservation and enhancement of biodiversity within the UK, to contribute to the conservation of global biodiversity. Also aims to

	increase public awareness and involvement in conservation.
The 2020 Challenge for Scotland's Biodiversity <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	The 2020 Challenge is Scotland's response to the UN Aichi Targets for 2020 and the EU Biodiversity Strategy to 2020. The 2020 Challenge supplements the 2004 Scottish Biodiversity Strategy and key aims include preserving and restoring the health of Scotland's ecosystems at a catchment-scale and promoting climate change resilience.
<p>Implications:</p> <ul style="list-style-type: none"> • Policy objectives aim to protect and enhance biodiversity within designated and non-designated sites. • The SEA should assess the extent to which the draft NTS2 has the potential to impact on biodiversity, flora and fauna, both positively and negatively. <p>Related SEA topics: Biodiversity, flora, and fauna impacts have direct or indirect effects on other SEA topics such as air, water and soil quality.</p>	
Soil	
European Commission's Thematic Strategy for Soil Protection	The Strategy is founded on the principles of preventing further soil degradation and safeguarding its functions, ensuring responsible soil use and management patterns, mitigating the effects of human activities and environmental phenomena on soil condition, as well as restoring degraded soils to an acceptable level.
Scottish Soil Framework 2009	<p>The Framework acknowledges the multiple functions of soils and includes a vision that soils be recognised as a vital part of our economy, environment, and heritage, and be safeguarded for existing and future generations. It notes that while Scotland's soils are generally in good health, they face two significant pressures: climate change and the loss of organic matter, and identifies 13 key soil outcomes, such as protecting soil biodiversity, reducing and remediating soil erosion, and tackling greenhouse gas emissions.</p> <p>It also considers that improving the availability of soil data and highlighting the knowledge gaps and research needs in Scotland are both important.</p>
Scotland's National Peatland Plan	The Plan sets out a number of targets regarding the protection and restoration of peatland.
Scottish Government's draft Peatland and Energy Policy Statement	Seeks to align peatland and energy policy in order to maximise greenhouse gas emissions abatement in a way that delivers multiple benefits.

The Climate Change Plan	The Plan includes peatland restoration among its suite of policy outcomes aimed at reducing Scotland's greenhouse gas emissions.
Getting the best from our land: A Land Use Strategy for Scotland 2016-2012 <i>Also discussed in section 3.2 as part of the immediate policy context.</i>	The Strategy focuses on land as one of our key natural assets and recognises that it underpins much of Scotland's economic activity, further noting that the way it is used and managed is therefore of key importance.

Implications:

- Soil is recognised in a range of policies, European and national, as a key resource that requires protection.
- Soils are subject to a range of pressures, including changes to land management, climate change, and those that arise from construction activity, such as soil sealing and loss of biodiversity.
- Within the context of climate change, soil resources are recognised as an increasingly important resource. Safeguarding carbon rich soil, including peatland, has become a high priority.
- The draft NTS2 should aim to consider all soils as a valuable, non-renewable resource.
- The SEA should consider, where possible, the potential impact on soils from the draft NTS2.

Related SEA topics: Loss of soil or poor quality soils can have direct or indirect impacts on other SEA topics such as biodiversity, climatic factors and water quality.

Water including coastal and marine

EU's Water Framework Directive (2000/60/EC)	Introduced as a more comprehensive approach to managing and protecting Europe's water bodies including rivers, lochs, transitional waters, coastal waters, and groundwater resources. The WFD sets out a requirement for an assessment of both chemical and ecological status, alongside the requirement to consider the status of biodiversity as an indicator in determining water quality, and has a goal of bringing all European waters to "good ecological and chemical status". The Directive was transposed into Scottish law by the WEWS Act 2003 (see below).
Water Environment and Water Services (WEWS) (Scotland) Act 2003	Scotland fulfils its water protection obligations under the WFD primarily through WEWS which defines the establishment of River Basin Management Plans. These plans aim to improve the environmental status of water bodies, and reduce adverse impacts on the water environment as a whole.
Scotland's River Basin Management Plans (RBMPs)	The current RBMPs are: the Scotland river basin management plan for the Scotland river basin district: 2015-2027 and the river basin management

	plan for the Solway Tweed river basin district 2015-2027. They provide an assessment of the condition of Scotland's water environment, and identify where efforts for protection and improvement must be targeted.
Water Environment (Controlled Activities) (Scotland) Regulations 2011	The Regulations, more commonly known as the Controlled Activity Regulations (CAR), and their further amendments, apply regulatory controls over activities which may affect Scotland's environment. The Regulations also fulfil the requirements of the WFD and cover river, lochs, transitional waters (estuaries), coastal waters, groundwater, and ground water dependent wetlands.
Flood Risk Management (Scotland) Act 2009	The Act implements the requirements of the EU Floods Directive (2007/60/EC). The Directive mandates the creation of flood risk management plans for all inland and coastal areas at risk of flooding, integrating their development and employment with existing RBMPs. Flood risk management plans are designed to minimise negative impacts due to flooding on a range of receptors, including human health, the environment, and cultural heritage.
Pollution Prevention and Control (Scotland) Regulations 2012	Developed specifically to control pollution relating to industry discharges, including emissions to water.
Bathing Water Directive (76/1160/EEC)	Aims to protect and reduce pollution of bathing waters. Makes provisions for identifying and monitoring bathing waters and requires the identification of acceptable quality standards.
European Marine Strategy Framework Directive 2008/56/EC	Notes the need to address pressures on natural marine resources, and to reduce impacts on marine waters. Emphasises the value of the marine environment, for maintaining biodiversity, and "providing diverse and dynamic oceans and seas which are clean, healthy and productive". The Directive obligates Member States to develop adaptive management strategies to bring their marine environments to Good Environmental Status by 2020 as well as to safeguard the marine resources that underlie key economic and social activities. The Directive is implemented within the UK via a three-part Marine Strategy. Revised criteria and methodological standards for Good Environmental Status as well as standardised methods for monitoring and assessment were introduced in 2017.
Scotland's National Marine Plan (2015)	The national marine plan fulfils joint requirements under the Marine (Scotland) Act 2010 and Marine

	<p>and Coastal Access Act 2009 to prepare marine plans, providing a cohesive approach to the management of both inshore and offshore waters in accordance with EU Directive 2014/89/EU on maritime spatial planning. It seeks to promote development in a way that is compatible with the protection and enhancement of the marine environment. The Plan covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The Plan also notes the interaction between marine and terrestrial planning and highlights the importance of alignment between both.</p>
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Implications:

- Policy relating to the water environment aims to improve the condition of water bodies through appropriate management of activities that could lead to a range of pressures.
- Policy on flood risk management seeks to promote sustainable solutions that reflect and address the impact of climate change on the water environment over the long term.
- There are numerous existing environmental protection objectives for the marine and coastal area, including those that recognise and protect their valued natural and cultural heritage objectives.
- Coastal planning emphasises the importance of integrated management of these areas, whilst the National Marine Plan requires a consistent approach with terrestrial planning.
- The SEA should consider the potential impacts of measures or policies within the draft NTS2 on the water environment.

Related SEA topics: Water quality and quantity can have a direct or indirect impact on other SEA topics such as biodiversity and population and human health.

Cultural Heritage and the Historic Environment

<p>Historic Environment Scotland (HES) Policy Statement (2016)</p>	<p>The HES Policy Statement 2016 guides the operation of decision making in the Scottish planning system and provides an overarching framework for historic environment policy in Scotland. It sets out how HES fulfills its regulatory and advisory roles and how it expects others to interpret and implement SPP. Historic Environment Circular 1 provides further detail on how the processes set out in Policy Statement work.</p> <p>Together with Our Place in Time, they emphasise the importance of preserving recognised sites, avoiding negative impacts on them and their wider setting, and contributing to their enhancement where appropriate. These key objectives also extend to</p>
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	<p>taking into accounting of, and avoiding damage to or loss of, currently unknown archaeology.</p> <p>The 2016 publication replaces the operational practises set out in the Scottish Historic Environment Policy (2011).</p>
Our Place in Time – The Historic Environment Strategy for Scotland (2014)	Our Place in Time sets out a 10 year vision for Scotland’s historic environment. The vision is founded upon the fundamental aims of understanding, protecting, and valuing our historic environment, ensuring it continues to benefit Scotland’s wellbeing through its cultural, social, environmental, and economic contributions.
NPF3/SPP	NPF3/SPP set out to improve the quality of settlements and built environment with a national level focus, noting the importance of protecting and enhancing natural and cultural resources.
Historic Environment (Amendment) (Scotland) Act (2011)	This builds upon existing legislation pertaining to ancient monuments and listed buildings as well as providing for the creation of inventories of gardens and designed landscapes, as well as of battlefields. Specifically, the 2011 Act amends the Historic Buildings and Ancient Monuments Act 1953 and modifies the Ancient Monuments and Archaeological Areas Act 1979 as well as the Planning (Listed Buildings and Conservation) (Scotland) Act 1997.
Historic Environment Scotland’s Managing Change in the Historic Environment: Guidance notes	These set out to advise planning authorities making decisions pertaining to applications for conservation area and listed building consents, and the consideration of planning applications on the potential impacts upon the historic environment and the greater context in which it is found. The guidance notes have been developed in line with Scottish Historic Environment Policy and SPP.
Creating Places: A policy statement on architecture and Place (2013)	The policy statement sets out the value good design can deliver, noting that successful places can unlock opportunities, build vibrant communities and contribute to a flourishing community. The important role of maintaining cultural connections is also noted.
Designing Streets: A Policy Statement for Scotland (2010)	Designing Streets is the first policy statement in Scotland for street design and marks a change in the emphasis of guidance or street design towards place-making and away from a system focused upon the dominance of motor vehicles.

Implications:

- National policy on cultural heritage emphasises the role of the environment in supporting sustainable economic growth.
- Policy on architecture and design also aim to ensure that high quality built environments contribute to quality of life. These also set out the importance of planning in relation to transport and are also of relevance to a number of other environmental topic areas.
- While some of the guidance is site specific, key principles for change in the historic environment could be applicable at a broader scale.
- The SEA should consider impacts of the draft NTS2 on cultural heritage, from a national perspective.

Related SEA topics: The SEA Topics of Cultural Heritage and Landscape are closely linked. Also climate change can have direct or indirect impacts on cultural heritage and the historic environment.

Landscape and Visual Amenity

<p>The European Landscape Convention (2000)</p>	<p>The European Landscape Convention strives to promote landscape protection, management, and planning as well as achieve a more concerted approach to addressing landscape issues at the European scale. The Convention presents a highly inclusive definition of landscape, specifying that protection and enhancement activities should apply equally to both “outstanding” as well as less remarkable or degraded landscapes. This definition encompasses natural, rural, urban, and peri-urban landscapes across land, marine, and inland water environments.</p>
<p>The National Scenic Areas (NSAs) Programme</p>	<p>The NSAs Programme identifies Scottish landscapes of “outstanding scenic value in a national context” for the purpose of ensuring such areas are afforded due consideration and protection within the local authority planning system.</p>
<p>NPF3/SPP</p>	<p>NPF3 acknowledges the multiple benefits we derive from landscapes, such as improving human health and wellbeing, as well as contributing to our quality of life. The vulnerability of landscape to climate change is also noted. Additionally, the importance of the protection and enhancement of Scotland’s natural heritage and landscapes in informing land use planning is set out in SPP.</p>
<p>SNH Natural Heritage Futures (2002, updated 2009)</p>	<p>Natural Heritage Futures aim to guide the sustainable management and use of Scotland’s nature and landscape up to 2025. They note the importance of the diversity of Scotland’s landscapes and their role inspiring</p>

	people, creating sense of place and areas for recreation and enjoyment. They emphasise the strong cultural links with the environment and recommend an integrated solutions and spatial plans with sufficient flexibility and clear objectives for natural heritage. The prospectuses were reviewed and updated in 2009 and consider transport, including transport infrastructure, among the factors that can influence landscape.
SNH Landscape Policy Framework	The Policy Framework sets out an overarching aim for landscapes “to safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland’s landscapes as a whole, so as to ensure tomorrow’s landscapes contribute positively to people’s environment and are at least as attractive and valued as they are today”.
SNH landscape policy – Wild Land Wildness in Scotland’s Countryside: Policy Statement	<p>The SNH policy statement describes the main pressures leading to loss of wildness and considers how to identify and care for wild land in Scotland.</p> <p>SNH identified 42 wild land areas following a detailed analysis of where wildness can be found across all of Scotland’s landscapes. This is based on four attributes: perceived naturalness of land cover; ruggedness of the terrain; remoteness from public roads or ferries; and lack of buildings, roads, pylons and modern artefacts This informed the preparation of the 2014 map of wild land areas.</p> <p>Wild land is not a statutory designation, however wild land areas as identified on the 2014 SNH map are recognised as nationally important assets which merit strong protection in NPF3 and SPP.</p>
<p>Implications:</p> <ul style="list-style-type: none"> • The SEA should assess the potential impacts of policies in the draft NTS2 on landscape and visual amenity. • The assessment should look beyond protected areas, reflecting the principles of the European Landscape Convention. <p><u>Related SEA topics: Climate change can have direct or indirect impacts on landscape, cultural heritage, and the historic environment.</u></p>	
Material Assets	
Strategic Transport Projects Review (2008)	The Strategic Transport Projects Review (STPR) sets out a range of projects that aim to improve journey times and connections, reduce emissions and improve quality, accessibility, and affordability, identifying national, land-based transport priorities for

	<p>the medium to long-term (2032). STPR seeks to compliment transport interventions taken forward at regional and local levels. STPR sets out a tiered approach to transport investment which includes promoting measures that make better use of existing capacity.</p> <p>The Scottish Government has committed to aligning the next review of the STPR and development of STPR2 with the preparation of NPF4, with both being informed by the NTS2.</p>
Scottish Ferry Services: Ferries Plan (2013-2022)	<p>Published in 2012, the Plan notes the essential role of ferries within Scotland's transport network for both island and mainland communities and aims to support economy and communities through reliable, high quality and affordable transport links. It provides a comprehensive review of ferry services alongside short, medium and long-term improvements over the next decade, as well as a commitment to retain all existing essential services.</p> <p>The Plan will be reviewed with the intention that a new long-term strategy will be in place in good time for the expiry of the first Ferries Plan in 2002.</p>
Rail Infrastructure Strategy Consultation 2017	<p>The Consultation sought views on a proposed approach to the rail infrastructure investment strategy from April 2019. The results from the consultation have helped to shape the Scottish Ministers High Level Output Specification (HLOS), which outlines regulated requirements for rail in the period 2019-2024, including performance, reduced journey times and the capability and resilience of the Scottish Rail network. The outcomes of the consultation are reflected in the Rail Enhancement and Capital Investment Strategy, published March 2018, which outlines the future approach to investment in railway improvements.</p>
Scotland's Railways (2006)	<p>Sets out Scottish Ministers' vision for the rail network over a 20 year time period. It sets out how rail can contribute to achieving the three strategic outcomes of: improving journey times and connections, reducing emissions, and improving quality, accessibility and affordability.</p>
Delivering the goods – Scotland's rail freight strategy (2016)	<p>Sets out a vision for a competitive, sustainable rail freight sector playing an increasing role in Scotland's economic growth by providing a safer, greener and more efficient way of transporting products and</p>

	materials. The Strategy notes the role of rail freight in tackling climate change and supporting stronger safer communities.
<p>NPF3/SPP</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>NPF3 sets out a spatial expression of the Scottish Economic Strategy and a framework for the long-term development of Scotland as a whole and includes 14 national developments. SPP sets out Ministers’ policy priorities for the operation of the Planning system.</p> <p>Scottish Ministers are now commencing work on the next National Planning Framework (NPF4). The development of NPF4 will be aligned with work focusing on transport issues, including the development of STPR2.</p>
<p>Infrastructure Investment Plan 2015</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The plan supports the Scottish Economic Strategy through a focus on strategic long term infrastructure priorities, noting the role that well planned investment in new or existing infrastructure can play a central role in improving competitiveness and driving inclusive economic growth.</p>
<p>Getting The Best From Our Land: A Land Use Strategy for Scotland 2016–2021</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>Sets a framework for a more unified and strategic approach to land use within Scotland. Its fundamental principles of “long-term, well integrated, sustainable land use delivering multiple benefits for all society” are consolidated across the management strategies for a range of sectors including forestry and agriculture.</p>
<p>The Scottish Energy Strategy: The future of energy in Scotland (2017)</p> <p><i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The recently published Scottish Energy Strategy sets out Scottish Government’s vision for energy generation and consumption to 2050. The Strategy centres around three themes: meeting our energy supply needs, transforming Scotland’s energy use and smart local energy systems.</p> <p>The Strategy builds on a well-established framework for energy policy in Scotland, including Scottish Government’s 2020 Routemap for Renewable Energy, the Electricity Generation Policy Statement, the Heat Policy Statement: Towards Decarbonising Heat – Maximising the Opportunities for Scotland, and the Community Energy Policy Statement.</p>
<p>Scotland’s Forestry Strategy 2019-2029</p>	<p>The Scottish Forestry Strategy 2019-2029 aims to achieve sustainable development of forests and woodlands, through good management and better integration with other land uses. Priorities include ensuring forests and woodlands are managed</p>

	<p>sustainably, increasing the adaptability and resilience of forests and woodlands and expanding the area of forests and woodlands, recognising wider land-use objectives. The Strategy sets out a vision of “In 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy flourishing communities</p>
<p>Making Things Last: A Circular Economy Strategy for Scotland (2016)</p>	<p>Sets out Scotland’s ambitions for changing how waste is seen in our economy. It seeks to reduce waste lost from the economy, and retain the value of materials through repair, reuse, recycling, and remanufacturing via a range of policies and proposals. This is noted as fundamental to helping tackle climate change and to preserve natural capital. Four priorities areas for action are identified in Making Things Last: food and drink and the broader bio-economy, remanufacture, construction and the built environment, and energy infrastructure. Making Things Last builds the progress that has been made to date and integrates key elements of the Zero Waste Plan (2010) and Safeguarding Scotland’s Resources (2013), with a view that in due course, the Strategy will supersede both.</p>
<p>Realising Scotland’s full potential in a digital world: A Digital Strategy for Scotland (2017) <i>Also discussed in section 3.2 as part of the immediate policy context.</i></p>	<p>The Strategy is a refresh of the 2011 “Scotland’s Digital Future” sets out in action of how the Scottish Government intend to achieve its digital ambition.</p>
<p>Implications:</p> <ul style="list-style-type: none"> • These policies, plans and strategies set out a number of objectives of relevance to the draft NTS2 environmental assessment. • Many of the aims around material assets focus on improving infrastructure with underpinning themes that seek to reduce emissions from key activities such as transport, energy and waste. • These objectives also have a strong economic focus, but are linked to opportunities for making the best use of resources and creating stronger, more resilient communities and environments. • The SEA should explore the extent to which energy consumption by the transport sector and the broader aims to improve strategic infrastructure and reduce waste are considered within the draft NTS2. <p>Related SEA topics: Changes made to material assets can directly or indirectly impact on other topic areas, such as air quality and population and human health.</p>	

Appendix C Relevant Environmental Protection Objectives and Environmental Baseline Information

1 Overview

- 1.1 Schedule 3 of the 2005 Act requires that the following be identified when undertaking an SEA:
- Relevant aspects of the current state of the environment and its likely evolution without the implementation of the plan or programme.
 - Environmental characteristics of areas likely to be affected.
 - Relevant existing environmental problems.
 - Relevant environmental protection objectives at the international, European or national level.
- 1.2 Many objectives for environmental protection and enhancement are detailed within existing legislation, policies, strategies, and plans at the international, UK, and national levels across all environmental topic areas. In addition to forming the context for the draft NTS2, these also form the context for this SEA. For each environmental topic scoped into this assessment, a summary of the existing environmental protection objectives has been set out below. The summaries have been included to provide an overview of, and complement, the review of environmental protection objectives relevant to the draft NTS2 which are set out in Section 3 and Appendix B.
- 1.3 Information has been drawn from a range of sources including the Scottish Government, Scottish Natural Heritage (SNH), Historic Environment Scotland (HES), the Scottish Environmental Protection Agency (SEPA), and Scotland's Environment Web, amongst others.

