Strategic Transport Projects Review (STPR2)
Consultancy Support Services Contract

STPR STRATEGIC **TRANSPORT** PROJECTS REVIEW

PROTECTING OUR CLIMATE AND IMPROVING LIVES

Strategic Environmental Assessment (SEA) Final Environmental Report

December 2022

Jacobs **AECOM**

Contents

Appendices

Appendix A: SEA Figures

Appendix B: Plans, Programmes and Strategies

Appendix C: National Environmental Baseline

Appendix D: Regional Environmental Summaries

Appendix E: SEA Consultation Feedback

Appendix F: Assessment Matrices

List of Figures

List of Tables

ABBREVIATIONS	
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
AST	Appraisal Summary Table
BTO	British Trust for Ornithology
CAR	(Controlled Activities) (Scotland) Regulations
CHFS	Clyde and Hebrides Ferry Services
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CRWIA	Child Rights and Wellbeing Impact Assessment
DMRB	Design Manual for Roads and Bridges
EqIA	Equalities Impact Assessment
EIA	Environmental Impact Assessment
EV	Electric Vehicle
GCR	Geological Conservation Review (designated sites)
GHG	Greenhouse Gas
HabMoS	Habitat Map of Scotland
HES	Historic Environment Scotland
HRA	Habitats Regulations Appraisal
ICIA	Island Communities Impact Assessment
IIP	Infrastructure Investment Plan
IPCC	Intergovernmental Panel on Climate Change
ITS	Intelligent Transport System
MaaS	Mobility as a Service
MPA	Marine Protected Area
NIFS	Northern Isles Ferry Services
NLEF	National Low Emission Framework
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPF4	National Planning Framework 4
NSA	National Scenic Area

ABBREVIATIONS	
NTS	National Transport Strategy
PfG	Programme for Government
$PM_{2.5}$	Particulate Matter of Diameter Less Than or Equal to 2.5 microns (μm)
PM_{10}	Particulate Matter of Diameter Less Than or Equal to 10 microns (μm)
PPS	Plans, Programmes and Strategies
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SIMD	Scottish Indices of Multiple Deprivation
SNH	Scottish Natural Heritage (now NatureScot)
SoilMAP	Soil Monitoring Implementation Plan
SO_2	Sulphur dioxide
SPA	Special Protection Area
STAG	Scottish Transport Appraisal Guidance
STPR	Strategic Transport Projects Review
SSSI	Site(s) of Special Scientific Interest
TPO	Transport Planning Objective
WFD	Water Framework Directive

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Active Travel Hubs	Specific locations which support/provide a base for active travel initiatives in a local community
Air Quality Management Area (AQMA)	A non-permanent designation created if monitoring reveals that statutory air quality thresholds are being exceeded or will be exceeded in the near future.
Appraisal Summary Table (AST)	These provide a high-level summary of the appraisal performance of each Grouping or Package in a format which is quick and easy to interpret
Assessment	An umbrella term for description, analysis, and evaluation.
Baseline	The existing conditions which form the basis or start point of the environmental assessment
Biodiversity	Biological diversity, or richness of living organisms present in representative communities and populations.
Community Severance	Community severance is defined here as the separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows.
Conservation Area	Area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance. Designated under section 61 Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997.
Consultation Authorities	Refers to the three statutory Consultation Authorities in Scotland: Historic Environment Scotland, NatureScot and the Scottish Environment Protection Agency
Cultural heritage resource	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest
Cumulative effects	Scottish SEA Guidance (2013) states that 'Cumulative effects can be considered in terms of synergistic effects, additive impacts and secondary effects.' For the purposes of this SEA, the term 'cumulative effects' also encompasses synergistic and secondary effects.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Detailed Options Appraisal	The third stage of the STAG process, which involves quantitative assessment. The end output of this is a series of recommendations for future investment. This was informed by more detailed and quantified appraisal of Groupings as far as was practicable, and consideration of Packages of Groupings, for example multi-modal or geographically based Packages. The framework for Detailed Appraisal has been developed through the spring and summer of 2021 and takes cognisance of refreshed STAG guidance published in January 2022.
Ecosystem	A biological community of organisms interacting with one another and their physical environment.
Effect	The result of change or changes on specific environmental resources or receptors.
Environmental Impact Assessment (EIA)	The process by which information about the environmental effects of a project is evaluated and mitigation measures are identified.
Environmental Report	An Environmental Report presents the findings of the SEA undertaken for a project
European Site	Otherwise known as 'Natura 2000' sites. These include Special Areas of Conservation (SACs) designated under the Habitats Directive (92/43/EEC) and Special Protection Areas (SPAs) designated under the Birds Directive (2009/147/EEC). In addition, Candidate and Possible SACs, Potential SPAs and Ramsar wetlands (designated under the Convention on Wetlands of International Importance) should be included in appraisals as they are afforded the same level of protection as European sites under domestic policy. Natura 2000 sites are designated due to the presence of specific habitats and species of internationally important biodiversity value, otherwise known as 'qualifying interest features.'
Grouping	A collection of similar transport interventions under a common theme or region. Groupings were established to: Allow similar options to be collated together to provide a more manageable list for further appraisal; Collate similar options across regions, thus aiding consistency in definition and appraisal; and, where appropriate Allow options that may, on their own merit, not be considered strategic, however when grouped address the identified national and regional Problems and Opportunities.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities, as used, for example in a Phase 1 Habitat Survey.
Habitat fragmentation	Describes the breaking up of an organism's preferred environment/habitat. Occurs naturally through long-term geological processes, or through human activities, such as change of land use or infrastructure development.
Habitats Regulations Appraisal	Under the Habitats Regulations, all competent authorities must consider whether any plan or project will have a 'likely significant effect' on a European site. If so, they must carry out carry out an 'appropriate assessment' (AA). This is known as Habitats Regulations Appraisal (HRA).
Habitats Directive	EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.
Hydrological	The exchange of water between the atmosphere, the land and the oceans.
Infrastructure Investment Plan (IIP)	The Infrastructure Investment Plan 2021-22 to 2025-26, published on 4 February 2021, focuses on three core strategic themes for guiding investment decisions in Scotland: - enabling the transition to net zero emissions and environmental sustainability; - driving inclusive economic growth; - building resilient and sustainable places.
Initial Appraisal: Case for Change	The first stage of the STAG process which demonstrates the rationale for intervention. The end output of this is a Sifted List of options. This process is informed by problems and opportunities, development of transport planning objectives, option generation and development, and sifting. Due to the scale of options being considered by the STPR2, the sifted list of options are grouped together to form 'option groupings' of a similar type or nature. Draft Initial Appraisal: Case for Change reports for the STPR2 were published in February 2020 (Transport Scotland (2021a). Due to an enforced pause to the programme as a result of the COVID-19 pandemic, the draft reports were subsequently updated to reflect the impacts that the pandemic was having on people's travel behaviour. The updated reports were re-published in February 2021 and these incorporated the outcomes from the option sifting and development processes.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Land Capability for Agriculture (LCA)	Land Capability for Agriculture (LCA) is derived from data published by The James Hutton Institute (2010) and its primary objective is to rank land based on its potential productivity and cropping flexibility determined by the extent to which its physical characteristics impose long term restrictions on its agricultural use.
Land Capability for Forestry (LCF)	Land Capability for Forestry (LCF) describes the potential for land to grow trees based on a number of factors including soil, climate and topography. The seven classes of LCF range from Class F1 (land with excellent flexibility for the growth and management of tree crops) to Class F7 (land unsuitable for producing tree crops.)
Landscape	Human perception of the land, conditioned by knowledge and identity with a place.
Land-take	Acquired land which is necessary to construct the project and associated infrastructure and to undertake the essential environmental mitigation measures.
Listed Building	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories are A-C.
Local Landscape Character Area (LLCA)	An area outlined as having distinct characteristics based on landscape features. Derived from regional landscape studies available from NatureScot.
MaaS	MaaS is a type of service that through a joint digital channel enables users to plan, book, and pay for multiple types of mobility services (for example, bus and train journeys). The concept describes a shift away from privately-owned transport modes and towards mobility provided as a service. This is enabled by combining transportation services from public and private transportation providers through a unified gateway that creates and manages the trip. Users can pay per trip or a monthly fee for a limited distance. The key concept behind MaaS is to tailor the transport service to traveller needs.
Mitigation	Measure to avoid, reduce or offset potential adverse effects.
Natural Capital	Natural Capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Net Zero	Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. There are two different routes to achieving net zero, which work in tandem: reducing existing emissions and actively removing greenhouse gases.
Net Zero Targets	Scotland has net zero greenhouse gas emissions target for 2045 and an interim 2030 target to reduce emissions by 75 percent compared to 1990 levels. This covers all greenhouse gas emissions.
Non-motorised users	Pedestrians, cyclists, wheelers, wheelchair users and equestrians.
Non-prime land	Agricultural land of Land Capability for Agriculture (LCA) classes 3.2 to 7.
Open space	Any land laid out as public parks or used for the purpose of public recreation, or land which is a disused burial ground.
Option Grouping	The 'Option Groupings' terminology has been adopted to refer to an intermediate stage in the option development process to support a proportionate appraisal of options through the Preliminary Appraisal stage. The Option Groupings have been identified based on consolidating a broad number of similar options and are designed to drive consistency in the appraisal of the significant number of options that remain following the Option Sifting stage (the Sifted Options List).
Option Sifting	Option Sifting is a process that should be undertaken when an unmanageably large number of options have been generated or where there is general consensus that a particular option or options generated will clearly not achieve the intended objectives or meet the identified transport problems and/or opportunities. The approach or basis for sifting options was agreed with decision-makers.
Packages/ Packaging	In STAG, packaging of transport Groupings should be used to support achievement of the desired transport outcomes. By effectively packaging Groupings this can reinforce, extend or complement the Grouping's impact, mitigate potential adverse effects or increase the public acceptability of a Grouping. This has been considered in the Detailed Appraisal.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Place	The Place Principle recognises that: Place is where people, location and resources combine to create a sense of identity and purpose and is at the heart of addressing the needs and realising the full potential of communities. Places are shaped by the way resources, services and assets are directed and used by the people who live in and invest in them. A more joined-up, collaborative, and participative approach to services, land and buildings, across all sectors within a place, enables better outcomes for everyone and increased opportunities for people and communities to shape their own lives.
Positive effects for biodiversity	Net positive effects on biodiversity that would be likely to result from a development. This terminology is taken from the Planning (Scotland) Act 2019.
Potential Effect	The effect on an aspect of the environment that may occur in the absence of mitigation.
Preliminary Appraisal	The second stage of the STAG process which involves qualitative assessment. The end output of this is a Short List of options. In this stage, the STPR2 option Groupings are subject to further consideration against the STPR2 TPOs, the five STAG criteria of Environment, Safety, Economy, Integration, Social Inclusion & Accessibility, relevant impact and duty assessments and deliverability. Consideration is also given to the synergies between different option Groupings.
Prime agricultural land	Agricultural land of Land Capability for Agriculture (LCA) classes 1, 2 and 3.1.
Public Transport Interchange	Places which allow for the interchange between one or more different (public/sustainable) mode of transport.
Ramsar site	Ramsar sites are wetlands of international importance, listed under the Convention on Wetlands of International Importance (Ramsar Convention 1971). It is Scottish Government policy to afford them the same protection as European Sites.
Receptor	In this context, an element that is susceptible to being affected (either directly or indirectly) by the project. Examples include habitats, species, people, properties, water bodies, landscape and archaeological remains.
Scoping Report	Scoping Reports provide sufficient information about the potential environmental effects to allow the Consultation Authorities to provide an informed view regarding the environmental topics to be included in the SEA. Scoping Reports also provide a proposed methodology to be used for assessing potential environmental effects.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Scottish Transport Appraisal Guidance (STAG)	Transport Scotland's formal option appraisal toolkit and methodology to guide the development and assessment of transport options in Scotland. STAG provides an evidence-based and objective-led framework for: identifying transport problems and/or opportunities in a study area; setting objectives to address the transport problems/opportunities and identifying and appraising options in a consistent manner with the potential to meet the objectives. STAG is integral to the investment decision making process at the Strategic Business Case stage. The four stages of STAG are: Initial Appraisal Case for Change (formerly Pre-Appraisal), Preliminary Options Appraisal (formerly Part 1), Detailed Options Appraisal (formerly Part 2) and Post-Appraisal (Monitoring and Evaluation).
Secondary effects	Secondary or indirect effects are effects that are not a direct result of the plan but occur away from the original effect or as a result of a complex pathway.
Severance	The separation of communities from facilities and services used within their community. Alternatively, in relation to agricultural land, the division of land into separate areas, potentially affecting access or availability for agricultural use.
Sites of Special Scientific Interest (SSSI)	Designated areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species in the UK. The site network is protected under the provisions of Sections 28 and 19 of the Wildlife and Countryside Act 1981 as well as the Amendment Act 1985 and the Environmental Protection Act 1990.
Special Area of Conservation (SAC)	An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status.
Special Protection Area (SPA)	An area designated under the Wild Birds Directive (Directive 74/409/EEC) to protect important bird habitats.
Stakeholder	A person or group that has an investment, share or interest in something.