2 Climatic Factors

Environmental Protection Objectives: The Scottish Government recognises that there is a global climate emergency. There are many plans and policies that seek to reduce the rate of climate change, not least the Climate Change (Scotland) Act 2009. Mitigating climate change is a key part of many policies, including those that relate to sectors such as transport and energy. The new Climate Change Bill contains proposals to strengthen the ambition of climate change targets and reach net-zero emissions of all greenhouse gases by 2045. The importance of adaptation to climate change impacts is also set out in a number of policies, with many noting the importance of collaborative action in order to deliver the objectives for adaptation.

Overview

- 2.1 A report by the Intergovernmental Panel on Climate Change (IPCC), published in October 2018, predicts that the impacts and costs of global warming 1.5°C above pre-industrial levels will be far greater than expected, and consequently much worse at 2°C¹⁰⁵. Further, the IPCC also reported that 1.5°C could be reached in as little as 11 years, and almost certainly within 20 years without major reductions in CO₂ emissions. The Scottish Government recognises that there is a global climate emergency and is acting accordingly.
- 2.2 The extent of the effects of climate change will vary by location, but there is significant evidence that significant changes in precipitation, snowfall, seasonality, cloud cover, humidity, wind speeds, soil moisture, sea level rise and extreme weather may occur¹⁰⁶. Temperatures have been increasing, with the last decade being the warmest since records began¹⁰⁷. Rainfall has also increased, with an increased intensity of downpours¹⁰⁸. In addition, many of the activities that contribute to climate change (e.g. transport and energy generation) are often also responsible for generating air pollution.
- 2.3 In 2017, Scotland's emissions of the seven GHG were estimated to be 40.5 million tonnes of carbon dioxide equivalent (MtCO_{2e}), a decrease in source emissions of 3.3% from 2016¹⁰⁹. The main contributors to this reduction

¹⁰⁵ IPCC (2018) Global Warming of 1.5oC October 2018 [online] Available at: <https://www.ipcc.ch/> (accessed 05/07/2019)

¹⁰⁶ IPCC (2014) Climate Change 2014: Synthesis Report - Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [online] Available at: <http://epic.awi.de/37530/> (accessed 05/07/2019)

¹⁰⁷ Adaptation Scotland (2018) Climate trends and projections [online] Available at: <https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections> (accessed 05/07/2019)

¹⁰⁸ *ibid*

¹⁰⁹ Scottish Government (2019) Scottish Greenhouse Gas Emissions 2017 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/> (accessed 11/07/2019)

between 2016 and 2017 are reported to be a fall in energy supply emissions, driven almost entirely by a decrease in the use of coal in the power generation sector, and a reduction in emissions from the combustion of fossil fuels in the chemical industry. A 46.8% reduction in estimated GHG emissions between 1990 and 2017 was also reported¹¹⁰. Decreases in emissions from energy supply, waste management (i.e. landfill), business and industrial processes (such as manufacturing) and agriculture and related land use were reported as the four main contributors to this overall reduction.

Evolution of the Baseline – Pressures, Trends and Key Points

- 2.4 Climate change projections indicate that the climate trends observed over the last century will continue and intensify over the coming decades. Key long-term climate change trends for Scotland are that weather may become more variable, typical summers will be hotter and drier, winter and autumn will be milder and wetter and sea levels will continue to rise¹¹¹. Increases in summer heat waves, extreme temperatures and drought, as well as an increase in the frequency and intensity of extreme precipitation events, are also expected¹¹².
- 2.5 Climate change is considered to be one of the most serious environmental threats to sustainable development, with adverse impacts expected to human health, food security, economic activity, natural resources, and physical infrastructure¹¹³. Adaptation to the effects of climate change is now acknowledged as being necessary to respond effectively and equitably to the impacts of climate change.
- 2.6 The main contributors to Scotland's GHG emissions in 2017 were the transport sector (including international aviation and shipping) (approximately 37%), agriculture and related land uses (24%), business and industrial process (22%), the energy supply sector (15%), and the residential sector (15%)¹¹⁴. Relatively minor totals were reported for public sector buildings, development, and waste management. Forestry was a net carbon sink and contributed to reducing emissions by approximately 24% in 2017¹¹⁵.
- 2.7 Almost three-quarters (73%) of Scotland's GHG emissions in 2016 were in the form of carbon dioxide (CO₂)¹¹⁶. During 2016, CO₂ was the main GHG emitted

¹¹⁰ Scottish Government (2018) Scottish Greenhouse Gas Emissions 2016 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2016/pages/3/> (accessed 05/07/2019)

¹¹¹ Adaptation Scotland (2018) Climate trends and projections [online] Available at: <https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections> (accessed 05/07/2019)

¹¹² *ibid*

¹¹³ ICAO (undated) Climate Change: Adaptation [online] Available at: <http://www.icao.int/environmental-protection/Pages/adaptation.aspx> (accessed 05/07/2019)

¹¹⁴ Scottish Government (2019) Scottish Greenhouse Gas Emissions 2017 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/> (accessed 11/07/2019)

¹¹⁵ *ibid*

¹¹⁶ *ibid*

in most sectors, with the exception of agriculture and related land use sector and waste management. Methane (followed by CO₂ and nitrous oxide) was the main gas emitted by the agriculture and related land use sector and almost all emissions emitted by the waste management sector were in the form of methane.

- 2.8 Transport emissions, including Scotland's share of international aviation and shipping, accounted for 36.8% (14.9 MtCO₂e) of Scotland's total emissions in 2017, an increase of 2.2% from 2016¹¹⁷ and the transport sector is considered to be the largest source of GHG emissions in Scotland. Transport emissions have remained relatively steady from 1990 to 2017, and the increase in emissions in 2017 was reported to be mainly due to an increase in emissions from road transport, in particular passenger cars and light duty trucks.
- 2.9 Between 1990 and 2017, road transport emissions have increased by 11.1%¹¹⁸. This is reported as being due to an increase in activity, partially offset by improvements in the efficiency of vehicles. Emissions from international aviation increased by 6.8% between 2016 and 2017, and have increased significantly since 1990 as a result of greater demand¹¹⁹. A slight increase of 3.6% has been reported for emissions from international shipping between 2016 and 2017, however, emissions have reportedly declined by over half since 1990¹²⁰.
- 2.10 Estimates of CO₂ emissions per passenger-km for different modes of transport are available only for GB/UK as a whole¹²¹. The lowest emitting modes of transport per passenger-kilometre (km) are national coaches and light rail and tram, approximately 28 and 40 grams of CO₂e respectively. Air travel tends to be the highest emitter per passenger-km, particularly domestic flights, which account for 158 grams of CO₂e per passenger-km¹²².
- 2.11 Transport is estimated to account for 25% of all Scotland's total energy use with the majority of this arising from road transport and provided for by fossil fuels¹²³. Action that sets out to decarbonise the transport sector through increased electrification, particularly in terms of road transport, could deliver significant benefits in terms of climatic factors¹²⁴. However, the demand for electricity is

¹¹⁷ Scottish Government (2019) Scottish Greenhouse Gas Emissions 2017 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/> (accessed 11/07/2019)

¹¹⁸ *ibid*

¹¹⁹ *ibid*

¹²⁰ *ibid*

¹²¹ Transport Scotland (2019) Scottish Transport Statistics No 37: 2018 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/> (accessed 01/07/2019)

¹²² *ibid*

¹²³ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://beta.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

¹²⁴ Scottish Government (2017) Draft Climate Change and Energy Strategies: joint strategic environmental assessments [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

expected to rise as a result of the electrification of transport, also posing a challenge for the distribution network¹²⁵.

- 2.12 Although other GHGs, such as carbon monoxide (CO) and nitrogen oxides (NOx), make up only a small percentage of emissions from transport, they are harmful pollutants and powerful GHGs which contribute to negative climatic impacts¹²⁶. Additionally, many air pollutants are also GHGs and there are opportunities to address both air pollution and climate change simultaneously through co-ordinated effort across multiple sectors, particularly transport and the energy sector¹²⁷.
- 2.13 Climate change has also been identified as a primary pressure on many of the SEA topic areas (i.e. soil, water, biodiversity, cultural heritage and the historic environment). These pressures and predicted impacts have been discussed further under the individual SEA topics scoped into the assessment. The complex interaction between air quality and climate change has also been considered under the SEA topic of “Air Quality”.

3 Population and Human Health

Environmental Protection Objectives: A range of environmental protection objectives are relevant to population and human health, including aspirations for greenspaces and sustainable transport in and around settlements. Access to the outdoors, green infrastructure and encouragement of physical activity are also key aims. Key environmental objectives relating to this topic also include on-going commitments to reducing pollution, in particular from air pollutants. Wider policy also addresses reducing inequalities and improving health.

Overview

- 3.1 The estimated population of Scotland in 2017 was 5.4 million, and has increased by 5% over the last decade¹²⁸. Projections forecast that the population will continue to rise to around 5.6 million in 2026 to around, continuing to increase to around 5.7 million in 2041¹²⁹. Life expectancy has

¹²⁵ DECC (2012) Electricity System: Assessment of Future Challenges - Summary [online] Available at: <https://www.gov.uk/government/publications/electricity-system-assessment-of-future-challenges> (accessed 05/07/2019)

¹²⁶ The Scottish Parliament (2016) SPICe Briefing - Air Quality in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-35_Air_Quality_in_Scotland.pdf (accessed 05/07/2019)

¹²⁷ *ibid*

¹²⁸ National Records for Scotland (2018) Scotland's population 2017 [online] Available at: <https://www.nrscotland.gov.uk/news/2018/scotlands-population-2017> (accessed 05/07/2019)

¹²⁹ National Records of Scotland (2017) Projected Population of Scotland (2016-based) [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2016-based> (accessed 05/07/2019)

increased over the past three decades, however this has slowed in recent years¹³⁰.

- 3.2 Almost 70% of Scotland's people live in urban areas, which accounts for just 2% of Scotland's land surface¹³¹. Most of the population and industry is concentrated in highly urbanised areas in the Central Belt and on the East Coast, and primarily in four key city regions (Aberdeen, Dundee, Edinburgh, and Glasgow) and a number of smaller cities and towns (i.e. Ayr, Inverness, Perth and Stirling). Around 12.4% of the population live in small towns of less than 10,000 people; of these, around 70% are located within a 30 minute drive of large urban settlements, with the other 30% located more remotely¹³².
- 3.3 Air quality is important for both short and long-term human health. In general, healthy people may not suffer from any serious health effects from exposure to the levels of pollution commonly experienced in urban environments. However, continual exposure can cause harm over the long term, and those with pre-existing health conditions such as heart disease, lung conditions, and asthma can be adversely impacted by daily exposure to air pollutants¹³³. Research has shown that air pollution reduces average life expectancy and can contribute to premature deaths¹³⁴. Air pollution can also worsen inequalities in local environment quality and human health¹³⁵. Activities that generate air pollutants have been considered under the topic of Air Quality.
- 3.4 The Scottish Index of Multiple Deprivation ranks small areas (data zones) in Scotland from the most deprived to the least deprived. It analyses data from a number of indicators across the domains of income, employment, health, education, skills and training, housing, geographic access and crime. Key findings from the 2016 Index show that 14 areas have been consistently among the 5% most deprived in Scotland since the 2004 Index. Of these, half were located in Glasgow City with the remainder located in Inverclyde, Renfrewshire, Highland, Dundee City, Stirling, North Lanarkshire and East Ayrshire. Eleven council areas now have a larger share of the 20% most deprived data zones in

¹³⁰ National Records for Scotland (2018) Scotland's population 2017 [online] Available at: <https://www.nrscotland.gov.uk/news/2018/scotlands-population-2017> (accessed 05/07/2019)

¹³¹ Scotland's Environment (2014) Scotland's State of the Environment Report 2014 – 7 People and the environment [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

¹³² *ibid*

¹³³ Scotland's Environment (2016) Air quality and health [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality-and-health/> (accessed 05/07/2019)

¹³⁴ House of Commons Environmental Audit Committee (2010) Air Quality - Fifth Report of Session 2009-10 – Volume 1 [online] Available at: <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/229/229i.pdf> (accessed on 05/07/2019)

¹³⁵ Scotland's Environment (2016) Air quality and health [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality-and-health/> (accessed 05/07/2019)

Scotland compared to four years ago, with the largest increases observed in West Dunbartonshire, Midlothian, North Ayrshire and South Ayrshire¹³⁶.

- 3.5 There are strong links between obesity and inequalities, with lower socio-economic status associated with higher levels of obesity¹³⁷. This can have harmful consequences for individuals and for the economy as being overweight or obese can increase the risk of developing a range of serious diseases including type 2 diabetes, hypertension, heart diseases, and some cancers, which has cost implications for the economy¹³⁸. Active travel such as cycling or walking can provide access to the outdoors with additional benefits for physical and mental health and well-being, including reducing obesity and stress. Access to healthcare services is also critical to good health, yet many rural residents face a variety of barriers. Common issues are a lack of integrated transport infrastructure and affordability as well as the high reliance of rural communities on private transport¹³⁹. Improved transport links and public transport have been identified as key actions following a consultation on the rural economy undertaken in 2018 by the National Council of Rural Advisors¹⁴⁰.
- 3.6 The European Environmental Noise Directive (2002/49/EC) defines environmental noise as harmful or unwanted outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic and from sites of industrial activity¹⁴¹. Noise created by roads, railways, and aircraft is a feature of both urban and rural areas in Scotland, with few areas remaining that are totally unaffected by some form of transport noise. However, noise issues remain heavily centred in urban areas¹⁴².
- 3.7 In addition to causing annoyance and perception of a lower quality of life, long-term exposure to environmental noise can affect people's health in other ways¹⁴³. Long-term noise exposure may lead to problems with the heart and circulatory (cardiovascular) system. It is also reported that night time noise may

¹³⁶ Scottish Government (2016) Introducing - The Scottish Index of Multiple Deprivation 2016 [online] Available at: <http://www.gov.scot/Resource/0050/00504809.pdf> (accessed 05/07/2019)

¹³⁷ NHS Health Scotland (2018) Diet and obesity [online] Available at: <http://www.healthscotland.scot/health-topics/diet-and-obesity/obesity> (accessed 05/07/2019)

¹³⁸ *ibid*

¹³⁹ Scottish Rural Parliament (2015) Action Plan 2015-16 [online] Available at: https://www.scottishruralparliament.org.uk/wp-content/uploads/2015/05/SRP_Action_Plan_Final_04.pdf (accessed 05/07/2019)

¹⁴⁰ Scottish Government (2018) New blueprint for Scotland's rural economy: recommendations to Scottish Ministers [online] Available at: <https://www.gov.scot/publications/new-blueprint-scotlands-rural-economy-recommendations-scottish-ministers/> (accessed 05/07/2019)

¹⁴¹ European Commission (2016) Noise – Environmental Noise Directive [online] Available at: http://ec.europa.eu/environment/noise/directive_en.htm (accessed 05/07/2019)

¹⁴² Scotland's Noise – part of Scotland's Environment (undated) Welcome to Scotland's noise [online] Available at: <https://noise.environment.gov.scot/index.html> (accessed 05/07/2019)

¹⁴³ European Commission (2015) Science for Environment Policy - Thematic Issue: Noise impacts on health - Issue 47 [online] Available at: <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf> (accessed 05/07/2019)

have more of an impact on cardiovascular health than day time noise as it can be particularly disruptive to sleep patterns¹⁴⁴.

- 3.8 Flooding can have significant environmental impacts and can also affect people, communities and businesses¹⁴⁵. When floods occur, they disrupt day-to-day lives and their impacts can be long lasting. Climate change is expected to increase the risk of flooding in coming years, and it also brings additional risks to human health posed by changes to air quality and rising temperatures¹⁴⁶.

Evolution of the Baseline – Pressures, Trends and Key Points

- 3.9 Reducing traffic - related air pollution can improve our sense of well-being as well as physical health and the quality of the environment¹⁴⁷. Transport is a significant contributor to poor air quality in urban areas¹⁴⁸ and although emissions from transport have declined over the years, the rate of the decline has started to level off¹⁴⁹. Due to several common sources, most notably road traffic in urban areas, there is also a close relationship between air quality and environmental noise¹⁵⁰.
- 3.10 Scotland's obesity rates continue to be amongst the highest in the developed world and are a significant public health issue¹⁵¹. In 2016, 29% of children in Scotland were at risk of becoming overweight (including obese) and 65% of adults were overweight, including 29% classed as obese¹⁵². Significant inequalities in levels of obesity persist between those living in the least and most deprived groups in Scotland¹⁵³. Additionally, it is reported that this gap is widening for children. Overall, around 32% of adults living in the most deprived areas are classed as obese, compared with 20% of those living in the least

¹⁴⁴ European Commission (2015) Science for Environment Policy - Thematic Issue: Noise impacts on health - Issue 47 [online] Available at: <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf> (accessed 05/07/2019)

¹⁴⁵ Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 05/07/2019)

¹⁴⁶ *ibid*

¹⁴⁷ Scotland's Environment (2016) Air quality and health [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality-and-health/> (accessed 05/07/2019)

¹⁴⁸ Scotland's Environment (2016) Air quality [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality/> (accessed 05/07/2019)

¹⁴⁹ *ibid*

¹⁵⁰ Scottish Government (2015) Cleaner air for Scotland: the road to a healthier future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

¹⁵¹ Scottish Government (2017) A healthier future – action and ambitions on diet, activity, and healthy weight: consultation [online] Available at: <https://beta.gov.scot/publications/healthier-future-action-ambitions-diet-activity-healthy-weight-consultation-document/> (accessed 05/07/2019)

¹⁵² NHS Health Scotland (2018) Diet and obesity [online] Available at: <http://www.healthscotland.scot/health-topics/diet-and-obesity/obesity> (accessed 05/07/2019)

¹⁵³ Scottish Government (2018) A healthier future: Scotland's diet and healthy weight delivery plan [online] Available at: <https://www.gov.scot/publications/healthier-future-scotlands-diet-healthy-weight-delivery-plan/pages/3/> (accessed 05/07/2019)

deprived areas¹⁵⁴ There are a range of factors that can impact on levels of exercise, and these include the built environment and transport systems that encourage active living and regular physical activity¹⁵⁵.