GLOSSARY	
TERMINOLOGY	**DESCRIPTION**
Statutory Assessments	A number of statutory assessments are being undertaken for the STPR2. These comprise an Equalities Impact Assessment, Fairer Scotland Duty Assessment, Child Rights and Wellbeing Impact Assessment, and Island Communities Impact Assessment. A Strategic Environmental Assessment is also being undertaken to assess and mitigate the environmental impacts predicted for STPR2. The methods for these assessments have informed the development of the STPR2 and vice-versa.
Strategic Environmental Assessment (SEA)	The process by which information about the environmental effects of proposed plans, policies and programmes are evaluated.
Strategic Transport Projects Review (STPR2)	A review of the Scottish transport network being undertaken by Transport Scotland. It aims to identify a range of potential interventions of national significance, which will be taken forward to improve the strategic transport network. Through selecting which transport projects of national significance should be progressed, the STPR would also affect regional and local transport networks.
Sustainable Drainage Systems (SuDS)	SuDS, or sustainable drainage systems are a sequence of water management practices and facilities designed to drain surface water in a manner that will provide a more sustainable approach than what has been the conventional practice of routing run-off through a pipe to a watercourse.
Synergistic effects	Synergistic effects interact to produce a total effect greater than the sum of the individual effects.
Transport Planning Objectives (TPOs)	These seek to capture the essence of the evidence-based problem to be addressed or opportunity being sought. The STPR2 has five national TPOs which are common to all regions and which reflect the evidence set out within the Case for Change reports. Where appropriate each region has considered the specific regional aspects in supporting the development of SMART (Specific, Measurable, Attainable, Relevant and Timed) sub-objectives.

1. Introduction

1.1. Background

In 2019, Transport Scotland commenced the second Strategic Transport Projects Review (STPR2) to help inform transport investment in Scotland for the next 20 years. STPR2 will help to deliver the vision, priorities and outcomes for transport set out in the National Transport Strategy (NTS2), aligning with other national plans such as the Climate Change Plan Update (Scottish Government, 2020a), the National Strategy for Economic Transformation (NSET) (Scottish Government, 2022a) and the Revised Draft fourth National Planning Framework (NPF4) (Scottish Government, 2022b).

Further information on the NTS2 and STPR2 is provided in Chapters 2 (STPR2 Overview) and 3 (Policy Context) of this report.

STPR2 involves conducting an evidence-based review of the performance of Scotland's strategic transport network across walking, wheeling, cycling, bus, ferry, rail and the trunk road network. The outcomes from the STPR2 will:

- enhance accessibility across Scotland for residents, visitors and businesses;
- create better connectivity with sustainable, smart and cleaner transport options;
- highlight the vital contribution that transport investment can play in enabling and sustaining Scotland's economic growth.