- 3.11 Green infrastructure can provide multiple benefits. In addition to providing functions such as active travel networks and habitat creation, they can contribute to climate change mitigation by absorbing CO₂ from the atmosphere and increase accessibility and connectivity¹⁵⁶. Approximately 34% of all car journeys in Scotland are less than two miles in length and could be covered by bicycle or on foot instead¹⁵⁷.
- 3.12 The Environmental Noise Directive requires Member States to prepare and publish noise maps and noise management action plans every five years, with a view to “preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good”. However, mapping of transport noise in towns reveals that noise has a complicated distribution¹⁵⁸.
- 3.13 Access to integrated transport infrastructure is a key issue within rural communities. Increasing connectivity between modes of transport can also provide a number of benefits, such as reducing congestion and supporting more sustainable modes of transport.
- 3.14 The potential risks and benefits of climate change on population and health will not be evenly spread. For example, pockets of dense urban development will be more at risk of surface water flooding and summer heat stress. In addition, the effects to human health from climate change may have the greatest impact on vulnerable people. Negative health effects are likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover¹⁵⁹.
- 3.15 In 2017, there were a reported 9,391 road accident casualties of all severities in Scotland, 14% fewer than the previous year¹⁶⁰. By mode, the majority of casualties (61%) were car users reported to be injured in road accidents. All

¹⁵⁴ Scottish Government (2018) A healthier future: Scotland’s diet and healthy weight delivery plan [online] Available at: <https://www.gov.scot/publications/healthier-future-scotlands-diet-healthy-weight-delivery-plan/pages/3/> (accessed 05/07/2019)

¹⁵⁵ NHS Health Scotland (2018) Diet and obesity [online] Available at: <http://www.healthscotland.scot/health-topics/diet-and-obesity/obesity> (accessed 05/07/2019)

¹⁵⁶ Central Scotland Green Network (undated) About Us [online] Available at: <http://www.centuralscotlandgreennetwork.org/about> (accessed 05/07/2019)

¹⁵⁷ Transport Scotland (undated) Walking and cycling [online] Available at: <https://www.transport.gov.scot/our-approach/active-travel/walking-and-cycling/#42959> (accessed 05/07/2019)

¹⁵⁸ Scotland’s Noise – part of Scotland’s Environment (undated) Welcome to Scotland’s noise [online] Available at: <https://noise.environment.gov.scot/index.html> (accessed 05/07/2019)

¹⁵⁹ The Scottish Parliament (2012) SPICe Briefing: Climate Change and Health in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_12-26rev.pdf (accessed 05/07/2019)

¹⁶⁰ Transport Scotland (2017) Key Reported Road Casualties Scotland 2017 [online] Available: <https://www.transport.gov.scot/media/42306/sct04185220761.pdf> (accessed 05/07/2019)

other modes of transport accounted for 25%, with the remainder involving pedestrians (14%)¹⁶¹.

4 Air Quality

Environmental Protection Objectives: Air quality objectives aim to reduce emissions which are potentially harmful to health and the environment. There are also requirements for monitoring, with a particular focus on areas where air pollution is concentrated (Air Quality Management Areas).

Overview

- 4.1 As discussed in 'Population and Human Health', air pollution can result in adverse impacts on human health and can significantly affect many aspects of quality of life. Air pollution can also cause adverse effects in the wider environment. For example, it can increase nutrient levels in water bodies and soil and contribute to acidification, both of which can impact on plant and animal life, as well as damage the fabric of buildings and monuments.
- 4.2 The quality of the air around us is affected by the pollutants released into the atmosphere through human activities, such as transport, industry and agriculture as well as pollutants arising from natural sources. The main air pollutants are nitrogen oxides (NO_x), particulate matter (PM_x), sulphur dioxide (SO₂), ammonia (NH₃), volatile organic compounds (VOCs), and ozone (O₃). Sulphur dioxide, oxides of nitrogen, particulates, and low level ozone are generally considered to be of most importance in relation to human health and the environment¹⁶².
- 4.3 Of these, transport is a significant contributor to emissions of NO_x and PM_x. Transport is also linked to ground level ozone, which is a secondary pollutant produced by chemical reactions involving NO_x¹⁶³. Road transport is the largest contributor to air pollution in the UK, with other transport-related pollutants including aviation and shipping¹⁶⁴. In some instances, the impacts of this pollution may be felt more significantly at a localised level. For example, "hotspots" of urban air pollution that can arise from traffic congestion within main access routes.

¹⁶¹ Transport Scotland (2017) Key Reported Road Casualties Scotland 2017 [online] Available: <https://www.transport.gov.scot/media/42306/sct04185220761.pdf> (accessed 05/07/2019)

¹⁶² Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

¹⁶³ Transport Scotland (2019) Scottish Transport Statistics No 37: 2018 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/> (accessed 01/07/2019)

¹⁶⁴ The Scottish Parliament (2016) SPICe Briefing - Air Quality in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-35_Air_Quality_in_Scotland.pdf (accessed 05/07/2019)

- 4.4 Section 83(1) of the Environmental Act 1995¹⁶⁵ sets out a requirement that where air quality objectives are not being met or are unlikely to be met within the relevant period, Local Authorities must designate an Air Quality Management Area (AQMA). In Scotland, 38 AQMAs have currently been declared, with 15 of Scotland's 32 Local Authorities having declared at least one. The majority of these are in urban areas as a result of NO_x alone or in combination with PM₁₀ levels, and primarily as a result of traffic emissions¹⁶⁶.
- 4.5 Air quality and climate change are inextricably linked; air pollution often originates from the same activities that contribute to climate change. The interactions between air quality and climate change are complex and in some instances, measures to address one can have conflicting implications for the other. For example, the promotion of diesel vehicles and use of biomass for energy, whilst having potentially positive effects on reducing GHG emissions, can have negative effects on air quality and human health¹⁶⁷. Conversely, some technologies, such as the fitting of particle filters, are effective at removing PM_x from diesel exhausts but can come with a fuel consumption penalty and hence, work against carbon reduction targets¹⁶⁸.

Evolution of the Baseline – Pressures, Trends and Key Points

- 4.6 Air quality in Scotland has improved considerably over the last few decades. Between 1990 and 2016 there were decreases of 83% for CO, 72% for NO_x, 66% for non-methane volatile organic compounds (NMVOCs), 64% for fine particulate matter (PM₁₀) and 94% for SO₂^{169,170}. However, air pollution is still estimated to reduce the life expectancy of every person in the UK by an average of 7–8 months¹⁷¹ and there are some towns and cities where air quality has been identified as a concern.
- 4.7 The main challenges for air quality include emissions from transport and energy production, with transport considered the most significant source of poor air

¹⁶⁵ Environment Act 1995, c.25 [online] Available at: <http://www.legislation.gov.uk/ukpga/1995/25/introduction> (accessed 05/07/2019)

¹⁶⁶ Air Quality in Scotland (2018) Air Quality Management Areas [online] Available at: <http://www.scottishairquality.co.uk/laqm/aqma> (accessed 05/07/2019)

¹⁶⁷ Scottish Government (2015) Cleaner air for Scotland: the road to a healthier future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

¹⁶⁸ DEFRA (2010) Air Pollution: Action in a Changing Climate [online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf (accessed 05/07/2019)

¹⁶⁹ Scottish Government (2015) Air Quality - Air Pollutant Emissions - High Level Summary of Statistics Trend [online] Available at: <http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment/trendairpollutants> (accessed 05/07/2019)

¹⁷⁰ National Atmospheric Emissions Inventory (2017) Air Quality Pollutant Inventories for England, Scotland, Wales, and Northern Ireland: 1990-2015 [online] Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1710060932_DA_Air_Quality_Pollutant_Inventories_1990-2015_v01-01.pdf (accessed 05/07/2019)

¹⁷¹ Scottish Government (2015) Air Quality - Air Pollutant Emissions - High Level Summary of Statistics Trend [online] Available at: <http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment/trendairpollutants> (accessed 05/07/2019)

quality in urban areas¹⁷². Of particular concern in the urban environment are levels of particulates and NO_x¹⁷³, and the majority of AQMAs declared in urban areas are due to NO_x alone or in combination with PM₁₀ levels, mainly as a result of traffic emissions¹⁷⁴.

- 4.8 Cleaner air provides multiple benefits and actions taken, such as a shift towards low or zero emissions transport and energy sources, should provide mutual benefits for both air quality and climate change¹⁷⁵. Additionally, the decarbonisation of transport and reducing vehicle emissions should support wider Scottish Government objectives, particularly those seeking to improve health, through improving air quality¹⁷⁶.

5 Biodiversity, Flora and Fauna

Environmental Protection Objectives: Legislation and policies relating to biodiversity, flora and fauna aim to protect habitats and species from damage and disturbance, by identifying areas of particular value. These policies define a hierarchy of protection - from the international to local level. At the European level, the Natura 2000 network of sites aims to protect key assets under the Habitats and Birds Directive. European protected species and the aims of the Scottish Biodiversity Strategy also provide conservation objectives. Beyond designated sites and species, there are longer term aspirations for enhancing biodiversity, improving landscape-scale ecological networks and addressing the impacts of climate change on the natural environment.

Overview

- 5.1 Biodiversity is commonly used as a measure of the health of an ecosystem, and helps to provide the ecosystems services that are the basis of life including the regulation of air and water, soil formation, nutrient cycling, flood regulation and pollination, amongst many others¹⁷⁷. Biodiversity, flora, and fauna is also closely linked with other environmental topics, particularly soil and water, which

¹⁷² Scotland's Environment (2016) Air quality [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality/> (accessed 05/07/2019)

¹⁷³ Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

¹⁷⁴ Air Quality in Scotland (2018) Air Quality Management Areas [online] Available at: <http://www.scottishairquality.co.uk/laqm/aqma> (accessed 05/07/2019)

¹⁷⁵ Scottish Government (2015) Cleaner air for Scotland: the road to a healthier future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

¹⁷⁶ Scottish Government (2017) Draft Climate Change and Energy Strategies: joint strategic environmental assessments [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

¹⁷⁷ SNH (undated) Ecosystem approach [online] Available at: <https://www.nature.scot/scotlands-biodiversity/value-ecosystem-approach/ecosystem-approach> (accessed 05/07/2019)

help to support an incredible diversity of life across Scotland and in its surrounding waters.

- 5.2 As of 2017, Scotland's protected areas included 241 Special Areas of Conservation (SACs), 153 Special Protection Areas (SPAs), 51 Ramsar sites and 2 Biosphere Reserves, amongst other internationally designated sites. There are further national level designations such as 1,423 Sites of Special Scientific Interest (SSSIs), 30 Marine Protected Areas (MPAs) and 2 National Parks¹⁷⁸.
- 5.3 The UK Biodiversity Action Plan identified 39 priority habitats and 197 priority species either occurring, or known to have occurred until recently, in Scotland¹⁷⁹. By May 2019, the proportion of nationally protected nature sites reported as being in a "favourable" condition decreased by 0.8% from 79.7% in 2018 to 78.9%¹⁸⁰. Despite this decrease, this represents a 2.9% percentage point increase since the current protocols were established in 2007¹⁸¹.
- 5.4 Areas of biodiversity value are not only found within this network of designated sites. Many undesignated areas of Scotland also contain a wide range of habitats and species that have important functions and roles. For example, urban greenspace such as public and private gardens, parks, woodlands, recreational grounds, green corridors, allotments and community growing spaces can provide habitats and ecosystems which are valuable to wildlife¹⁸².

Evolution of the Baseline – Pressures, Trends and Key Points

- 5.5 Biodiversity loss has been well documented over the last 50 years, and today there is a range of pressures with the potential to impact on Scotland's wildlife and biodiversity. Key issues such as land use intensification and modification, and pollution have been noted¹⁸³.
- 5.6 Scotland's trunk road network supports approximately 40% of all national traffic movements and this volume of traffic can have a significant impact on local

¹⁷⁸ SNH (undated) International designations [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations> (accessed 05/07/2019)

¹⁷⁹ Scottish Government (2014) Biodiversity – BAP Species and Habitats – High Level Summary of Statistics Trend [online] Available at: <https://www2.gov.scot/Topics/Statistics/Browse/Environment/TrendBAP> (accessed 05/07/2019)

¹⁸⁰ SNH (2019) The Proportion of Scotland's Protected Sites in Favourable Condition 2019: An Official Statistics Publication for Scotland [online] Available at: <https://www.nature.scot/information-hub/official-statistics/official-statistics-protected-sites> (accessed 05/07/2019)

¹⁸¹ SNH (2019) Statistical News Release: the proportion of Scotland's Protected Sites in Favourable Condition 2019 [online] Available at: <https://www.snhpresscentre.com/news/statistical-news-release-the-proportion-of-scotlands-protected-sites-in-favourable-condition-2019> (accessed 05/07/2019)

¹⁸² SNH (undated) Urban habitats [online] Available at: <https://www.nature.scot/habitats-and-ecosystems/habitat-types/urban-habitats> (accessed 05/07/2019)

¹⁸³ SNH (undated) Key pressures on biodiversity [online] Available at: <https://www.nature.scot/scotlands-biodiversity/key-pressures-biodiversity> (accessed 05/07/2019)

wildlife¹⁸⁴. In 2016, the estimated volume of traffic on Scotland's roads was at its highest level ever¹⁸⁵.

- 5.7 The installation of new energy and transport infrastructure required to meet GHG emissions reduction commitments has the potential for negative environmental effects at the local level¹⁸⁶. Development of transport infrastructure may impact biodiversity through damage to nature conservation sites, as well as the fragmentation or loss of habitats. Secondary impacts can occur through air and water pollution. Noise and light disturbance from transport activity can also impact on biodiversity¹⁸⁷.
- 5.8 Improving cycling and walking networks can promote active travel, helping to reduce transport emissions and build networks of priority habitats with positive impacts on biodiversity.
- 5.9 The use of transport fuels derived from biomass, in either liquid or gaseous form, can help to reduce GHG emissions, by reducing the use of fossil fuels. However, there are some long term challenges associated with the development and use of biomass as an alternative fuel. The challenges include changes in land use, feedstock availability and sustainability.
- 5.10 The predicted effects of climate change and the potential for associated impacts on biodiversity, flora and fauna are well documented, with evidence already showing the wide ranging effects that a changing climate can have on flora and fauna species and their habitats¹⁸⁸. Indirect impacts may also arise through climate change adaptation and the action taken in sectors such as agriculture, forestry, planning, water and coastal management in the face of a changing climate¹⁸⁹.

¹⁸⁴ Transport Scotland (2017) Landscape and biodiversity - Wildlife and roads [online] Available at: <https://www.transport.gov.scot/our-approach/environment/landscape-and-biodiversity/#42782> (accessed 05/07/2019)

¹⁸⁵ National Statistics (2017) Transport and Travel in Scotland 2016 [online] Available at: <https://www.transport.gov.scot/media/39692/sct09170037961.pdf> (accessed 05/07/2019)

¹⁸⁶ Scottish Government (2017) Draft Climate Change and Energy Strategies: joint strategic environmental assessments [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

¹⁸⁷ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

¹⁸⁸ SNH (undated) Climate change impacts in Scotland [online] Available at: <https://www.nature.scot/climate-change/climate-change-impacts-scotland> (accessed 05/07/2019)

¹⁸⁹ JNCC (2010) Biodiversity and Climate Change – a summary of impacts in the UK [online] Available at: <http://archive.jncc.gov.uk/page-5145> (accessed 05/07/2019)

6 Soil

Environmental Protection Objectives: Soil objectives include European level recognition of the importance of soil resources and national commitments to sustainable soil management that protect valued soils, including prime quality agricultural land (the land most suitable for farming), and those with a high carbon content, such as peat. Some objectives take this further, such as guidance on the development of wind farms on peat, commitments to remediation of contaminated land and prevention of soil pollution.

Overview

- 6.1 Soil is a non-renewable resource and is fundamentally one of Scotland's most important assets¹⁹⁰. It supports a wide range of natural processes and underpins much of our natural environment, helping to provide a wide range of environmental, economic and societal benefits. For example, soil provides the basis for food, controls and regulates environmental interactions such as regulating the flow and quality of water and providing a platform for buildings and roads¹⁹¹. There is an intrinsic relationship between soil health and other environmental topics; biodiversity, water and air quality in particular. For example, soil erosion is one of the main contributors to diffuse water pollution¹⁹².
- 6.2 Soils play a significant role in terms of storing carbon and therefore help to regulate GHG emissions. It is estimated that Scotland's soils contain 3,000 million tonnes of carbon, making up over 50% of the UK's soil carbon¹⁹³. It is estimated that the loss of just 1% of soil carbon as carbon dioxide would triple Scotland's annual GHG emissions¹⁹⁴.
- 6.3 Peatlands are of particular importance for mitigating climate change by acting as carbon 'sinks'. These important areas store carbon in peat deposits and continually sequester new carbon in peat-forming vegetation. Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west in areas with gentle slopes and poor drainage¹⁹⁵. Blanket

¹⁹⁰ Scottish Government (2006) Scotland's Soil Resource - Current State and Threats [online] Available at: <https://www2.gov.scot/publications/2006/09/21115639/7> (accessed 05/07/2019)

¹⁹¹ Scottish Government (2009) The Scottish Soil Framework [online] Available at: <http://www.scotland.gov.uk/Publications/2009/05/20145602/0> (accessed 05/07/2019)

¹⁹² SEPA (undated) Soil [online] Available at: <http://www.sepa.org.uk/environment/land/soil/#effect> (accessed 05/07/2019)

¹⁹³ Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: <http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/> (accessed 05/07/2019)

¹⁹⁴ Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: <http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/> (accessed 05/07/2019)

¹⁹⁵ SNH (2014) Commissioned Report No. 701 - Scotland's peatland – definitions & information resources [online] Available at: <https://www.nls.uk/e-monographs/2014/701.pdf> (accessed 05/07/2019)

bog is the most extensive semi-natural habitat in Scotland, covering around 23% of the land area¹⁹⁶. As with all soils, peats are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to be a significant contributor to Scotland's GHG emissions¹⁹⁷.