The review will help inform Scottish Ministers on a programme of potential transport investment opportunities for the period between 2022 and 2042.

As a result of the COVID-19 pandemic, the STPR2 adopted a phased approach. The initial Phase 1 (Jacobs AECOM 2021a) focused on measures that support and extend the increase in travel by sustainable travel modes and support economic recovery. The Final STPR2 Technical Report combines the previous Phase 1 recommendations with the medium- to longer-term recommendations. This, therefore, provides the full suite of recommendations for transport investment for the next 20 years. Lasting responses to the COVID-19 pandemic such as increased working from home do, however, create an element of uncertainty with regards to future travel patterns, but also opportunities for increased use of sustainable travel. The review has recognised this uncertainty and has ensured that there is an element of flexibility and agility to allow specific recommendations to be reviewed or amended as travel patterns become clearer.

The Phase 1 STPR2 SEA Progress Report (Jacobs AECOM, 2021a) was published in February 2021. Feedback to the Phase 1 STPR2 SEA Progress Report was received from NatureScot and Historic Environment Scotland and this informed the development of the Environmental Report. The first draft of this Environmental Report was published for a 12-week consultation, starting 20 January 2022. The SEA responses to the feedback from both of these consultations are provided in **Appendix E (Consultation Feedback).**

1.2. SEA Requirements

SEA is a means of systematically assessing the likely impact of a public plan on the environment. Under the Environmental Assessment (Scotland) Act 2005 (hereby referred to as 'the Act'), those bodies preparing qualifying Scottish plans are required to undertake a SEA of plans that are likely to have significant environmental effects, if implemented. The Act transposes the requirements of the European Community SEA Directive (Directive

2001/42/EC, 2001).

SEA aims to offer greater protection to the environment by ensuring public bodies (in this case, Transport Scotland) and those organisations preparing plans of a 'public character' consider and address the likely significant environmental effects.

The STPR2, as described in **Section 1.1**, is considered to fall under Section 5(3) of the Act and, as such, a SEA is required to explore the potential for significant environmental effects, either positive or negative. As the STPR2 falls under this section of the Act, a 'screening' report did not need to be prepared, as it was clear that a SEA would be required. Thus, the key remaining stages of the STPR2 SEA are:

- SEA Scoping Report (Jacobs AECOM, 2019) (completed and consulted on between December 2019 and February 2020).
- Draft Environmental Report (Jacobs AECOM, 2022d) (completed and consulted on from January to April 2022). (see **Chapter 7: The Approach to the Assessment**). This assessment stage establishes the likely significant (positive and negative) environmental effects of implementing the STPR2. Any potential reasonable alternatives were considered at this stage, along with viable mitigation measures to avoid, reduce or offset significant adverse effects. The assessment and a summary of key findings were included in the Draft Environmental Report (Jacobs AECOM 2022d: **Chapter 8: Assessment Results**), which was made available for consultation alongside the draft STPR2.
- Final Environmental Report (this report): that responds to SEA consultation comments and any post-consultation updates to the STPR2.
- Post-adoption Statement. This statement will be published in early-2023. It will outline how the assessment and consultation responses have been taken into account within the finalised STPR2.

The SEA topics listed in the SEA Directive, to be 'scoped' in or out at the SEA scoping stage, are:

- Climatic factors;
- Air quality;
- Population and human health;
- Material assets
- Water environment;
- Biodiversity, fauna and flora;
- Soil;
- Cultural heritage;
- Landscape and visual amenity.

The SEA topics and sub-topics that were scoped into the SEA were used for the assessment of the STPR2 at the Draft Environmental Report (Jacobs AECOM, 2022d) stage. All of these topics have been scoped in and the baseline that has been collected and summarised in **Chapter 4 (Baseline Summary)** has been used to develop targeted SEA objectives to undertake the assessment. These SEA objectives are provided in **Chapter 7 (The Approach to the Assessment)**.

The SEA has been developed to incorporate the feedback from statutory Consultation Authorities. The Scottish statutory Consultation Authorities are:

- Scottish Environment Protection Agency (SEPA);
- NatureScot;

- Historic Environment Scotland (HES).

The role of the statutory Consultation Authorities within SEA is to bring their individual environmental expertise to the assessment process. This can help to ensure that the future consultation process undertaken by a Responsible Authority (in this case Transport Scotland) is more robust. This in turn means that the public can gain a better understanding of the likely effect of a plan on the environment and meaningfully contribute to the plan's preparation process by offering an informed view (Scottish Government, 2013).