Evolution of the Baseline – Pressures, Trends and Key Points

- 6.4 While Scotland's soils are considered to generally be in good health, there are a range of pressures on them. Climate change and loss of organic matter pose significant threats to Scottish soils, with both likely to affect soil function, including loss of soil carbon. The loss of valued soils in particular has the potential for national impacts which will be difficult to reverse. In the case of climate change, these impacts have the potential to be felt on a global scale¹⁹⁸.
- 6.5 Changes in land use and land management practices are also a key pressure on soil. These include activities such as transport and development, including road building and the expansion of agriculture and forestry¹⁹⁹. At present, there is uncertainty and a lack of quantitative information regarding threats to soil functions and ecosystem services, particularly in relation to the extent of soil sealing, changes in soil biodiversity, and compaction of soils²⁰⁰. Estimates of soil sealing suggest figures of approximately 1000 hectares a year²⁰¹.
- 6.6 The deposition of atmospheric pollutants can lead to soil contamination. This can occur as either dry or wet deposition and is a result of compounds mixing with moisture in the atmosphere and falling as rain. Elevated levels of soil nitrogen can result in soil acidification and excess nitrogen can also leach from the soil, polluting surface and ground water.

¹⁹⁶ SNH (2014) Commissioned Report No. 701 - Scotland's peatland – definitions & information resources [online] Available at: <https://www.nls.uk/e-monographs/2014/701.pdf> (accessed 05/07/2019)

¹⁹⁷ Scotland's Soils – part of Scotland's Environment (undated) Welcome to Scotland's soils [online] Available at: <http://soils.environment.gov.scot/> (accessed 05/07/2019)

¹⁹⁸ *ibid*

¹⁹⁹ Scotland's Environment (2011) Soils [online] Available at: <https://www.environment.gov.scot/media/1213/land-soils.pdf> (accessed 05/07/2019)

²⁰⁰ European Commission (2016) JRC Technical Reports - Soil threats in Europe - Status, methods, drivers and effects on ecosystem services [online] Available at: http://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR27607.pdf (accessed 05/07/2019)

²⁰¹ SEPA (2011) The State of Scotland's Soil [online] Available at: <https://www.sepa.org.uk/media/138741/state-of-soil-report-final.pdf> (accessed 05/07/2019)

7 Water

Environmental Protection Objectives: Coastal and marine water policies include Scotland's two River Basin Management Plans, which aim to improve the overall condition of water bodies inland and on the coast, and marine policies, such as Scotland's National Marine Plan. The protection of coastal areas and the management of both coastal and inland flood risk are also key objectives. The importance of the interaction between the marine and terrestrial environments is also noted.

Overview

- 7.1 Scotland's water provides a wide range of benefits that support our health and prosperity, such as the provision of drinking water and as a resource for use in agriculture and industry. These water resources also support a rich diversity of habitats and species, attract tourism, promote recreation and provide for the sustainable growth of the economy²⁰².
- 7.2 In recent decades, significant improvements to water quality in many rivers, canals, and estuaries have been observed alongside significant reductions in pollution. Most of Scotland's seas, coasts, and estuaries are in good or excellent condition; however, some localised areas of concern remain. Nearly half of rivers are now in good condition or better and almost two thirds of lochs surveyed were found to be in good or high condition²⁰³. Scotland's groundwater is a valuable asset and nearly 80% of ground water bodies are considered to be in good condition²⁰⁴.
- 7.3 Flooding can have significant and long-lasting impacts on people, communities, and businesses. Climate change is expected to increase the risk of flooding in coming years, an increase associated primarily with changing rainfall patterns and extreme weather events. Flood Risk Management Strategies²⁰⁵ co-ordinate action to tackle flooding in Scotland, setting out the national direction for flood risk management and helping target investment and coordinate action across public bodies. Flood maps have also been produced which help to show where areas are likely to be at risk of flooding from rivers, seas and surface water²⁰⁶.

²⁰² Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 26/02/2019)

²⁰³ *ibid*

²⁰⁴ Scotland's Environment (2016) Scotland's freshwater [online] Available at: <https://www.environment.gov.scot/our-environment/water/scotland-s-freshwater/> (accessed 26/02/2019)

²⁰⁵ SEPA (undated) Flood Risk Management Strategies [online] Available at: <http://apps.sepa.org.uk/FRMStrategies/> (accessed 26/02/2019)

²⁰⁶ SEPA (undated) Flood maps [online] Available at: <http://www.sepa.org.uk/environment/water/flooding/flood-maps/> (accessed 26/02/2019)

Evolution of the Baseline – Pressures, Trends and Key Points

- 7.4 Key pressures on the surface water environment include urbanisation, an increase in invasive non-native species, intensive agriculture/aquaculture and climate change. Rural and urban diffuse pollution remains a concern for water quality, particularly in relation to agriculture, forestry, and urban development^{207,208}.
- 7.5 The predicted effects of climate change such as increased temperatures and changes to rainfall patterns could affect flows in rivers and impact on water resource availability²⁰⁹. A changing climate is also expected to have ecological impacts, such as warmer sea temperatures and an increasing risk of non-native species spreading and becoming established in water environments²¹⁰.
- 7.6 Increased waterborne travel, passengers and freight, could present greater potential for accidental spills and operational discharges, with negative impacts on the marine environment²¹¹. Additionally, pollution can arise from operational activities, such as ballast water and grey water discharges.
- 7.7 The development and operation of new transport infrastructure has the potential to negatively impact on water quality, either during construction or via pollution run-off²¹². New structures on land can also affect the capacity of flood plains or flood defences.
- 7.8 Airborne pollution can impact upon water bodies. Heightened nitrogen concentrations can cause the acidification and eutrophication of water bodies. Eutrophication occurs when the concentrations of otherwise limiting nutrients increase, allowing aquatic plants and algae to grow unchecked and depleting oxygen levels.

²⁰⁷ SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 05/07/2019)

²⁰⁸ *ibid*

²⁰⁹ Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

²¹⁰ SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 05/07/2019)

²¹¹ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

²¹² Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

8 Cultural Heritage and the Historic Environment

Environmental Protection Objectives: Cultural heritage objectives focus on protecting sites, townscapes (places, buildings and open spaces), buildings, archaeological sites, battlefields, wrecks and landscapes which have been internationally, nationally or locally designated. Policy also emphasises the importance of recognising and avoiding negative impacts on the wider setting of sites, and enhancement where appropriate. Key objectives also extend to preventing the loss of currently unknown archaeology. Policies on architecture and place aim to improve the quality of our settlements and built environment.

Overview

- 8.1 Scotland's many and varied historical sites are unique and irreplaceable. These sites and features are regarded as making a valuable contribution to our quality of life, cultural identity, education and economy. While these assets are distributed widely throughout Scotland, there are clusters of sites in and around our settlements and also around our coastlines.
- 8.2 Some parts of Scotland's historic environment are protected through a process of designation. The process aims to identify parts of the historic environment for their significance and enhance their protection. As of 2016, it is estimated that around 5-10% of the historic environment is designated²¹³. Designated assets currently include World Heritage Sites, listed buildings, scheduled monuments, conservation areas and Historic Marine Protected Areas (MPAs). However, whilst most of the historic environment is undesignated (90-95%), these known but undesignated assets provide important contextual information which helps us better understand designated sites²¹⁴.

Evolution of the Baseline – Pressures, Trends and Key Points

- 8.3 Inappropriate development is a key pressure on the historic environment and cultural heritage, both directly in terms of damage to known and unknown features, and the potential for impacts on setting. Other known pressures include changing land use and land management, tourism/visitors, pollution and climate change.
- 8.4 Increasing levels of congestion can affect historic towns, cities and the countryside, while the development of new transport infrastructure can affect

²¹³ Historic Environment Scotland (2016) Scotland's Historic Environment Audit: Summary Report 2016 [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=315b3f0d-631b-4a24-b12b-a6db00ba1696> (accessed 05/07/2019)

²¹⁴ Historic Environment Scotland (2016) Scotland's Historic Environment Audit: Summary Report 2016 [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=315b3f0d-631b-4a24-b12b-a6db00ba1696> (accessed 05/07/2019)

historic landscapes and may cause direct damage to heritage assets²¹⁵. Measures to reduce the need to travel, manage demand, and encourage modal shift, have the potential to enhance the integrity of the cultural environment in urban and rural areas through an associated reduction in traffic levels²¹⁶.

- 8.5 It is projected that Scotland will become warmer and wetter as a result of climate change, resulting in the increased weathering of stone, rotting timbers and corrosion of metals. Rising sea levels and increased storm events may increase coastal erosion, endangering our historic landscapes, structures, buildings and archaeology in the coastal zone. Some of Scotland's unique and special sites, such as Skara Brae in Orkney, are at most risk²¹⁷. This threat will grow in the future, given the future predictions of the likely effects of global warming and climate change for the remainder of this century.

9 Landscape and Visual Amenity

Existing Environmental Protection Objectives: Landscape objectives, including the European Landscape Convention, recognise and protect special landscapes but also aim to improve degraded landscapes and highlight the importance of all landscapes. Key national objectives include the National Scenic Areas Programme. Policies include a continuing commitment to protecting the special qualities of nationally important landscapes, with planning also recognising and protecting regionally and locally important landscapes. Geological sites are also protected, including through the geological Sites of Special Scientific Interest designation.

Overview

- 9.1 Rich in diversity, Scotland's landscapes are internationally renowned. Scotland's distinctive landscapes are a significant part of the country's natural and cultural heritage, and make a significant contribution to both the country's economic performance and the well-being of its people. Scotland's landscapes play a key role in attracting tourism, affording opportunities for business and providing the setting for outdoor recreation.
- 9.2 There are currently two National Parks (Loch Lomond and The Trossachs, and the Cairngorms) and 40 National Scenic Areas in Scotland. Over 13% of

²¹⁵ Historic England (undated) Transport and the Historic Environment [online] Available at: <https://historicengland.org.uk/advice/planning/infrastructure/planning-and-transport/> (accessed 05/07)

²¹⁶ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

²¹⁷ Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 05/07/2019)

Scotland's land area has been classified as a National Scenic Area²¹⁸. Designations such as Local Landscape Areas, Special Landscape Areas, Regional Scenic Areas and Areas of Great Landscape Value have also been established at a regional and local level by many local authorities. These areas of important nature or landscape value have been designated locally for conservation purposes and are afforded protection from inappropriate development.

- 9.3 SNH's Landscape Policy Framework strives to "safeguard and enhance the distinct identity, diverse character, and the special qualities of Scotland's landscapes as a whole"²¹⁹. Additionally, in 2014 SNH produced a map showing wild land areas²²⁰.
- 9.4 "Fitting Landscapes"²²¹ is a Transport Scotland policy statement addressing the landscape design and management of transport corridors in Scotland. It has four main aims: ensure high quality of design and place, enhance and protect natural heritage, use resources wisely, and build in adaptability to change. This includes that consideration should be given to ensure that transport operations or interventions fit with the landscape through which they pass²²².

Evolution of the Baseline – Pressures, Trends and Key Points

- 9.5 Scotland's landscapes are constantly changing and evolving in response to both natural processes and the changing demands of society. Changes in landscape tend to occur over long periods of time, and gradual change, as a result of development such as housing, and changes in farming and forestry practice, can be difficult to determine²²³.
- 9.6 The two main direct pressures that influence the character of the landscape are land use and the intensification of land use and management, such as incremental and on-going development and action to increase maximum yields in agriculture²²⁴.

²¹⁸ Scottish Natural Heritage (undated) National Scenic Areas [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/national-scenic-areas> (accessed 05/07/2019)

²¹⁹ Scottish Natural Heritage (2005) Statement - SNH's Landscape Policy Framework - Policy Statement No. 05/01 [online] Available at: <https://www.nature.scot/sites/default/files/2017-06/A147583%20-%20policy%20statement%200501-%20Landscape%20Policy%20Framework.pdf> (accessed 05/07/2019)

²²⁰ Scottish Natural Heritage (2014) Wild land areas 2014: map [online] Available at: <https://www.nature.scot/sites/default/files/2018-02/Wild%20land%202014%20-%20Phase%203%20-%20%20Wild%20land%20areas%202014.pdf> (accessed 05/07/2019)

²²¹ Transport Scotland (2014) Fitting Landscapes: securing more sustainable landscapes [online] Available at: <https://www.transport.gov.scot/media/33663/j279083.pdf> (accessed 05/07/2019)

²²² Transport Scotland (undated) Landscape and biodiversity [online] Available at: <https://www.transport.gov.scot/our-approach/environment/landscape-and-biodiversity/#overview> (accessed 05/07/2019)

²²³ Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 05/07/2019)

²²⁴ *ibid*

- 9.7 The expansion of many towns and cities and their associated infrastructure, such as roads and railways, is seen as a pressure and the distinctive landscape setting of many towns and cities is being lost as a result of settlement expansion and the need for associated infrastructure²²⁵. Measures that seek to reduce the need to travel, manage demand and encourage modal shift, could in turn reduce the need for new infrastructure and consequently reduce the likelihood of disturbance to the landscape posed by new construction²²⁶.
- 9.8 Climate change is expected to lead to extensive landscape change across Scotland with the greatest changes likely to occur in lowland and coastal areas where human population is highest²²⁷. Direct impacts are likely as a result of changing temperatures and patterns of precipitation, weather events, and sea level change²²⁸. However, mitigation and adaptation measures are expected to have a greater influence on both Scotland's landscapes and quality of life than the direct effects of climate change²²⁹. For example, the development of renewable energy (such as wind farms and hydro schemes) is seen by many as a pressure on both visual amenity and the character of many rural landscapes.

10 Material Assets

Environmental Protection Objectives: 'Material assets' is a broad topic area, encompassing a range of environmental objectives. Under this heading, the assessment has focused particularly on issues arising from transport, energy and waste. Policies relating to these assets are wide-ranging, but aim to contribute to core planning objectives of sustainable development, a transition to a low carbon economy, and making the best use of existing resources and infrastructure.

Overview

- 10.1 While existing policies relating to energy, waste, transportation and land use are wide-ranging, they largely share the aims of contributing to core planning objectives, supporting sustainable development, reducing GHG emissions, and making the best use of Scotland's resources and existing infrastructure.

²²⁵ Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 05/07/2019)

²²⁶ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report – Environmental Report [online] Available at: <https://www2.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

²²⁷ Scottish Natural Heritage (undated) Landscape: climate change [online] Available at: <https://www.nature.scot/professional-advice/landscape-change/landscape-policy-and-guidance/landscape-climate-change> (accessed 05/07/2019)

²²⁸ Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 05/07/2019)

²²⁹ SNH (undated) Landscape: climate change [online] Available at: <https://www.nature.scot/professional-advice/landscape-change/landscape-policy-and-guidance/landscape-climate-change> (accessed 05/07/2019)

- 10.2 Scotland's natural resources are also material assets. Mineral resources and aggregates are used for purposes such as fuel (e.g. coal), and construction (e.g. sand, gravel and rock). However, the quantity of these resources is finite and once they are used up, they cannot be replaced.
- 10.3 The following baseline sets out information under the headings of transport, waste management and energy generation as these are considered the key aspects of "Material Assets" likely to be affected by the draft NTS2.

11 Transport ²³⁰

- 11.1 Over the last five years there has been an increase in car, air, rail, and ferry passenger numbers, as well as in distance cycled. At the same time, there has been a fall in bus passengers. In 2017, 48.0 billion vehicle kilometres were travelled on Scotland's roads. This figure represents an increase of 3% over the year and 7% over 2007, and is the highest recorded level to date. Long-term, it has been observed that the volume of car traffic on major roads (Motorways and A roads) has more than doubled. Cars account for over three quarters (75%) of the total volume of traffic on the roads while the remaining traffic is shared between light goods vehicles (17%) and heavy goods vehicles (5%). Further, nearly 3.0 million vehicles, of which 83 % were cars, were licensed in Scotland by the end of 2017 - the highest number ever recorded. 71% of households reported to have at least one car available for private use and 29% reported to have two or more cars.
- 11.2 More than 99% of road vehicles in Scotland ran on petrol (51%) or diesel (48%) in 2017, with electric and hybrid cars making up the remaining share (>1%). Whilst the number of electric and hybrid cars make up a small share, this is increasing with new registrations up by 57% in 2017 from 2016.
- 11.3 In 2016, 11.7% of car driver journeys were perceived to be delayed due to congestion, with the "volume of traffic" and road or maintenance works/temporary traffic lights given as the two main reasons for delays²³¹. Some types of journeys are more likely to be delayed by congestion than others, for example, those undertaken for commuting purposes, with car and bus journeys experiencing congestion more frequently²³².
- 11.4 In the automotive industry, EU legislation and standards aim to reduce emissions of CO₂, NO₂ and particulate matter. Since the early 1990s, new car models have had to meet increasingly stringent exhaust pollution limits, known as Euro emissions standards, before they can be sold. The latest standard

²³⁰ All statistics in this section of text have been drawn from the following reference document, unless individually referenced: Transport Scotland (2019) Scottish Transport Statistics No 37: 2018 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/> (accessed 01/07/2019)

²³¹ National Statistics (2017) Transport and Travel in Scotland 2016 [online] Available at: <https://www.transport.gov.scot/media/39692/sct09170037961.pdf> (accessed 05/07/2019)

²³² *ibid*

“Euro 6” applies to all new cars from September 2015 onwards and reduces some pollutants by 96% compared to 1992 levels. Additionally, newly registered cars are becoming more fuel efficient, therefore emitting fewer emissions per kilometre. However, progress in improving new car efficiency has been slow and evidence has also continued to mount showing there is a large and growing gap between test cycle and real-world emissions for new cars²³³.

- 11.5 As of 2018, there were 56,364 kilometres of public road in Scotland, 7% of which was trunk road managed centrally by Transport Scotland. The remaining roads are overseen by local authorities. A third of Scotland’s road network is accounted for by Highland Council, Aberdeenshire Council, and Dumfries and Galloway Council combined. Overall, there was an increase of 24% in the amount of trunk road that was newly constructed, reconstructed, strengthened, or surface dressed in 2017-18 compared to the previous year.
- 11.6 Passenger journeys on Scotrail services increased by 4% in 2017-18, with 97.8 million passenger journeys undertaken. This figure represents a 32% increase over 2007-08 numbers and, in general, rail patronage has been steadily rising since 1994-95. Glasgow Central was the busiest national rail station in 2017-18 with 33 million passenger journeys, followed by Edinburgh Waverly which was used by almost 23 million passengers, and Glasgow Queen Street by 16 million. The total route length of the railway network in Scotland is 2,819km in Scotland which is serviced by 359 stations. Of this total, 709km are electrified.
- 11.7 Scotland’s marine areas and coastal waters are utilised by a wide range of vessels and service a variety of industries. Ports and harbours are located all around the Scottish coastline. These broadly range from single jetties that accommodate recreational vessels and fishing vessels; small ports and harbours that facilitate lifeline ferry services as well as recreational, to fishing vessels. There was a total of 8.5 million passengers and 3.1 million vehicles carried on ferry routes within Scotland in 2017. Although the total number of ferry routes in Scotland is not known, Audit Scotland estimate there are 66 scheduled routes currently operating in Scotland, managed by a range of public and commercial operators. Larger ports such as Cairnryan support ferry services between Scotland and Northern Ireland, and the Forth, Clyde and Sullom Voe ports accounted for the highest freight traffic in 2016²³⁴.
- 11.8 Scotland has four commercial airports: Aberdeen International Airport, Edinburgh Airport, Glasgow Airport, and Glasgow Prestwick Airport. Scottish Ministers own Highlands and Islands Airports Limited, which operates airports in Barra, Benbecula, Campbeltown, Dundee, Inverness, Islay, Kirkwall,

²³³ Committee on Climate Change (2018) Reducing emissions in Scotland – 2018 Progress Report to Parliament [online] Available at: <https://www.theccc.org.uk/publication/reducing-emissions-in-scotland-2018-progress-report-to-parliament/> (accessed 05/07/2019)

²³⁴ Transport Scotland (2018) Scottish Transport Statistics No 36: 2017 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-36-2017-edition/> (accessed 05/07/2019)

Stornoway, Sumburgh, Tiree, and Wick. Local Authorities run a number of smaller airports in Scotland, such as Oban Airport, and some of these provide connections to more remote areas.

- 11.9 A reported 28.8 million air terminal passengers travelled through Scottish airports in 2017, an increase of 7.3% or 2 million people from 2016. Edinburgh airport had 13.4 million passengers in 2107 (9% increase) and Glasgow airport had 9.9 million, 6% more than the previous year. Aberdeen had 3.1 million (up 5%) and Inverness had 0.9 million (12% more). Over the past ten years, trends for these airports were similar to the national picture, except for Edinburgh which saw a levelling off in numbers after 2007.
- 11.10 Bus passenger journeys decreased by 1.5% between 2016 and 2017 and have generally been falling in the long-term, almost halving between 1960 and 1975 and roughly halving again since then. Bus use is higher in urban areas with the Scottish Household Survey reporting 56% of those who used the bus living in urban areas compared to 3% living in remote rural areas. The number of buses in operators' fleets has fallen by 16 percent over the past five years.
- 11.11 Freight is transported in Scotland by road, rail and water. Road, by weight, is the predominant means of carrying freight and, in 2017, it was estimated that 123 million tonnes was transported by road in Scotland. Of the distances covered, most road freight journeys are 50 kilometres or less in length or less. A reported 67 million tonnes of freight was handled by ports in Scotland in 2017, with exports accounting for approximately half of this 31 million tonnes of this. Rail freight numbers initially fell between 1960 and 1995, then increased until 2005, when they began to decline again. Decreases in air freight were also recorded between 2015 and 2016, with 55 thousand tonnes carried by air in 2016 compared to 56 million tonnes in 2015.

12 Energy and energy infrastructure

- 12.1 Transport is estimated to account for 25% of Scotland's total energy use, with the majority of this used by road transport and provided for by fossil fuels²³⁵. The split of energy used to transport people and goods on the roads is approximately 60:40 respectively²³⁶.
- 12.2 The Scottish Government has target for 10% of transport fuels to come from renewables by 2020²³⁷. Liquid biofuels are broken down into two categories: bioethanol (used with petrol) and biodiesel (used with diesel). In the UK as a

²³⁵ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

²³⁶ Scottish Government (2017) Energy in Scotland 2017 [online] Available at: <http://www.gov.scot/Resource/0051/00514474.pdf> (accessed 05/07/2019)

²³⁷ *ibid*

whole²³⁸ biofuels currently account for 3.1% of total fuels²³⁹. While the Scottish Government remains committed to the existing renewable energy target of 30% by 2020 and the associated individual targets for renewable electricity, heat and transport, the Scottish Energy Strategy sets a 2030 target that “the equivalent of 50% of the energy for Scotland’s heat, transport, and electricity consumption be supplied from renewable sources”.

- 12.3 Setting the 2030 target based on all sources of energy, across heat, transport and electricity, will accommodate variations in the rate of development and take up of renewables in individual sectors; and act as a complement to our new “whole-system” approach to energy policy. For example, in transport, Scottish Government analysis underpinning the 2030 target anticipates the switch from fossil fuels in transport to ultra-low emission vehicles, including plug-in hybrids, battery powered electric vehicles which can directly use electricity from renewable sources, as well as the use of biofuels. It is assumed the non-electrical proportion of all transport demand met by renewables (i.e. the biofuel component) to be around 5%.
- 12.4 As Scotland’s energy mix changes over the next few years, the electricity transmission network (grid) that supports the balance between energy generation and demand will change significantly. In the future, a greater proportion of transport demand is likely to be met by electricity. In turn, the uptake of electric transport on a large scale is likely to place extra pressure on the networks ability to generate, store and deliver the capacity necessary to meet peak demand²⁴⁰. Infrastructure will play a key role in ensuring security of supply and decarbonising our energy systems in the most cost effective, affordable way²⁴¹.
- 12.5 New infrastructure, or upgrades to existing infrastructure, may be required to facilitate a transition to new technologies and/or a large scale uptake of some technologies. For example, “Switched on Scotland: A Roadmap to Widespread Adoption of Plug in Vehicles”²⁴² states that a long term transformation that extends to 2050 will rely on factors such as the provision of recharging infrastructure to meet the changing needs of the electric and plug in hybrid electric vehicles market. The number of public charging points increased by 41% in 2017, however, it is noted that electric vehicle car sales are currently

²³⁸ Separate data is not available for Scotland, so the UK proportion is assumed.

²³⁹ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

²⁴⁰ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

²⁴¹ DECC (2015) Towards a Smart Energy System [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/486362/Towards_a_smart_energy_system.pdf (accessed 05/07/2019)

²⁴² Transport Scotland (2013) Switched On Scotland: A Roadmap to Widespread Adoption of Plug-in Vehicles [online] Available at: <https://www.transport.gov.scot/media/30506/j272736.pdf> (accessed 05/07/2019)

behind the rest of the UK²⁴³. A review of the Roadmap undertaken in 2016 noted that concerns such as a lack of charging points in certain areas, or else a lack of knowledge of where these are, were among the factors deterring licence holders from purchasing electric cars or vans²⁴⁴.

- 12.6 Energy storage is likely to be an increasingly important part of the transition to delivering clean, affordable and secure supplies of energy²⁴⁵. With regard to transport, this is likely to include the continued development of battery storage technologies and hydrogen fuel cells for vehicle use.
- 12.7 The network support services underlying energy, transport, water, and information and communications technology are vital to health and wellbeing and economic prosperity. The effect of climate change on these infrastructure systems will be varied but is likely to include an increase in disruptive events such as flooding, landslides, drought, and heatwaves. Further, this infrastructure is closely inter-linked and failure in any area can lead to wider disruption across these networks²⁴⁶.

13 Waste

- 13.1 A key driver to waste management has been achieving the aim of ‘moving up’ the waste hierarchy, and promoting the long-term benefits of waste prevention, use minimisation and reuse in preference to disposal options. Much of Scotland’s policy approach to waste management was set out in Scotland’s Zero Waste Plan, Safeguarding Scotland’s Resources: Blueprint for a More Resource Efficient and Circular Economy²⁴⁷ and Making Things Last: A Circular Economy Strategy for Scotland²⁴⁸.
- 13.2 Making Things Last set out actions focused on promoting a circular economy and identified four areas of priority: food and drink, and the broader bio-economy, remanufacture, construction and the built environment, and energy infrastructure. The automotive and shipping industries are two examples where the benefits of designing for a circular economy can be seen, partially as a result of extended producer responsibility via the End of Life Vehicle

²⁴³ Committee on Climate Change (2018) Reducing emissions in Scotland – 2018 Progress Report to Parliament [online] Available at: <https://www.theccc.org.uk/publication/reducing-emissions-in-scotland-2018-progress-report-to-parliament/> (accessed 05/07/2019)

²⁴⁴ Transport Scotland (2016) Switched on Scotland: A roadmap to widespread adoption of plug in vehicles - 2016 Review [online] Available at: <https://www.transport.gov.scot/media/20291/j457836.pdf> (accessed 05/07/2019)

²⁴⁵ ClimateXChange (2016) Energy Storage in Scotland - Summary of reports on thermal and electrical energy storage [online] Available at: https://www.climateexchange.org.uk/media/1391/summary_energy_storage.pdf (accessed 05/07/2019)

²⁴⁶ Adaptation Scotland (undated) 15 Key Consequences of Climate Change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climate-ready-places/impacts/> (accessed 05/07/2019)

²⁴⁷ Scottish Government (2013) Zero Waste - Safeguarding Scotland’s Resources: Blueprint for a More Resource Efficient and Circular Economy [online] Available at: <https://www2.gov.scot/Resource/0043/00435308.pdf> (accessed 05/07/2019)

²⁴⁸ Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 05/07/2019)

Directive²⁴⁹. Development is also taking place in the automotive industry to reduce embedded carbon emissions not only while driving, but at disposal and recycling²⁵⁰. This includes expanding the use of recycled materials and design principles that make it easier to dismantle vehicles.

- 13.3 Additionally, key Scottish industries, such as the food and drink industry and the broader bio economy, could play greater roles in energy recovery. For example, increasing the use of biological wastes in processes such as anaerobic digestion can increase the production of biogas, a source of renewable fuel and heat²⁵¹. Implementing bioenergy technologies can offer many environmental benefits. For example, it can help divert waste materials away from landfill, reducing the amount of waste going to landfill which can also lead to the reduction of sequestered gases that would otherwise be released into the atmosphere.
- 13.4 Making Things Last also sets out to promote the re-use of infrastructure, in particular, energy infrastructure, whilst the STPR (2008) gives preference, wherever possible, to making more efficient use of existing resources over the construction of new transport infrastructure²⁵². The efficient use of existing infrastructure and natural assets is also set out in NPF3.

Material assets evolution of the Baseline – Pressures, Trends and Key Points

- 13.5 Over the last five years there has been an increase in car, air, rail and ferry passenger numbers, as well as in distance cycled, however, at the same time, there has been a fall in bus passengers. The total volume of traffic on Scotland's roads in 2016 was at its highest recorded level to date and over the long-term it has been observed that the volume of car traffic on major roads has more than doubled. Over the past ten years, the number of air passengers per head of population has been higher for Scotland than for the UK as a whole.
- 13.6 The majority of the transport sector's energy demand is provided for by fossil fuels, predominately by road transport, and the uptake of electric transport on a large scale is likely to place extra pressure on the electricity system, and on the networks ability to generate, store and deliver the capacity necessary to meet

²⁴⁹ Scottish Government (2016) Making Things Last - A Consultation on Creating a More Circular Economy in Scotland - Strategic Environmental Assessment [online] Available at: https://consult.gov.scot/zero-waste-delivery/making-things-last/supporting_documents/A11726904%20docx.pdf (accessed 05/07/2019)

²⁵⁰ Toyota (undated) Challenge 2 - Life Cycle Zero CO₂ Emissions Challenge [online] Available at: <http://www.toyota-global.com/sustainability/environment/challenge2/> (accessed 05/07/2019)

²⁵¹ Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 05/07/2019)

²⁵² Transport Scotland (2009) Strategic Transport Projects Review - Final Report [online] Available at: <https://www.transport.gov.scot/media/26366/j11260a.pdf> (accessed 05/07/2019)

peak demand²⁵³. Additionally, new or upgraded infrastructure may be required to facilitate a transition to a decarbonised transport sector and transport infrastructure. For example the trunk road system and public transport infrastructure are an important material asset and rely on the availability of other natural resources for their construction and operation²⁵⁴.

- 13.7 EU legislation and standards aim to reduce emissions of CO₂, NO₂ and particulate matter, and the automotive and shipping industries are two examples where the benefits of designing for a circular economy can be seen, partially as a result of extended producer responsibility via the End of Life Vehicle Directive. The re-use of infrastructure is a key objective in Scottish Government policies such as Making Things Last and NPF3. Additionally, the food and drink industry and the broader bio economy, have been identified as key Scottish Industries that could play a greater role in energy recovery. The Scottish Biofuel Programme is a partnership of leading research institutions in the biofuel sector developing opportunities to convert low value residues into bio-energy and biofuels.
- 13.8 Advances in technology are likely to continue, such as more efficient engines with associated benefits. For example, average CO₂ emissions in Scotland for new car registrations have fallen by 27% over the last 10 years and by 2.4% in the last year alone²⁵⁵. However, progress in improving new car efficiency has been slow.
- 13.9 In the coming years, the digitalisation of transport and ITS in particular are likely to take a leap forward, including new technologies to support the move to more connected, cooperative and potentially more autonomous vehicles and the concept of Mobility as a Service²⁵⁶. Mobility as a Service integrates various forms of transport services into a single mobility service accessible by users on demand, potentially changing the way people travel. Demand management such as ITS, has the potential to lead to benefits such as improved air quality through reduced emissions and congestion, and increased integration across different modes of transport²⁵⁷.
- 13.10 Flooding poses the greatest long-term climate-related risk to infrastructure performance, but the growing risks posed from heat, water scarcity and slope

²⁵³ Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

²⁵⁴ Scottish Government (2008) Strategic Transport Projects Review - Environmental Report [online] Available at: <https://www.transport.gov.scot/media/23668/j10194b-00.pdf> (accessed 05/07/2019)

²⁵⁵ Transport Scotland (2017) Scottish Transport Statistics No 35: 2016 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-35-2016-edition/> (accessed 05/07/2019)

²⁵⁶ Transport Scotland (2017) Scotland's Trunk Road and Motorway Network - Future Intelligent Transport Systems Strategy 2017 [online] Available at: <https://www.transport.gov.scot/media/40406/its-strategy-2017-final.pdf> (accessed 05/07/2019)

²⁵⁷ *ibid*

instability caused by severe weather could also prove significant²⁵⁸. Road and rail transport is generally more vulnerable to a changing climate than air and water transport and flooding is anticipated to be the have the most significant impact²⁵⁹. Infrastructure is closely linked, including the network support services that underlie energy, transport, water and information and communications technology. Failure in any area can lead to wider disruption across these networks and whilst research projects are beginning to qualify the scale of interdependency at the national level, the scale of the risk remains largely unknown²⁶⁰.

²⁵⁸ Committee on Climate Change (undated) UK Climate Change Risk Assessment 2017 Evidence Report - Summary for Scotland [online] Available at: <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/national-summaries/scotland/> (accessed 05/07/2019)

²⁵⁹ *ibid*

²⁶⁰ *ibid*

Appendix D Assessment of High Level Policies

This Appendix contains the assessment tables for the 14 draft High Level Policies. These tables set out the potential for positive and negative impacts across the environmental topics scoped in to the assessment.

The environmental effects are presented in two formats within the tables:

- i. **A narrative describing the potential for environmental effects** – this narrative discusses the likely primary environmental impacts associated with the draft policy, and identifies the potential for secondary or indirect impacts.
- ii. **Colour-coded gradings assigned to the individual environmental topic areas scoped into the assessment** – the gradings reflect the likely significant impacts against each environmental topic.

In many instances, existing mitigation measures have been identified which can help to address the potential for adverse impacts, many of which are likely arise indirectly. For example, negative effects associated with construction activities and the development of infrastructure should be mitigated through a combination of appropriate design, on-site environmental management measures, and existing statutory mechanisms (e.g. the planning system, Environmental Impact Assessment (EIA)). Where applicable, this “assumed mitigation” is factored into the assessment of the significance of effects.

While the narrative discusses the potential for secondary or indirect impacts, the gradings reflect the overall assessment findings. This approach has been taken to enable the reader to readily identify the significant impacts associated with each policy.

Where positive impacts have been identified, the assessment narrative has also sought to identify any opportunities to enhance these where possible.

The tables also outline any assumptions made in undertaking the assessment and where relevant, refer to previous SEA work used to inform the assessment.

The gradings used are:

+	Potential for positive environmental effects
-	Potential for negative environmental effects
+/-	Potential for mixed environmental effects
0	Potential for environmental effects has not been identified

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>Policy and policy measures</p> <p>Continue to improve the reliability, safety and resilience of our transport system</p> <ul style="list-style-type: none"> • Increase safety of the transport system and meet casualty reduction targets • Increase resilience of Scotland's transport system from disruption and promote a culture of shared responsibility • Implement measures that will improve perceived and actual security of Scotland's transport system • Increase the use of asset management across the transport system 	+	+	+	0	0	0	0	0	+	<p>This policy is likely to primarily benefit population and human health, climatic factors, air quality and material assets through seeking to improve the reliability, safety and resilience across the transport network.</p> <p>Direct benefits for the population are likely to arise through the reduced risk of accidents and fatalities, however, there is also potential for wider benefits. Increased resilience of the network should also lead to reduced disruption and congestion, with associated benefits for climatic factors, air quality, and population and human health. Further benefits for material assets may arise through reduced pressure on the transport network. Reduced congestion can also lead to lower noise exposure, which alongside improving air quality, can have a particular relevance in urban areas where these issues can be experienced to a greater extent.</p> <p>This policy has the potential to encourage a more integrated response in reducing disruption, for example, to adverse weather conditions. Benefits could include improved resilience of communities and individuals to the impacts of climate change, facilitating safe travel choices and, reducing the risk of injury or accidents. This is likely to be of particular importance for individuals and communities less able to prepare for, respond to and recover from such events, for example, in areas of severe deprivation. Adverse weather conditions can also lead to traffic congestion, and greater preparedness for the impacts of any predicted events also has the potential to reduce this and associated greenhouse gas (GHG) emissions, with corresponding benefits for air quality, and population and human health.</p> <p>As transport networks become increasingly digital, the importance of giving consideration to security risks to services and infrastructure, such as from cyber-attacks/breaches, is likely to become increasingly vital. For example, the potential for increased risk to the security and safety of automated systems, such as connected and autonomous vehicles, being compromised. Additionally, as more devices and control systems are connected online, increased data storage and collection will be required and could lead to increased vulnerability, including the protection of customer data. As cyber technology becomes more sophisticated, the threat of attack is moving from data breaches to interrupting physical infrastructure. The benefits of giving consideration to this includes positive impacts for not only population and human health, but also material assets through the potential increased protection of the transport network.</p> <p>Potential benefits for material assets are also predicted through helping to ensure current infrastructure is fit for purpose and that its lifespan is prolonged through improvements in the repair and maintenance of network assets. In turn, this should also lead to wider benefits through reducing the use of other natural resources for new infrastructure construction and operation. Possible vulnerable areas or issues considered a priority, such as those at risk of flooding, could also be identified to ensure the maintenance of current infrastructure. There is also an opportunity for the policy to focus on ensuring that early consideration is given to future-proofing infrastructure or identifying opportunities to accommodate new emerging technologies to support climate change mitigation and adaptation.</p>