1.3. Integrated Assessments

The STPR2 is accompanied by various assessments that are required and integrated into each stage of STPR2 Scottish Transport Appraisal Guidance (STAG) assessment, as described in **Chapter 2: STPR2 Overview**. These assessments comprise this SEA, an Equality Impact Assessment (EqIA) and various other related assessments, as shown in Figure 1. These impact assessments interact with each other, complement each other and ensure the STPR2 is environmentally sustainable and socially equitable. They share baseline data wherever possible. Figure 1 shows the impact assessments required for the STPR2 and the relationships between these assessments.
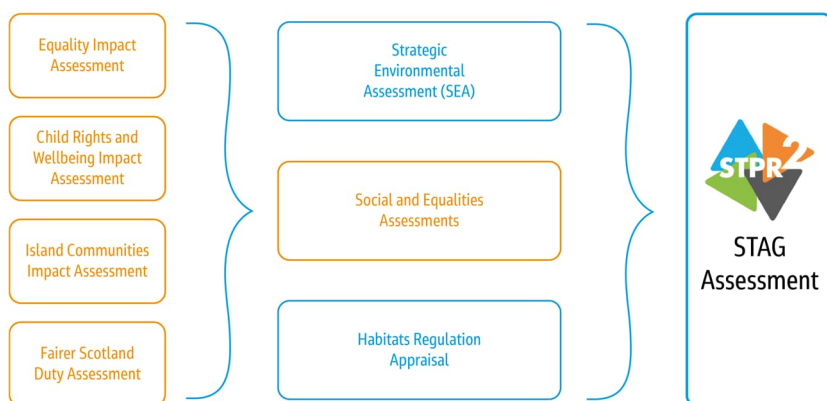
Figure 1: Relationship between the Impact Assessments and STAG

1.3.1. Equality Impact Assessment

As a public body, Transport Scotland has a legal duty when creating new plans and policies to pay due regard to the Public Sector Equality Duty (PSED), included within the Equality Act 2010. The PSED aims to eliminate unlawful discrimination, promote equality and cohesion between different groups and advance equality of opportunity. The Equality Act 2010 (Authorities subject to the Socio-economic Inequality Duty) (Scotland) Regulations 2018 (more commonly known as the 'Fairer Scotland Duty'), places a further legal responsibility on Transport Scotland to actively consider how it can reduce inequalities of outcome caused by socio-economic disadvantage when making strategic decisions.

Transport Scotland is also required to consider the impact of proposals on island communities (Islands (Scotland) Act (2018)) and take account of children's rights and wellbeing (Children and Young People (Scotland) Act (2014)), which are therefore both considered within the wider impact assessment process.

For the purposes of assessment, the term EqIA encompasses all of these statutory requirements. The EqIA (Jacobs AECOM, 2022a) therefore includes the national Equalities Impact Assessment, the Children's Rights and Wellbeing Impact Assessment

(CRWIA), Island Communities Impact Assessment (ICIA) and Fairer Scotland Duty Assessment (FSDA).

This Final SEA Environmental Report should be read in conjunction with the EqIA Reports listed above, particularly in relation to the cross-cutting themes of transport, economy and employment, health, housing, population and human health. The EqIA Reports will be issued to the SEA statutory Consultation Authorities for completeness and transparency, despite this not being a statutory requirement.

1.3.2. Habitats Regulations Appraisal

The purpose of Habitats Regulations Appraisal (HRA) is to determine any likely significant effects on European Union-designated 'European sites.' These sites include Special Areas of Conservation (SACs) designated under the Habitats Directive (92/43/EEC) and Special Protection Areas (SPAs) designated under the Birds Directive (2009/147/EEC). In addition, Candidate and Possible SACs, Potential SPAs and Ramsar wetlands should also be included in appraisals.

European sites are designated due to the presence of specific habitats and species of internationally important biodiversity value, otherwise known as 'qualifying interest features.'

Each stage in the development of the STPR2 has been reviewed to determine any potential indirect or direct likely significant effects on European sites.

In Scotland, Regulation 48 of the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) requires that competent authorities, in this case Transport Scotland, undertake an HRA of a plan that could potentially have a significant effect on a European Site.

The statutory consultation authority for HRAs in Scotland, NatureScot (formerly SNH), were consulted in September 2019 and have continued to be engaged in the HRA process for the STPR2. For example, the methodology and programme for the STPR2 HRA was discussed in meetings with NatureScot in November 2020 and September 2021.

The HRA has been produced concurrently with the SEA but has been delivered as a separate report (Jacobs AECOM 2022c). The HRA concluded that no likely significant effects were identified due to the intentionally high-level of detail in the 45 STPR2 recommendations. This provides the opportunity to design schemes to avoid or adequately mitigate effects on European sites. In line with case law, a refreshed and more detailed HRA process will be required for individual schemes (for example, local transport plan and/or planning applications) as they are devised and developed, particularly if they have been flagged in the HRA. The HRA also recommended that some wording about the need for Construction Environmental Management Plans and project-level HRA should be added to the final version of the STPR2 Technical Report (Jacobs AECOM, 2022f) and this wording was added.

1.4. Purpose and Structure of Environmental Report

The purpose of the Environmental Report is to present the assessed environmental effects of the STPR2, including alternatives, in a form suitable for public consultation and use by decision-makers.

In line with the requirements of Schedule 3 of the Act, the Environmental Report contains the following Chapters:

- **Chapter 1** summarises the general background to the STPR2 and SEA and various impact assessments required for the STPR2
- **Chapter 2** provides a more detailed background and context for the STPR2, including the STPR2 stages
- **Chapter 3** shows the key relationships between the STPR2 and other plans, programmes and strategies (PPS), including the environmental requirements associated with them
- Chapter 4 provides a summary of the environmental baseline
- **Chapter 5** describes the approach to stakeholder engagement throughout the development of the STPR2 and the SEA
- Chapter 6 describes the consultation requirements for SEA
- Chapter 7 shows the approach for undertaking the SEA
- Chapter 8 provides a summary of the assessment results
- **Chapter 9** describes examples of mitigation measures required to avoid or minimise any significant negative effects that would arise from implementing the STPR2 and enhancement measures to create and maximise positive environmental effects
- **Chapter 10** provides an overview of the monitoring required for any significant environmental effects
- **Chapter 11** summarises the next steps required for the STPR2 and the SEA