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>Summary of opportunities for enhancement and mitigation: Where possible, potential benefits could be maximised through the use of measures that not only improve safety, but also provide support for sustainable modes of transport, which in turn can lead to improved air quality and reduced exposure to noise. Consideration could also be given to prioritising the maintenance of infrastructure in vulnerable areas, including where risks from climate change have been identified, and future-proofing infrastructure where possible, to support climate change mitigation and adaptation.</p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Integrate policies and infrastructure investment across the transport, energy and digital system’, ‘Embrace transport innovation that positively impacts on our society, environment and economy’, and: ‘Plan our transport system to cope with the effects of climate change’ <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3 / Scottish Planning Policy Climate Change Plan 2017 – 2032 and Energy Strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021. Proposals for a new Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	<p>Embed the implications for transport in spatial planning and land use decision making</p> <ul style="list-style-type: none"> Ensure greater integration between transport, spatial planning, and how land is used Ensure that transport assets and services 	+	+	+	0	0	0	0	0	+	<p>Embedding the implications for transport in spatial planning and land use decision making has the potential to lead to positive effects for climatic factors, population and human health, air quality and material assets.</p> <p>There is a significant interaction between land use and transport and ‘Getting the best from our land: a Land Use Strategy for Scotland 2016-2021’ sets out a continued move towards a more integrated and strategic approach to land use and the generation of multiple benefits from land resources. Taking a strategic approach to the delivery of transport needs has the potential to take account of cross-policy considerations through the identification of opportunities and barriers to implementation. For example, considering development in a way that aligns with infrastructure can help reduce the length and number of journeys, making places safer and increasing accessibility, including potentially enabling increased uptake of more sustainable modes of transport. In turn, the capacity of infrastructure can influence the pattern of land use. Potential benefits include reduced GHG emissions, the significance of which is recognised in SPP. Changes in land use and land management practices can also be a key pressure on a number of receptors, such as soil, biodiversity, landscape and cultural heritage, and giving greater consideration to land use and transport at a strategic level should lead to the early identification of these factors. The interface between coast and land can be</p>

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	adopt the Place Principle <ul style="list-style-type: none"> Ensure the transport system is embedded in regional decision making 										<p>challenging to address and there is an opportunity for this policy to support greater alignment and consideration between transport and marine planning²⁶¹. This is likely to be of increasing relevance due to the risk of coastal flooding and sea level rise as a result of climate change impacts on infrastructure.</p> <p>It is also considered that improvements in air quality are likely to arise, with additional benefits for population and human health. This will be particularly relevant in areas where current air quality problems exist due to air pollution from traffic. Further, where the adoption of the Place Principle leads to greater local community engagement in the process of designing local transport systems, further benefits could arise from ensuring the diverse needs of all population groups are recognised. In turn, this has the potential to support sustainable modes of transport and reduce car use. Additional benefits for population and human health could also arise through increased accessibility from a more integrated multi-modal transport network that meets the needs of all, and through other secondary, less measurable benefits, such as improved community cohesion.</p> <p>Ensuring that transport considerations are embedded in the regional decision making process is also likely to play a key role where transport infrastructure has implications spanning regional boundaries, through supporting cross-boundary working. This has the potential to improve the integration of transport infrastructure in a way that supports multi-modal use through giving consideration of cross-boundary implications. For example, active travel routes that span regional areas and additionally support the increased uptake of more sustainable modes of transport. Benefits are likely to include reductions in GHG emissions and improved air quality, with associated benefits for population and human health. Increased accessibility should also further benefit population and human health.</p> <p>Over all, benefits for material assets are considered likely to arise though the consideration and support for an integrated transport system that supports access to a number of different modes. Additionally, there is the opportunity to ensure that infrastructure is considered in way that increases the resilience of the network to the predicted impacts of climate change, including through encouraging increased uptake of green infrastructure. Where development is located in sustainable and accessible areas, positive impacts for material assets are also likely to arise where the reuse of existing infrastructure as supported by SPP and Strategic Transport Project Review (STPR).</p> <p>Summary of opportunities: <i>Where possible, greater alignment between transport and land use planning should give consideration to the interface between coast and land due to increased risk of coastal flooding. The development of the transport network should be undertaken in a way that supports sustainable modes of transport, including increased uptake of green infrastructure.</i></p>

²⁶¹ Scottish Government (2017) Proposals for a new Climate Change Bill: Strategic Environmental Assessment Environmental Report. Available at: <https://www2.gov.scot/seag/seagDocs/SEA-01269/20084.pdf> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. Support for the Place Principle will lead to increased public engagement in the planning process. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and 'Integrate policies and infrastructure investment across the transport, energy and digital system', 'Provide a high quality transport system that integrates Scotland and recognises our different geographic needs' and 'Reduce the transport sector's emissions to support our national objectives on air quality and climate change'. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 - 2032 and Energy Strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021. Proposals for a new Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	<p>Integrate policies and infrastructure investment across the transport, energy and digital system</p> <ul style="list-style-type: none"> Ensure that local, national and regional policies offer an integrated approach across all aspects of infrastructure investment including the transport, digital, and energy system 	+	+	+	0	0	0	0	0	+	<p>This policy is likely to lead to benefits for climatic factors, air quality, population and human health and material assets.</p> <p>The policy seeks to promote an integrated approach being taken to the consideration of transport infrastructure across transport, digital and energy. This has the potential to support a shift to more sustainable modes of transport, as decarbonising the transport sector will have implications for energy and the digital network. For example, the increased uptake of low emissions vehicles, such as electric and electric-hybrid vehicles on a large scale, has the potential to increase electricity demand and increase pressure on electricity generation and distribution networks. New or improved infrastructure such as recharging points are also likely to be required in order to meet demand. In addition, the continued development of battery storage technologies and hydrogen fuel cells for vehicle use is also likely to play an increasingly important role. Both of these have implications for the energy sector. Benefits are considered likely to arise from giving early consideration to these implications in order to support the decarbonisation of the transport system. In particular, the increased electrification, particularly in terms of road transport, has the potential to deliver significant benefits to climatic factors, with associated benefits of improved air quality²⁶². Secondary benefits for population and human health are also anticipated through improved air quality and increased accessibility. The role of digital connectivity and transport services is recognised in Realising Scotland's full potential in a digital world: A Digital Strategy for Scotland and the digitalisation of transport and intelligent transport systems in particular are likely to take a leap forwards in the coming years. This is likely to include the consideration of</p>

²⁶² Scottish Government (2017) Strategic Environmental Assessment Environmental Report on the Draft Climate Change Plan and Draft Scottish Energy Strategy [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>new technologies to support the move to more connected, cooperative transport network. On-demand services, self-driving cars and other new technologies are set to become increasingly transformational in how and in what way transport choices are made and undertaken. For example, Mobility as a Service or smart mobility strives to integrate all modes of transport to provide a vision of a seamless end to end journey. In turn, this has the potential to reduce GHG emissions through improved efficiencies and reducing the number of journeys undertaken. Additionally intelligent transport systems can also respond in real time to manage capacity, predict and avoid disruption²⁶³, for example, as a result of adverse weather conditions. The increased digitisation of the transport sector is considered likely to increase efficiencies in the movement of people and goods, including via new and alternative modes, and increased accessibility, with associated benefits anticipated for climatic factors, air quality and population and human health. This may be of particular relevance in urban areas where issues of congestion and poor air quality can be experienced to a greater extent. However, smart mobility is likely to be of importance in rural areas where private car dependency can be higher than in cities. Improved logistics and innovation in technology can also play a key role in improving responsiveness to the impacts of climate change, further benefiting climatic factors and population and human health.</p> <p>As transport networks become increasingly digital, and as more devices and control systems are connected online, increased data storage and collection will be required. This has the potential to lead to increased vulnerability to cyber security increasing the potential for disruption to physical assets. There will also be a need to ensure that the energy and digital network is able to support the transition to a decarbonised transport sector and increased digitation. The increased integration of policies and consideration of infrastructure across transport, energy and digital should help ensure that consideration is being given across all three areas to support a transport network that evolves as challenges arise, benefiting material assets. Further, the effects of climate change on infrastructure systems will be varied and failure in one area can lead to wider disruption across networks due to their interlinked nature. This includes the network support services that underlie energy, transport, water, and information and communications technology. Failure in any area can lead to wider disruption across these networks²⁶⁴. Giving greater consideration to the infrastructure interdependencies should also be beneficial for material assets through potentially increasing resilience.</p> <p>There may however be a requirement for upgrades to, or new infrastructure, to support this policy with associated adverse impacts from construction and operation. This could include secondary negative impacts such as disturbance and displacement to biodiversity and lead to localised adverse impacts on soil, water, landscape, and cultural heritage. Local level consideration would need to be given to the potential implications that may arise through the siting, construction and development of any required infrastructure. Existing mechanisms such as, EIA and consenting conditions at the project level prior to work being undertaken should also reduce the potential for negative impacts.</p> <p>Summary of opportunities for enhancement and mitigation: Consideration should be given to improving resilience within the network across all three areas of transport, energy and digital, due to their</p>

²⁶³ Deloitte (2015) Transport in the Digital Age Disruptive Trends for Smart Mobility [online] Available at: <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/bps/deloitte-uk-transport-digital-age.pdf> (accessed 05/07/2019)

²⁶⁴ Adaptation Scotland (undated) 15 Key consequences of climate change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climate-ready-places/impacts/> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p><i>interdependencies, and ensure that where possible, climate change adaptation measures are also supported. Adverse secondary and localised impacts could arise from the construction and operation of infrastructure and will require consideration at project level under existing mechanisms.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> The safety and security of the transport network, including increased digitisation, has been considered under 'Continue to improve the reliability, safety and resilience of our transport system'. There are also links between this policy and 'Provide a high transport system that integrates Scotland and recognises our different geographic needs' and 'Improve the quality and availability of information to enable better transport choices' <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 - 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 Proposals for a new Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	<p>Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally</p> <ul style="list-style-type: none"> Optimise accessibility and connectivity within business-business and business-consumer 	-	+/-	+/-	0	0	0	0	0	+	<p>Negative impacts for climatic factors have been identified, with mixed impacts identified in respect to air quality, population and human health. Positive impacts for material assets has also been identified.</p> <p>In 2016, transport, including international aviation and shipping, was the largest source of net GHG emissions in Scotland²⁶⁵, an increase from 2015 and reported to be mainly due to an increase in emissions from road transport. However, emissions from international aviation and shipping have also increased slightly within that time period. Through seeking to increase accessibility and connectivity, the policy has the potential to give rise to mixed impacts for climatic factors and air quality, in particular, where focus is given to key infrastructure hubs and international gateways, such as airports and ports. Whilst vital to the movement of people and goods, these can often support modes of transport that can significantly contribute to GHG emissions and air pollution²⁶⁶. Further, congestion can be a particular issue in and around access roads to some of Scotland's key transport hubs. For example, a number of areas along popular traffic routes to and from several airports are currently designated as having air quality issues²⁶⁷. Further, due to several common sources, most notably</p>

²⁶⁵ The Scottish Government (2018) Scottish Greenhouse Gas Emissions 2016 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2016/pages/3/> (accessed 05/07/2019)

²⁶⁶ The Scottish Parliament (2016) SPICe Briefing, Air Quality in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-35_Air_Quality_in_Scotland.pdf (accessed 05/07/2019)

²⁶⁷ Civil Aviation Authority (2017) Information on aviation's environmental impact [online] Available at: <http://publicapps.caa.co.uk/docs/33/CAP1524EnvironmentalInformation29032017.pdf> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>markets by all modes of transport</p> <ul style="list-style-type: none"> • Ensure gateways to and from domestic and international markets are resilient and integrated into the wider transport networks to encourage people to live, study, visit and invest in Scotland • Support measures to improve sustainable surface access to Scotland's airports and sea ports 										<p>road traffic in urban areas, there is also a close relationship between air quality and environmental noise²⁶⁸ which can have a negative impact on human health. Conversely, the policy has the potential to lead to positive impacts for population and human health through increasing accessibility to services and goods. This may be of particular relevance where lack of integrated transport infrastructure can be a common issue, for example, in rural and remote locations. Benefits may also arise for climatic factors, air quality and population and human health where focus is given to improving efficiency within the transport network, particularly the movement of freight. For example, the consolidation of the movement of goods or alternatives modes of distribution has the potential to lead to reduced GHG emissions, improved air quality and reduced noise.</p> <p>Consideration will need to be given to the potential for increased uptake of less sustainable modes of transport to arise and the policy should be considered alongside wider Scottish Government objectives strengthen the ambition of climate change targets and improve air quality. Where support is given to improving surface access to key hubs, there is the potential for reduced impacts for climatic factors, air quality and population and human health. The benefits of this are likely to be felt to a greater extent in urban locations, particularly where current issues with air quality and noise are experienced. There may also be an opportunity for the policy to support the uptake of technological improvements and improved air transport management, which can lead to not only reduced GHG emissions and improved air quality, but reduced noise footprints.</p> <p>The policy provides an opportunity to ensure that, where possible, the transport network is developed in a way that improves integration and supports accessibility, potentially benefiting material assets overall. However, there is the potential for indirect adverse impacts should upgraded or new infrastructure be required or if increased surface traffic were to arise at major hubs without infrastructure measures being implemented to support increased demand. Negative impacts could include land take, visual and cultural heritage effects from the siting of infrastructure, as well as impacts on soil, air, water and biodiversity from construction and operational activities. The significance of these identified impacts will be largely dependent on factors such as scale, siting and design. Potential negative impacts should also be reduced at project level though existing mechanisms such as the planning process and EIA..</p> <p>Summary of opportunities for enhancement and mitigation: Consideration should be given to opportunities to implement the policy in a way that supports sustainable modes of transport and ensure the network is developed in a way that supports these alternative options. Additionally, potential negative impacts could also be reduced though ensuring that surface transport links to and from major gateways hubs support more sustainable modes of transport. Consideration may need to be given to where negative indirect impacts may arise at a local level through possible infrastructure requirements and where these will be subject to existing mechanisms at project level.</p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p>

²⁶⁸ The Scottish Government (2015) Cleaner Air Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<ul style="list-style-type: none"> Measures to implement this policy are currently unknown The policy applies to all modes of transport. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Embed the implications for transport in spatial planning and land use decision making’, ‘Provide a high quality transport system that integrates Scotland and recognises our geographic needs’, and ‘Improve access to healthcare, employment, education and training opportunities to generate inclusive sustainable economic growth’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> Air departure Tax Climate Change Plan 2017 – 2032 and Energy strategy Proposals for a new Climate Change Bill
	<p>Provide a high quality transport system that integrates Scotland and recognises our different geographic needs</p> <ul style="list-style-type: none"> Ensure that infrastructure hubs and links form an accessible integrated system that improves the end-to-end journey for people and freight Minimise the connectivity and cost disadvantages faced by island communities and those in remote and rural areas 	+	+	+	0	0	0	0	0	+	<p>Benefits for climatic factors, air quality and population and human health and material assets are considered likely to arise through this policy seeking to take into account that transport requirements differ across Scotland.</p> <p>The policy has the potential to have an overall positive impact for climatic factors, air quality with associated benefits for population and human health through supporting the increased integration of the transport network, and in turn, potentially increasing efficiency and supporting a modal shift. Particular benefits may also arise where focus is given to improving the integration of the network with regard the movement of freight, as currently this is prominently undertaken by road. Potential benefits from increased network integration should include reduced GHG emissions, improved air quality and reductions in noise, with secondary benefits for population and human health. The benefits of which are likely to be felt to a greater extent in urban locations, particularly where current issues with air quality and noise are experienced.</p> <p>Around 20% of Scotland’s population lives in areas that have been classified as remote and rural, and a common issue raised in rural and remote locations is the lack of integrated transport infrastructure²⁶⁹. This can hinder access to goods and services, including important health care services. Through seeking to identify and minimise the barriers to connectivity, particularly where focus is given to differing geographical needs, benefits for population and human health are considered likely to arise from increased accessibility. Additionally, Scotland’s islands face particular challenges that differ from other parts of the country and these challenges also extend to the transport network. Their remoteness means that connectivity of all kinds is fundamental, including transport which is vital and includes links by sea and air, both to other islands or to the mainland²⁷⁰. However, a greater dependency on less sustainable modes of transport can occur in more remote and island</p>

²⁶⁹ NHS Scotland (undated) Improve access to care for remote and rural areas [online] Available at: <http://www.shiftingthebalance.scot.nhs.uk/improvement-framework/improve-access-to-care-for-remote-and-rural-areas/> (accessed 05/07/2019)

²⁷⁰ Scottish Government (2014) Empowering Scotland’s Island Communities [online] Available at: <https://beta.gov.scot/publications/empowering-scotlands-island-communities/pages/7/> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<ul style="list-style-type: none"> Safeguard the provision of lifeline transport services and connections 										<p>locations, such as private car use and aviation. Where support is given to the sustainable travel hierarchy and the increased uptake of more sustainable modes of transport, the unintentional and potentially necessary uptake of less sustainable modes of transport in these locations should be reduced.</p> <p>Positive impacts are considered likely for material assets where support is given to the provision of a stronger and more cohesive transport network that supports sustainable modes of transport. Consideration should also be given to ensuring that climate change adaptation is a key consideration given the lifeline nature of many of these services, which should lead to additional benefits for climatic factors and material assets. New infrastructure, or upgrades to the existing network, may be required to support improved connectivity, with associated negative impacts for a range of environmental receptors, such as soil, water, biodiversity, landscape and cultural heritage. Environmental effects such as these should be given consideration through existing mechanisms at project level.</p> <p>Summary of opportunities for enhancement and mitigation: <i>There is an opportunity to implement the policy in a way that supports sustainable modes of transport and ensure that climate change resilience is considered. Adverse secondary and localised impacts that could arise from the construction and operation of infrastructure. will require consideration at project level under existing mechanisms.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Embed the implications for transport in spatial planning and land use decision making’, ‘Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally’ and ‘Improve access to healthcare, employment, education and training opportunities to generate inclusive sustainable economic growth’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 - 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 Proposals for the Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	Improve the quality and availability of information	+	+	+	0	0	0	0	0	+	Climatic factors, air quality and population and human health and material assets are considered likely to be benefit from this policy.

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>to enable better transport choices</p> <ul style="list-style-type: none"> Support improvements and innovations that enable all to make informed travel choices Support seamless journeys providing the necessary infrastructure, information and interchange facilities to connect all modes of transport Ensure that appropriate real-time information is provided to allow all transport users to respond to extreme weather and incidents 										<p>The policy seeks to improve the clarity of methods of communication used and increase the availability of journey planning information with benefits considered likely for population and human health through enabling users to make fully informed transport choices, including potentially healthier and safer travel choices. This will also be of key relevance to the provision of information to better inform travel choices during periods of adverse weather conditions, helping individuals and communities to prepare, respond and recover from extreme weather events. There is also the potential for the policy to lead to increased accessibility, particularly where support is provided for the provision of transport planning information focused towards those who normally have difficulties in using public transport. Wider societal benefits may also be gained from increased accessibility if measures seek to address issues of social isolation.</p> <p>The policy could also lead to increased uptake of sustainable travel choices and reduced congestion, with associated benefits for climatic factors, air quality and population and human health. The digitisation of transport is also likely to play an increasing role in the transport network, potentially changing the way and the means by which travel is undertaken. This may be of particular relevance where support is given to enabling concepts such as seamless travel and the provision of a “door to door” services, which have the potential to reduce the number of less sustainable travel journeys being undertaken. Traffic congestion can also be caused by adverse weather conditions and greater preparedness for the impacts of any predicted events also has the potential to reduce GHG emissions, with associated benefits for air quality and population and human health. Positive impacts for material assets should arise though ensuring that early consideration given to the interlinks between transport and other relevant networks, such as digital to support this policy.</p> <p>Summary of opportunities to maximise benefits: <i>There is an opportunity to implement the policy in a way that supports sustainable modes of transport and ensures that early consideration is given to the increased role of digitalisation of transport within wider relevant policy areas.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Embrace transport innovation that positively impacts on our society, environment and economy’, and ‘Provide a transport system that is equally accessible to all’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> Climate Change Plan 2017 - 2032 and Energy strategy Proposals for the Climate Change Bill
	Embrace transport innovation that positively impacts on our society,	+	+	+	0	0	0	0	0	+	Primary benefits are likely to arise for climatic factors, air quality and population and human health and material assets.

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>environment and economy</p> <ul style="list-style-type: none"> Support Scotland to become a market leader in the development and early adoption of beneficial transport innovations 										<p>This policy should lead to a number of benefits though seeking to support innovation in the transport sector which will be of key importance to ensure continued mitigation and adaptation to climate change. For example, low carbon technologies, including the use of alternative fuels, is likely to benefit climatic factors and air quality, with associated benefits for population and human health. This approach aligns with the Scottish Energy Strategy target to increase the use of renewable sources of energy used in the transport sector. In setting this target, it is anticipated that there will be a switch from fossil fuels in transport to ultra-low emission vehicles, including plug-in hybrids, battery powered electric vehicles which can directly use electricity from renewable sources, as well as the use of biofuels. The role of energy storage is likely to become increasingly important with a move to a higher proportion of intermittent renewable electricity generation within the transport sector, along with the decarbonisation and replacement of conventional fuel. Smaller distribution technologies, such as batteries and hydrogen cells, have the potential to contribute to peak load and demand management, however support will be required to reach the point of significant deployment²⁷¹.</p> <p>Where, when and how travel is undertaken is also likely to evolve, and technological developments, will impact on logistics and can enhance journey times and connections for both people and goods, potentially also benefiting climatic factors, air quality and population and human health. For example, this could be through support for the continued development and evolution of Intelligent Transport Systems to encompass the growing field of connected and autonomous vehicles. Potential benefits are likely to include increased efficiency, increased safety and enhanced resilience of the transport network. Further benefits may arise through the use of connected and autonomous vehicles, which can lead to a number of benefits including the optimisation of the road network, reduced congestion and emissions²⁷². There is also an opportunity for the policy to not only support innovation and technology that that seeks to improve responsiveness to the impacts of climate change, but innovation in products designed to protect assets from the risks of climate change. An example of this is technology that can detect cracks in rail lines due to temperature changes²⁷³.</p> <p>Secondary benefits for population and human health should arise as a result of the policy from improved air quality, as well as due to innovation and increased efficiencies leading to reductions in noise levels, for example, through the use of Intelligent Transport Systems²⁷⁴. Further, studies have also reported that technologies, such as autonomous and connected vehicles, are considered to increase accessibility to some of society's most disadvantaged, including disabled people and the elderly²⁷⁵, potentially leading to further benefits to population and human health. However, the policy should also give consideration to the mitigation of possible unintended negative impacts for population and human health which can result from the move towards decarbonisation, for example, some groups may be excluded from affording or operating certain technologies due to low income or disability.</p>

²⁷¹ ClimateXChange (2016) Summary of energy storage [online] Available at: <https://www.climateexchange.org.uk/research/projects/energy-storage-in-scotland/> (accessed 05/07/2019)

²⁷² Atkins (undated) connected and autonomous vehicles introducing the Future of Mobility [online] Available at: http://www.atkinsglobal.co.uk/~media/Files/A/Atkins-Corporate/uk-and-europe/uk-thought-leadership/reports/CAV_A4_080216.pdf (accessed 05/07/2019)

²⁷³ BSR (undated) Adapting to climate change: A guide for the transport industry [online] Available at: https://www.bsr.org/reports/BSR_Climate_Adaptation_Issue_Brief_Transportation.pdf (accessed 05/07/2019)

²⁷⁴ ITS United Kingdom (undated) Intelligent Transport Systems (ITS) and their benefits [online] Available at: <http://its-uk.org.uk/wp-content/uploads/2017/02/ITS-UK-Benefits-of-ITS.pdf> (accessed 05/07/2019)

²⁷⁵ SMMT (2017) Connected and autonomous vehicles [online] Available at: <https://www.smmt.co.uk/2017/03/connected-and-autonomous-vehicles-will-improve-quality-of-life-for-six-in-10-people-with-limited-mobility-finds-new-study/> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>Benefits for material assets are considered likely to arise where support is given to ensuring that the transport network can accommodate the future innovative technologies that are likely to play a key role in the decarbonisation of the transport sector. Consideration may need to be given however to where this could place pressure on other wider networks. For example, it is recognised that supplying a greater proportion of transport demand by electricity would place additional pressure on the electricity system and on the network's ability to generate, store and deliver the capacity necessary to meet peaks in demand²⁷⁶. However, the transport and energy network as a whole should benefit from being developed to support a transition to decarbonisation.</p> <p>Additionally, to support the shift towards decarbonisation, it will be fundamental to align policies that relate to climate, digital and energy, and this is recognised in Scotland's digital and energy strategies and the NPF3. Where possible, any new infrastructure or upgrades to existing infrastructure that may be required to support this policy should be designed with flexibility to accommodate future changes in the transport system. This could lead to a reduced need for further work to be undertaken in order for the transport network to be adaptive to future changes and support the preference where ever possible to use existing resources as set out in STPR and NPF3.</p> <p>Summary of opportunities for enhancement and mitigation: <i>The policy has the potential to support innovation needed to decarbonise the transport sector whilst recognising that consideration should also be given to linkages with the energy sector. Support for technology innovation and products that can improve the protection of assets and responsiveness to the impacts of climate change should also be considered.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and 'Integrate policies and infrastructure investment across the transport, energy and digital system', 'Improve and enable the efficient movement of people and goods on our transport system', 'Provide a transport system that is equally accessible for all', and 'Provide a transport system which promotes and facilitates travel choices which help to improve people's health and wellbeing'. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> Climate Change Plan 2017 – 2032 and Energy strategy Proposals for the Climate Change Bill

²⁷⁶ Scottish Government (2017) Scottish Energy Strategy: The Future of Energy in Scotland [online] Available at: <https://beta.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>Improve and enable the efficient movement of people and goods on our transport system</p> <ul style="list-style-type: none"> • Ensure the Scottish transport system efficiently manages needs of people and freight • Promote the use of space-efficient transport 	+	+	+	0	0	0	0	0	+	<p>Benefits for climatic factors, air quality and population and human health are considered likely to arise, with potential mixed impacts for material assets through the policy providing support to the increased efficiency in the movement of people and goods.</p> <p>Benefits for climatic factors are likely to arise from a potential reduction in journeys undertaken where support is given to the consolidation in the movement of both people and goods. Additionally, increased efficiencies and reduced congestion are also expected to lead to a reduction in GHG emissions. Particular benefits are likely to arise where focus is given to the movement of freight as currently the majority of freight transportation is undertaken by road. For example, the trunk road and motorway network represents 6% of the total Scottish road network yet carries 60% of heavy goods vehicle movements²⁷⁷. It is estimated that each freight train removes the equivalent of 76 HGVs from the road and produces 76% less carbon dioxide than road freight per tonne of cargo²⁷⁸ and there is an opportunity for the policy to support a modal shift from road to rail. Heavy vehicles also cause more wear on road surfaces, and their emissions, including noise, are higher than other vehicles on the network. Secondary benefits for population and human health are considered likely to arise from the policy leading to improvements in air quality and reduced exposure to noise. The benefits of this are likely to be experience to a greater extend in urban locations, particularly where current issues with air quality and noise are experienced. Reduced exposure to noise and air pollutants also has the potential to lead to increased levels of social interaction²⁷⁹. The benefits of this are likely to be felt to a greater extent in urban locations, particularly where current issues with air quality and noise are experienced. In order to maximise the potential benefits of the policy, consideration will need to be given to differing geographical needs. For example, in rural and remote areas there tends to be a greater dependency on private car use. Additionally, for much of the country, the potential for using rail is not available and road freight is the only option²⁸⁰.</p> <p>Where focus is given to promoting the increased uptake of space efficient modes of transport, such as buses, and vehicle sharing mechanisms such as car share schemes, benefits should also arise for climatic factors, air quality and population and human health. There is also the potential that the policy could support a modal shift and behaviour change through measures that seek to improve journey times and reduce congestion, as these can act as a barrier to the uptake of public transport. Further benefits may also arise through increased uptake of active travel, which can have a positive impact on physical and mental wellbeing, in addition to reduced GHG emissions and improved air quality.</p> <p>Innovation is also likely to have an increasing influence on transport demand and management, helping support efficiencies in the network, in turn reducing congestion, and the increased use of electric, hybrid and fuel cell vehicles. Intelligent Transport Systems and the development of “door to door” services, also have the potential to influence the number of travel journeys being undertaken and promote more sustainable travel</p>

²⁷⁷ Transport Scotland (2017) Scotland's Trunk Road and Motorway Network, Future Intelligent Transport Systems Strategy 2017 [online] Available at: <https://www.transport.gov.scot/media/40406/its-strategy-2017-final.pdf> (accessed 05/07/2019)

²⁷⁸ Transport Scotland (2016) Delivering the goods – Scotland's rail freight strategy [online] Available at: <https://www.transport.gov.scot/publication/delivering-the-goods-scotlands-rail-freight-strategy/> (accessed 05/07/2019)

²⁷⁹ WHO (2018) Health, environment and sustainable development [online] Available at: <http://www.who.int/sustainable-development/transport/health-risks/noise/en/> (accessed 05/07/2019)

²⁸⁰ Transport Scotland (2016) Delivering the goods – Scotland's rail freight strategy [online] Available at: <https://www.transport.gov.scot/publication/delivering-the-goods-scotlands-rail-freight-strategy/> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>options. Benefits are likely to include reduced GHG emissions, improved air quality and noise levels with associated benefits for population and human health.</p> <p>The policy should lead to reduced pressure on the network through greater efficiencies and the increased integration of the transport network to support space efficient modes of transport with positive effects for material assets anticipated overall. However, consideration should be given to where the policy could lead to increased electrification or a modal shift from road to rail, as this is likely to place additional pressure on these respective networks from increased demand should the appropriate infrastructure not be in place to accommodate a modal shift.</p> <p>Summary of opportunities for enhancement and mitigation: <i>Where possible, support should be given to the mass transit for both people and goods to maximise benefits, with an opportunity to focus on freight. Consideration should be given to differing geographical locations and infrastructure dependencies with other networks, such as rail and energy. Possible negative impacts of any modal shift and the potential for additional pressure to be placed on wider networks, such as road to rail, should be given early consideration.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> This policy links with 'Embed the implications for transport in spatial planning and land use decision making', 'Integrate policies and infrastructure investment across the transport, energy and digital system', 'Provide a high quality transport system that integrates Scotland and recognises our different geographic needs' and 'Embrace transport innovation that positively impacts on our society, environment and economy'. Measures to implement this policy are currently unknown. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021. Proposals for the Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	Provide a transport system that is equally accessible for all	+	+	+	0	0	0	0	0	+	The policy seeks to ensure that the transport network is accessible to all, which is likely to lead primarily to benefits for population and human health, climatic factors and air quality by ensuring fair and equitable access to travel services.

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<ul style="list-style-type: none"> Ensure transport in Scotland is accessible for all Identify and remove barriers to public transport connectivity and accessibility within Scotland Reduce the negative impacts which transport has on the safety, health and wellbeing of people Continue to support the implementation of the recommendations from, and the development of, Scotland's Accessible Travel Framework 										<p>Increased accessibility can lead to benefits including increased autonomy, improved quality of life, and reduced social isolation stemming from greater integration in society²⁸¹. Benefits such as these are likely to be realised to a greater extent through the policy having a focus on identifying barriers to accessibility, such as, giving consideration to particular geographical areas where barriers currently exist, or for individuals or communities where specific needs are currently overlooked. For example, one such consideration could be the predicted increase in Scotland's aging population which is projected to increase faster than any other age group²⁸². This will come with associated challenges in terms of ensuring the transport system can adequately respond to the changing physical and social needs of users. A lack of integrated transport infrastructure in rural and remote locations can also be a common issue raised, leading to barriers to accessing services. Further, whilst technical innovations could also lead to further benefits from increased accessibility, consideration may need to be given to where members of society could potentially be negatively impacted through possible barriers to using these technologies, for example, due to low income or disability.</p> <p>There is also an opportunity for the policy to lead to wider benefits for climatic factors, air quality and population and human health through providing support for more sustainable modes of transport in order to reduce the negative impacts of transport. Further, particular benefits likely be to gained through targeting action to minimise risks that disproportionately affect vulnerable groups. For example, improved air quality could lead to significant benefits for those at greatest risk, such as children and those currently considered to be living in deprivation or experience pre-existing health conditions. Depending on the measures implemented, further benefits may arise from increased safety, with an opportunity for secondary benefits from reduced GHG emissions, for example, from measures which seek to reduce the amount of journeys undertaken.</p> <p>Barriers around good access to the transport network extend beyond the physical act of getting there and also includes the provision of accessible travel information. Through seeking to support Scotland's Accessible Travel Framework, this policy should also provide benefits through ensuring that the challenges faced by those who have difficulties in accessing and using the transport network are taken into account.</p> <p>Summary of opportunities to maximise benefits: <i>There is an opportunity for the policy to focus action and measures where benefits could be significant, such as vulnerable groups. The implementation of measures that could lead to further benefits through reductions in GHG emissions should also be supported where possible to provide multiple benefits.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown.

²⁸¹ ISEMOA (2012) Benefits of improving accessibility [online] Available at: http://www.isemoa.eu/docs/42/ISEMOA_benefit_brochure_EN_120502_final.pdf (accessed 05/07/2019)

²⁸² National Records of Scotland (2017) Projected Population of Scotland (2016-based) [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2016-based> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Provide a transport system which promotes and facilitates travel choices which help to improve people’s health and wellbeing’, ‘Improve the quality and availability of information to enable better transport choices’, ‘Embrace transport innovation that positively impacts on our society, environment and economy’ and ‘Improve access to healthcare, employment, education and training opportunities to generate inclusive sustainable economic growth’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 National Planning Framework 3/Scottish Planning Policy
	<p>Improve access to healthcare, employment, education and training opportunities to generate inclusive sustainable economic growth</p> <ul style="list-style-type: none"> Ensure sustainable labour market accessibility to employment locations Ensure sustainable access to education and training facilities Improve sustainable access to healthcare facilities for staff, patients and visitors 	+/-	+	+/-	0	0	0	0	0	0	<p>The policy considers improving accessibility to employment, education and training opportunities which is likely to primarily benefit population and human health. Mixed impacts may arise for climatic factors and air quality.</p> <p>Primarily, the policy is likely to lead to benefits for population and human health through increased accessibility to a number of services, which in turn, could also lead to wider societal benefits. Particular benefits are likely to arise where focus is given to those that are currently excluded from the labour market due to existing accessibility challenges. For example, access to services such as employment and education can be hindered by financial and locational constraints and public transport availability and barriers to accessibility, serving to perpetuate existing disadvantage and exclusion²⁸³. Providing support to low income groups in accessing public transport and active travel can work towards removing some of these barriers, in turn, increasing the likelihood of access to key opportunities that may improve health and socioeconomic outcomes, benefiting population and human health²⁸⁴.</p> <p>Where active travel is promoted, additional benefits could also arise through increased physical activity. Access to healthcare services is also critical to good health, however, barriers to accessing these services exist, for example, in rural locations. Further benefits are likely to arise for population and human health through ensuring that consideration is given to the access of these services, such as improved linkages with public transport services.</p> <p>The policy could also present an opportunity for positive impacts for climatic factors through reductions in GHG emissions, with associated benefits for air quality and population and human health, if implemented alongside others that support sustainable modes of transport. Providing support for the sustainable travel hierarchy should also help to reduce potential negative impacts that may arise through a potential increase in travel journeys undertaken via less sustainable modes.</p>

²⁸³ University College London (2014) Transport and Poverty: A review of the evidence [online] Available at: <http://discovery.ucl.ac.uk/1470392/> (accessed 05/07/2019)

²⁸⁴ ibid

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>Summary of opportunities to maximise benefits: Preference should be given, where possible, to the sustainable travel hierarchy to reduce possible negative impacts from uptake of less sustainable modes of travel.</p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> The policy will include a focus on those currently excluded from the labour market due to existing accessibility challenges. The policy will be implemented in a way that supports sustainability. Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Provide a transport system that is equally accessible for all’, ‘Provide a transport system which promotes and facilitates travel choices which help to improve people’s health and wellbeing’, and ‘Embed the implications for transport in spatial planning and land use decision making’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 Proposals for the Climate Change Bill
	<p>Support the transport industry in meeting current and future employment and skills needs</p> <ul style="list-style-type: none"> To meet the changing employment and skills demands of the 	0	0	0	0	0	0	0	0	0	<p>The policy seeks to support the transport industry to meet changing employment and skills demands, whilst promoting retention of the workforce within the sector. It is considered unlikely that this policy will give rise to any direct or indirect environmental effects.</p> <p>Summary of opportunities to maximise benefits: Although the implementation of this policy is not considered to have any direct significant environmental effects, the prioritisation and promotion of upskilling and training on transport sector innovation could have wider environmental benefits. For example, the promotion and retention of skilled workers with increasing knowledge of the new and innovative technologies that are likely to play an increasingly important key role in the decarbonisation of the transport sector, could help to support transport innovation and the adoption of low carbon transport more widely.</p>