  - Appendix A contains the constraints plans, depicting nationally or internationally significant environmental and heritage designations
  - Appendix B contains a comprehensive review of the PPS that are summarised in **Chapter 3** of the report
  - Appendix C contains the full, national-level environmental baseline data, which is summarised in **Chapter 4** of the report
  - Appendix D contains summaries of the regional environmental baseline data and regional assessment summary
  - Appendix E contains summaries of the consultation responses
  - Appendix F contains the assessment of the STPR2 multi-modal packages and the 45 STPR2 recommendations

2. STPR2 Overview

2.1. Purpose of STPR2

The purpose of the STPR2 is to conduct a Scotland-wide, evidence-based review of the performance of the strategic transport system, against multiple criteria, including safety, environment, economy, integration, accessibility and social inclusion and, fundamentally, to support the Scottish Government's aims, including sustainable inclusive growth and the move to a low carbon transport system.

In so doing, the STPR2 makes recommendations for potential transport investments for Scottish Ministers to consider as national investment priorities. The STPR2 is an ambitious plan for investment for the next 20 years (2022 – 2042), however it is not a funded plan and is subject to the funding allocations agreed by Parliament each year through the annual budget process.

2.2. Content and Scope of STPR2

The STPR2 will guide the Scottish Government's transport investment in Scotland for the next 20 years and help to deliver the vision, priorities and outcomes that are set out in the NTS2.

It is recognised that Scotland's geography is unique and varied, ranging from rural lowlands to remote uplands, and from large cities to sparsely inhabited islands, meaning no two parts of Scotland are the same, nor are their travel patterns and demands. For that reason, the STPR2 considered both national and regional issues in order to appraise Options, Groupings (similar types of intervention) and Packages of Interventions in the context of place. Groupings and Packages are both defined in the glossary.

The national focus considered the strategic links between the cities and key ports, international gateways and cross-border links, whilst the regional focus considered the role of the strategic network in the context of regional economic geographies and changes emanating from, for example, the Planning Review, Enterprise and Skills Review, and City and Regional Growth Deals. This approach enabled examination of regional issues which would have significant effects on the national strategic network, to deliver national investment priorities.

A total of 11 regions have been established for the STPR2: Argyll and Bute, Ayrshire and Arran, Edinburgh and South East Scotland, Forth Valley, Glasgow City Region, Highlands and Islands, North East Scotland, Scottish Borders, Shetland Islands, South West Scotland and Tay Cities. Within North East Scotland, the Scottish Borders and South West Scotland work was carried out in advance of the STPR2 commission, and collectively these are referred to as the STPR2 Advanced Studies. Further details of the regional structure are set out in the National Case for Change Report (Jacobs AECOM, 2021c; Transport Scotland, 2021a) and the 11 STPR2 regions are shown in Figure 2, on the following page.

The STPR2 specifically focusses on Scotland's key strategic transport assets. In this context, a strategic transport project is defined as:

- Any transport project that plays a significant part in supporting the four NTS2 priorities and related outcomes;
- Projects or groups of projects related to transport networks owned, operated and

funded directly by Transport Scotland;
- Passenger and freight access to major ports and airports;
- Inter-urban bus and active travel networks and principal corridors within urban areas.
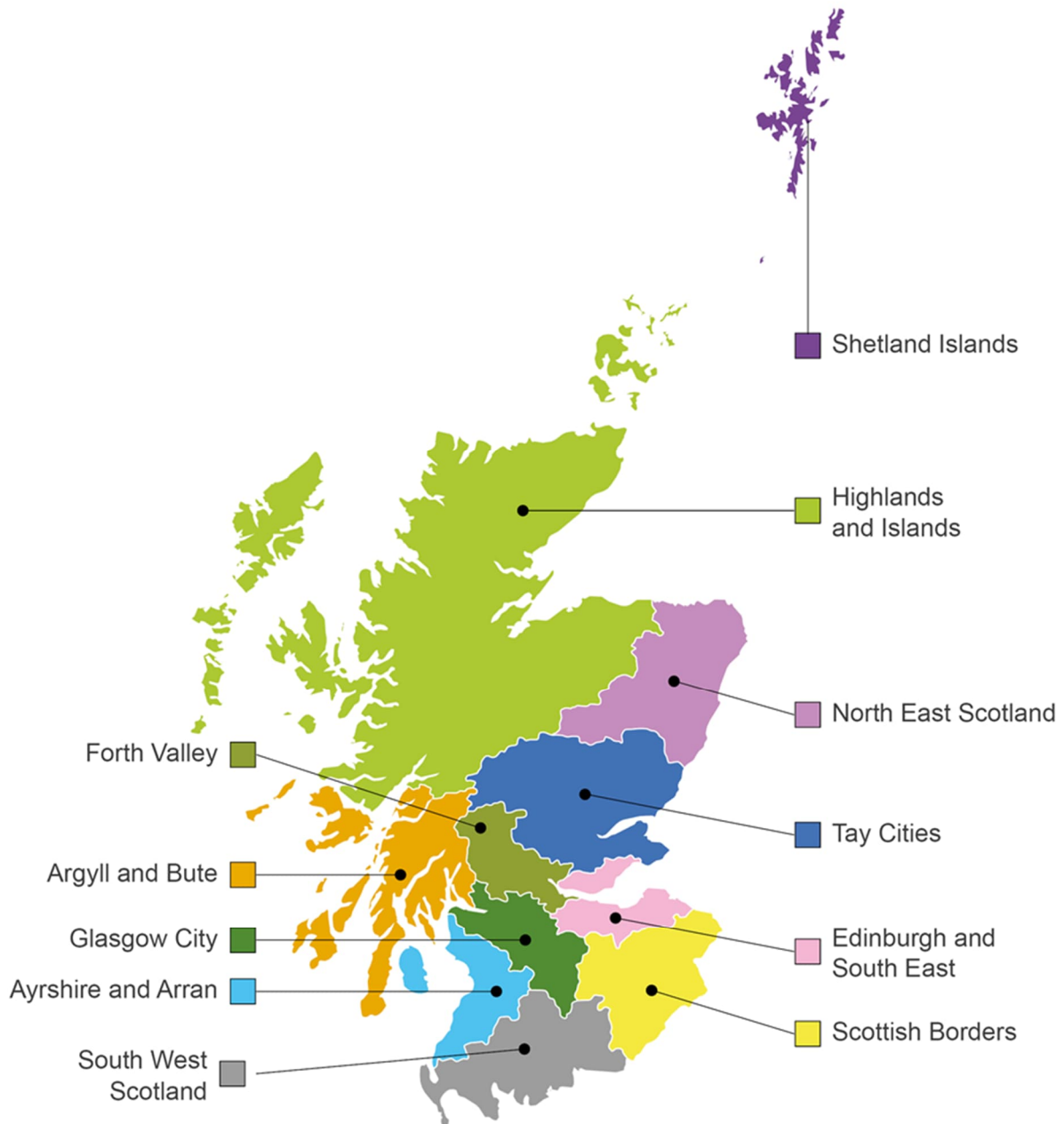
Figure 2: The STPR2 regions