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	transport industry and upskill workers <ul style="list-style-type: none"> Support initiatives that promote the attraction and retention of an appropriately skilled workforce across the transport sector 										<p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and 'Improve access to employment, education and training opportunities to generate inclusive sustainable economic growth'.
	<p>Provide a transport system which promotes and facilitates travel choices which help to improve people's health and wellbeing</p> <ul style="list-style-type: none"> Promote and facilitate active travel choices across mainland Scotland and islands Integrate active travel options with public transport services Support transport's role in improving peoples' health and wellbeing 	+	+	+	0	0	0	0	0	+	<p>Benefits of the policy are likely to include positive impacts on population and human health, climatic factors, air quality and material assets.</p> <p>Scotland's obesity rates continue to be amongst the highest in the developed world and are a significant public health issue²⁸⁵. Active travel, such as cycling or walking, can provide access to the outdoors with additional benefits for physical and mental health and well-being, including reducing obesity and stress. Through seeking to increase uptake of active travel, the policy has the potential to lead to benefits for population and human health. There will also be an opportunity for the policy to maximise benefits through targeting action where health issues currently exist. For example, there are strong links between obesity and inequalities, with lower socio-economic status associated with higher levels of obesity with a higher proportion of women and children in the most deprived areas being affected by extreme obesity²⁸⁶. These benefits could be further maximised if the policy leads to long-term behaviour change, and in turn, support wider health outcomes by increasing physical activity and reducing the incidence of conditions such as diabetes²⁸⁷.</p> <p>An increase in the uptake of active travel can also lead to reduced GHG emissions and improve air quality with associated benefits for climatic factors and population and human health. Where uptake of active travel leads to improved air quality, the benefits of this could be significant when considering those at greatest risk. This could include those currently considered to be living in deprivation or experiencing pre-existing health conditions. Additionally, due to the nature of their developing lungs, air pollution can have a bigger impact on children's health than it does on adults²⁸⁸. Improvements in air quality are likely to be seen in urban areas, particularly if action is targeted towards Air Quality Management Areas which were designated as a result of poor air quality. Active travel can also lead to further benefits for population and human health through reducing environmental noise.</p>

²⁸⁵ Scottish Government (2017) A healthier future – action and ambitions on diet, activity, and healthy weight: consultation [online] available at: <https://beta.gov.scot/publications/healthier-future-action-ambitions-diet-activity-healthy-weight-consultation-document/> (accessed 05/07/2019)

²⁸⁶ NHS Health Scotland (2018) Diet and obesity [online] Available at: <http://www.healthscotland.scot/health-topics/diet-and-obesity/obesity> (accessed 05/07/2019)

²⁸⁷ Scottish Government (2012) Growing up in Scotland: Overweight, obesity and activity [online] Available at: <http://www.gov.scot/Resource/0039/00392688.pdf> (accessed 05/07/2019)

²⁸⁸ Global Action Plan (2017) Air pollution and children [online] Available at: <https://www.cleanairday.org.uk/air-pollution-and-children> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>There is a range of factors that can impact on individuals' levels of exercise, and these include the availability of built environment and transport systems that encourage active living and regular physical activity²⁸⁹. The policy is likely to have a beneficial impact through giving consideration to the integration of active travel options with public transport. For example, travel is often difficult in rural and remote areas where residents live far from schools, worksites, and other common destinations. As such, there is a need for environments that support active travel, even if residents must drive to get to them²⁹⁰. There is also the potential for the policy to lead to long term behaviour change with further benefits for climatic factors, air quality and population and human health. Additionally, if measures are implemented to encourage the uptake of active travel through improved safety, this could lead to wider societal benefits arising through increased opportunity for social interaction.</p> <p>Due to common sources, most notably, road traffic in urban areas, there is a close relationship between air quality and noise²⁹¹. The World Health Organisation considers that noise is the second largest environmental cause of health problems, with the impact of air quality from particulate matter considered the most detrimental²⁹². Environmental noise is emitted from a range of transport and is a feature of both urban and rural environments in Scotland. Few areas remain that are totally unaffected by some form of transport noise, however issues remain heavily centred in urban areas²⁹³. Active travel can lead to improved air quality, reduced environmental noise and congestion, and there is an opportunity for the policy to maximise benefits across these topic areas. Further wider benefits should also arise through reduced noise and light disturbance from transport activity which can have a negative impact on biodiversity²⁹⁴.</p> <p>Additional or enhanced infrastructure may be required to support this policy. This could present an opportunity to develop a cohesive, multi-use transport network, including the creation of green infrastructure, with clear benefits in terms of material assets. Additionally, green infrastructure such as walking and cycling paths, can have a beneficial impact on air quality, support wildlife and habitats and increase the capacity of the environment to adapt to climate change.</p> <p>Summary of opportunities to maximise benefits: <i>There is the potential to maximise benefits through targeted action, for example, towards those at risk; greater consideration of the use of green infrastructure to support the policy; and support for measures that could lead to improvements in noise exposure.</i></p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p>

²⁸⁹ Global Action Plan (2017) Air pollution and children [online] Available at: <https://www.cleanairday.org.uk/air-pollution-and-children> (accessed 05/07/2019)

²⁹⁰ Active Living Research (2015) Promoting active living in rural communities [online] Available at: https://activelivingresearch.org/sites/default/files/ALR_Brief_RuralCommunities_Sept2015.pdf (accessed 05/07/2019)

²⁹¹ Scottish Government (2015) Cleaner Air Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

²⁹² European Commissions (2016) Noise, health effects of noise [online] Available at: http://ec.europa.eu/environment/noise/health_effects_en.htm (accessed 05/07/2019)

²⁹³ Scotland's Environment (undated) Scotland's noise, part of Scotland's environment [online] Available at: <https://noise.environment.gov.scot/index.html> (accessed 05/07/2019)

²⁹⁴ Scottish Government (2006) Scotland's National Transport Strategy Consultation: Strategic Environmental Assessment Environmental Report [online] Available at: <http://www.gov.scot/Publications/2006/05/16112258/0> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Continue to improve the reliability, safety and resilience of our transport system’ and ‘Reduce the transport sector’s emissions to support our national objectives on air quality and climate change’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 Proposals for the Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	<p>Reduce the transport sector’s emissions to support our national objectives on air quality and climate change</p> <ul style="list-style-type: none"> Facilitate a shift to more sustainable modes of transport for people and commercial transport Reduce emissions generated by the transport system to improve air quality 	+	+	+	0	0	0	0	0	0	<p>The policy has the potential to lead to significant benefits for both climatic factor and air quality, in addition to associated benefits for population and human health.</p> <p>Transport emissions, including Scotland’s share of international aviation and shipping, accounted for approximately 37% of Scotland’s total emissions in 2017, an increase of 2.2% from 2016²⁹⁵. In 2017, road transport was the largest source of emissions in Scotland²⁹⁶. Additionally, energy accounted for approximately 15% of total emissions in 2017²⁹⁷, and transport is estimated to account for 25% of all Scotland’s total energy use with the majority of this arising from road transport and provided for by fossil fuels²⁹⁸. Action that sets out to decarbonise the transport sector, particularly in terms of road transport, could deliver significant benefits in terms of climatic factors. However, consideration may need to be given to where modal shift or increased electrification or could place additional pressures on other networks. For example the increased electrification of the transport sector on a large scale is expected to place pressure on electricity network²⁹⁹. The new Climate Change (Scotland) Bill, which is currently progressing through Parliament, contains proposals to strengthen the ambition of climate change targets and reach net-zero emissions by 2045. Alongside recent announcements recognising that there is a global climate emergency, this strengthened ambition will increase the pressure on a range of sectors, including transport, to identify measures to reduce GHG emissions.</p>

²⁹⁵ Scottish Government (2019) Scottish Greenhouse Gas Emissions 2017 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/> (accessed 11/07/2019)

²⁹⁶ ibid

²⁹⁷ ibid

²⁹⁸ Scottish Government (2018) Energy in Scotland [online] Available at: <https://www2.gov.scot/Resource/0054/00541605.pdf> (accessed 05/07/2019)

²⁹⁹ ibid

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<ul style="list-style-type: none"> Reduce emissions generated by the transport system to mitigate climate change Support management of demand to encourage more sustainable transport choices 										<p>Climate change and air quality are inextricably linked and the transport sector is a significant contributor to both GHG emissions and poor air quality in urban areas³⁰⁰. There are number of areas that have been designated as Air Quality Management Areas, with the majority of these primarily as a result of traffic emissions. Additionally, air pollution is often worse in inner cities areas considered to be deprived, worsening existing inequalities in local environmental quality and human health³⁰¹. Action taken to support a shift towards more sustainable modes of transport, such as low or zero emissions vehicles and alternative energy sources, should provide mutual benefits for both air quality and climate change³⁰² and there is an opportunity for the policy to focus action to maximise benefits. Additionally, the decarbonisation of transport and a reduction of vehicle emissions should support wider Scottish Government objectives, such as those seeking to improve health, through improving air quality³⁰³. This includes the vision set out in Cleaner air for Scotland (CAFS) Strategy³⁰⁴ “to have the best air quality in Europe” and the Climate Change Plan and Scottish Energy Strategy, which set out actions to ensure commitments to climate change targets are met. Due to common sources, there is also a close relationship between air quality and noise³⁰⁵, and action taken to improve air quality should be optimised where possible to support reduced exposure to noise, further benefiting population and human health.</p> <p>Demand management, including through Intelligent Transport Systems, will also continue to play a key role in reducing GHG emissions with potential benefits including improved air quality through reduced emissions and congestion, and increased integration across different modes of transport³⁰⁶. Advances in technology, such as more efficient engines which can lead to reduced emissions, are also likely to play an increasing role. However, consideration will need to be given to where possible measures to address climate change can have negative implications for air quality, and vice versa³⁰⁷. For example, some technologies, such as the fitting of particle filters are effective at removing particulate matter from diesel exhausts but can come with a fuel consumption penalty and hence, work against carbon reduction targets³⁰⁸. There is also an opportunity for the policy to support the use of green infrastructure which can provide multiple benefits, including climate change mitigation through carbon storage, and support more sustainable modes of travel, such as active travel. Additional benefits include improved air quality and positive impacts on soil and water. The use of green</p>

³⁰⁰ Scotland’s Environment (undated) Air Quality [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality/> (accessed 05/07/2019)

³⁰¹ Scotland’s Environment (undated) Air quality and health [online] Available at: <https://www.environment.gov.scot/our-environment/air/> (accessed 05/07/2019)

³⁰² Scottish Government (2015) Cleaner Air for Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

³⁰³ Scottish Government (2017) Strategic Environmental Assessment Environmental Report on the Draft Climate Change Plan and Draft Scottish Energy Strategy [online] Available at: <http://www.gov.scot/Publications/2017/01/9030> (accessed 05/07/2019)

³⁰⁴ Scottish Government (2015) Cleaner Air Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

³⁰⁵ ibid

³⁰⁶ Transport Scotland (2017) Scotland’s Trunk Road and Motorway Network, Future Intelligent Transport Systems Strategy 2017 [online] Available at: <https://www.transport.gov.scot/media/40406/its-strategy-2017-final.pdf> (accessed 05/07/2019)

³⁰⁷ Scottish Government (2015) Cleaner Air Scotland – The Road to a Healthier Future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 05/07/2019)

³⁰⁸ DEFRA (2010) Air Pollution: Action in a Changing Climate [online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p>infrastructure can also support climate change adaptation and can lead to wider societal benefits, for example, increased community cohesion.</p> <p>Summary of opportunities to maximise benefits: Consideration should be given to ensure that actions taken are mutually beneficial to both climatic factors and air quality, including given due consideration to any unintended negative consequences that may arise. Where possible, targeted action and the consideration of the links between air quality and noise, and use of green infrastructure should be supported to maximise benefits</p> <p>Assumptions & links between other policies & SEA Work</p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and 'Integrate policies and infrastructure investment across the transport, energy and digital system', 'Improve and enable the efficient movement of people and goods on our transport system', and 'Provide a transport system which promotes and facilitates travel choices to improve people's health and wellbeing'. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> National Planning Framework 3/Scottish Planning Policy Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 National Planning Framework 3/Scottish Planning Policy Proposals for the Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
	<p>Plan our transport system to cope with the effects of climate change</p> <ul style="list-style-type: none"> Increase resilience of Scotland's transport system to climate 	+	+	0	0	0	0	0	0	+	<p>Positive impacts for climatic factor, population and human health and material assets are considered likely to arise from this policy</p> <p>Climate change is likely to pose an increased risk to infrastructure as a result of severe weather and especially flooding, landslides and high winds. Road and rail transport are generally more vulnerable to a changing climate than air and water transport, and flooding is anticipated to have the most significant impact³⁰⁹. Many key transport hubs and routes are also located around Scotland's coast and are likely to face significant risk from increased flooding and rising sea levels. Benefits for material assets are considered likely to arise through seeking to ensure resilience of the network to the predicted impacts. There may also be an</p>

³⁰⁹ HR Wallingford, AMEC Environment & Infrastructure UK Ltd, The Met Office, Collingwood Environmental Planning, Alexander Ballard Ltd, Paul Watkiss Associates, Metroeconomica (2012) A Climate Change Risk Assessment for Scotland, DEFRA [online] Available at: randd.defra.gov.uk/Document.aspx?Document=CCRAforScotland.pdf (accessed 16/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
	<p>change related disruption</p> <ul style="list-style-type: none"> Ensure the transport system adapts to the projected climate change impacts 										<p>opportunity for the policy to support greater consideration and clarification on the ownership of coastal land and flood defences to help maintain these assets³¹⁰, and reduce the risk of flooding.</p> <p>The physical risks of climate change can lead to the disruption of operations and assets, either temporary or permanently, leading to congestion and delays. Increasing the resilience of infrastructure to the predicted impacts of climate change can reduce closures or delays. In turn, this has the potential to reduce GHG emissions, with associated benefits for air quality and population and human health. Additionally, disruption to transport networks will invariably result in stresses across other sectors, given the interlinks between infrastructure and the network support services that underlie them, for example, energy and digital technology. Failure in any area can lead to wider disruption across these networks. Where consideration is given to infrastructure interdependencies, potential benefits are likely to arise for not only material assets but for population and human health through increased resilience of these vital services.</p> <p>Further benefits for population and human health should also arise from increased safety and reduced risk of accidents and operational disruption with further potential benefits, including the improved ability to prepare for extreme weather events through increased awareness of predicted events and potential delays. However, new structures, including transport infrastructure, can also affect the capacity of flood plains or flood defences. Consideration will need to be given to this due to the potential increased risk of flooding which can lead to significant impacts on people and communities in addition to environmental impacts.</p> <p>To support to shift towards decarbonisation, it is likely that greater pressure will be placed on other networks, such as the digital and energy networks. Requirements for upgrades or new infrastructure work is likely to lead to associated indirect negative impacts for a range of environmental receptors, such as soil, water, biodiversity, landscape and cultural heritage. It will be fundamental to align policies that relate to climate, digital and energy. Where possible, new infrastructure or upgrades to the existing one, should be designed to accommodate future changes in the transport system, such as alternative modes or sources of energy. This should lead to a reduced need of further work to be undertaken in order for the transport network to be adaptive as innovation and technologies develop. Additionally, where possible, the efficient use of existing resources should also be supported, for example the reduction of the use of natural resources for new infrastructure development. There is also an opportunity for the policy to support the use of green infrastructure, where possible, which can significantly contribute to climate change adaptation, support more sustainable modes of transport, such as active travel, and provide wider benefits through the creation of habitats.</p> <p>Summary of opportunities to maximise benefits: <i>There is an opportunity to future-proof the transport system, and give consideration to coastal and land defence ownership and network interdependencies to maximise the benefits of this policy. Additionally, support for the use of green infrastructure can lead to multiple benefits.</i></p>

³¹⁰TRL: the Future of Transport(2017) Assessing the Risks to Infrastructure from Coastal Storms in a Changing Climate [online] Available at: <https://trl.co.uk/reports/assessing-risks-infrastructure-coastal-storms-changing-climate> (accessed 05/07/2019)

	Policy and policy measures	Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural heritage	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
											<p><u>Assumptions & links between other policies & SEA Work</u></p> <p><u>Assumptions:</u></p> <ul style="list-style-type: none"> Measures to implement this policy are currently unknown. <p><u>Links between policies:</u></p> <ul style="list-style-type: none"> There are links between this policy and ‘Continue to improve the reliability, safety and resilience of our transport system’, ‘Embed the implications for transport in spatial planning and land use decision making’, ‘Integrate policies and infrastructure investment across the transport, energy and digital system’ and ‘Embrace transport innovation that positively impacts on our society, environment and economy’. <p><u>Previous SEA work:</u></p> <ul style="list-style-type: none"> Climate Change Plan 2017 – 2032 and Energy strategy Getting the Best From Our Land: A Land Use Strategy for Scotland 2016-2021 National Planning Framework 3/Scottish Planning Policy Proposals for the Climate Change Bill Climate Ready Scotland: Draft Second Climate Change Adaptation Programme
<p>Summary of Overall Effects</p>	<p>Greater integration of spatial planning and transport considerations, demand management and improving efficiencies across the transport system has the potential to significantly reduce GHG emissions (climatic factors). Many of the policies should also lead to greater resilience and will support climate change adaptation (climatic factors, population and human health).</p> <p>Many of the policies have the potential to improve air quality and reduce exposure to noise, particularly in urban areas and locations where air quality issues currently exist (such as Air Quality Management Areas), with associated benefits for human health. High level policies which support the increased uptake of active travel and help to create conditions that encourage walking and cycling can lead to reduced GHG emissions and improved air quality, with associated benefits from increased uptake of physical activity (climatic factors, air quality and population and human health). The use of green infrastructure can also lead to multiple benefits, providing support for habitats and species, improved air quality and increased community cohesion (biodiversity, air quality and population and human health). Increased access to goods and services, especially vital services such as health care, can lead to benefits for population and human health, particularly where a focus is given to reducing barriers for individuals or communities with specific needs. However, there is the potential that the increased movement of goods and people could lead to the uptake of less sustainable modes of travel, with negative impacts for climatic factors and air quality. Support for the sustainable travel hierarchy and ensuring the transport system is developed in a way that supports sustainable modes of travel can help to avoid or reduce any potential negative impacts and can benefit the transport system overall (material assets).</p> <p>Positive impacts can also arise where greater integration is proposed across wider systems, such as energy and digital, and support the transition to a decarbonised transport system (climatic factors, material assets). Benefits are also likely to arise where a focus is given to ensuring infrastructure is fit for purpose and is maintained (material assets). There may also be an opportunity to future proof infrastructure, including through the use of green infrastructure, to support continued climate change mitigation and adaptation (climatic factors and material assets).</p> <p>Where policies lead to the need for upgrades to, or require new infrastructure there may be associated adverse impacts from construction and operation. This could include secondary negative impacts such as disturbance and displacement to biodiversity and lead to localised adverse impacts on soil, water, landscape, and cultural heritage. Local level consideration would need to be given to the potential implications that may arise through the siting, construction and development of any individual infrastructure proposals. Existing mechanisms such as, Environmental Impact Assessment (EIA) and relevant consenting conditions at the project level prior to work being undertaken can reduce the potential for negative impacts.</p>										