2.3. STPR2 Development Approach

The STPR2 process has been developed in accordance with STAG. STAG is Transport Scotland's formal option appraisal toolkit and methodology to guide the development and assessment of transport options in Scotland and is compliant with UK Government's Green Book. It provides an evidence-based and objective-led framework for: identifying transport problems and/or opportunities in a study area; setting objectives to address the transport problems/opportunities; and identifying and appraising options in a consistent manner with the potential to meet the objectives.

The four sequential stages in the STAG process are:

- Initial Appraisal: Case for Change (formerly Pre-Appraisal);
- Preliminary Appraisal (formerly Part 1);
- Detailed Appraisal (formerly Part 2);
- Post Appraisal: Monitoring and Evaluation.

Whilst consistent with the STAG 2008 version, incorporating periodic updates to the STAG Technical Database, the last of which was dated January 2018 (Transport Scotland, 2018), the STPR2 approach, where appropriate, has sought to supplement the STAG process by:

- Reflecting Transport Scotland's current policy position by embedding the new NTS2 vision, priorities and outcomes;
- Taking on board the STAG updates published in January 2022 and new and emerging areas of appraisal research, including research into inclusive growth and valuing the health benefits of schemes which increase active travel;
- Ensuring the outcomes from the wider suite of Impact Assessments being undertaken are fully integrated into the STPR2 appraisal process.

The Detailed Appraisal has taken cognisance of updated guidance, as set out within the Scottish Transport Appraisal Guidance - Managers Guide published in January 2022. This includes the new criterion of 'Climate Change', against which all recommendations have been appraised. The SEA approach to the climate change topic is discussed in **Section 7.9** of this report.

Sections 2.4 to 2.7 describe the key outputs for each of the STPR2 STAG Stages. The approach taken at each of these stages is described in detail in the Final STPR2 Technical Report (Jacobs AECOM 2022b). The SEA Post Adoption Statement, which will be published in early-2023, will set out how the SEA influenced each of these STPR2 stages.

2.4. Initial Appraisal: Case for Change

A National Case for Change Report was published in February 2021 (Transport Scotland, 2021a; Jacobs AECOM (2021c). It specifically covers key challenges for transport and infrastructure, and the impact of COVID-19 on current and future transport patterns. The impact of the pandemic on transport patterns is also discussed in the Final STPR2 Technical Report (Jacobs AECOM, 2022f).

A Case for Change Report was produced for each of the 11 STPR2 regions and these were also published in February 2021 (Jacobs AECOM, 2021d).

Five National Transport Planning Objectives (TPOs) were developed for use across the country during the appraisal process. Sitting under each TPO is a series of sub-objectives to better define the overarching objectives and aid their application in appraisal (see

Section 2.5).

Each region has developed a set of specific sub-objectives that not only align directly to the outcomes sought by the NTS2 for Scotland as a whole, but that also reflect the transport and other relevant problems and opportunities within each specific region.

A long list of initial transport options was generated based on a range of sources, including: a review of options identified from recent local and regional studies; and extensive stakeholder engagement and public consultation activities. Approximately 14,000 individual ideas/suggestions/options were identified at this stage in the process.

This long list included options from the three STPR2 Advanced Studies: North East Scotland, Scottish Borders and South West Scotland. Options from the three Advanced Studies were reviewed through the STPR2 sifting methodology and reported through Update Notes that sit alongside the Case for Change reports. Options from the three Advanced Studies have been incorporated into the list of Groupings and appraised within the STPR2.

Following an option cleaning and consolidation exercise, approximately 2,800 options were retained in the long list of interventions to be sifted.

Each of the 2,800 options has been reviewed using a methodology developed to drive consistency in the sifting of options across all of the STPR2 regions. Following this process, options were either:

- Recommended at a national level for further consideration through the STPR2 process;
- Recommended as part of a route/corridor-level intervention for further consideration through the STPR2 process; or
- Sifted from the process and passed to the appropriate local/regional transport authorities and partnerships for consideration outside the STPR2.

Following the sifting exercise, approximately 1,400 options remained in the process.

There were many options that shared common traits across the regions and many options which in isolation would not deliver the strategic improvements the STPR2 is seeking to deliver. Recognising the strategic and national dimension, options that were sifted in for further appraisal were allocated to Groupings, which were established to:

- Allow similar options to be collated together to provide a more manageable list for further appraisal;
- Collate similar options across regions, thus aiding consistency in definition and appraisal; and, where appropriate
- Allow options that may, on their own merit, not be considered strategic, however when grouped address the identified national and regional TPOs, Problems and Opportunities.

A total of 80 Groupings were identified to take forward for Preliminary Appraisal.

The Groupings were reviewed from both a regional and modal/technical perspective to determine those that would meet the criteria to be considered in more detail as part of the appraisal process.

2.5. STPR2 Transport Planning Objectives

STAG is an objective-led appraisal process, requiring TPOs to be developed that take full account of evidence pertaining to the particular problems and opportunities identified by

the Case for Change stage and within the context of the relevant policies and strategies and evidenced by stakeholders and data. TPOs should:

- Provide a clear indication of what the STPR2 is trying to accomplish;
- Introduce clarity where there may exist strong vested interests and entrenched views on priorities;
- Allow the proper appraisal of candidate options to allow the decision makers to make informed choices on investment priorities.

At the national level, the NTS2 sets out the Case for Change for Scotland and is at the heart of the objective-setting process for the STPR2. A consistent set of TPOs has been developed for use across the country during the appraisal process. These objectives are directly linked to each of the NTS2 priorities and outcomes. Sitting below the five TPOs are a set of national sub-objectives.

Within this approach there is a need to reflect the regional focus from the analysis and stakeholder engagement undertaken to inform the STPR2 process. Therefore, each region has developed a set of specific sub-objectives to reflect the issues within their specific area.

The STPR2 TPOs and corresponding sub-objectives are as follows:

A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target

- Reduce the consumption of fossil fuels through a shift to more sustainable modes of transport;
- Increase the mode share of active travel for shorter everyday journeys;
- Increase the mode share of public transport by providing viable alternatives to single occupancy private car use;
- Reduce emissions generated by the strategic transport system.

An inclusive strategic transport system that improves the affordability and accessibility of public transport

- Increase public transport mode share by connecting sustainable modes of transport to facilitate integrated journeys;
- Improve mobility and inclusion, recognising the specific needs of disadvantaged and vulnerable users;
- Reduce transport poverty by increasing travel choice;
- Reduce the reliance on private car for access to key centres for healthcare, employment and education.

A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing

- Reduce demand for unsustainable travel by embedding the place principle in the changes to the strategic transport system;
- Increase the mode share of active travel for shorter everyday journeys;
- Reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the NPF4.

An integrated strategic transport system that contributes towards sustainable inclusive growth in Scotland

- Increase sustainable access to labour markets and key centres for employment, education and training;
- Increase competitiveness of key domestic and international markets, by reducing costs and improving journey time reliability for commercial transport;
- Increase resilience of accesses to key domestic and international markets to encourage people to live, study, visit and invest in Scotland;
- Increase the mode share of freight by sustainable modes.

A reliable and resilient strategic transport system that is safe and secure for users

- Improve resilience from disruption through adaption of Scotland's trunk road, rail and strategic ferry infrastructure;
- Reduce transport related casualties in line with reduction targets;
- Improve resilience through climate change adaptation within the management and maintenance of trunk road, rail and ferry infrastructure;
- Improve perceived and actual security of the strategic transport system.

2.6. Preliminary Appraisal

The Preliminary Appraisal involved a qualitative appraisal of all Groupings against the following criteria: TPOs, STAG Criteria, Established Policy Directives and Deliverability Criteria. Parallel to the STAG process, the SEA and Statutory and Impact Assessments were undertaken and informed the Preliminary Appraisal. The five key STAG criteria used to appraise the Groupings are as follows:

Environment

- Supporting net zero emissions targets;
- Maximising the quality of the built and natural environment for the enjoyment of all.

Safety

- Reducing the risk and incidence of accidents and improving the security of the transport network for all users.

Economy

- Improves connectivity, journey times and reliability to facilitate inclusive economic growth.

Integration

- Fitting the transport network together and ensuring a rational relationship between transport and land-use and wider policy.

Accessibility and Social Inclusion

- Increasing the accessibility of the transport network and opportunities to travel, including access to jobs, communities, shops, services and other facilities, for all users, particularly socially excluded groups.

The main purpose of the Preliminary Appraisal was to capture the likely impacts of Groupings, and key dependencies, with more detailed assessment undertaken at the Detailed Appraisal stage. Decisions on whether or not to take Groupings forward from Preliminary to Detailed Appraisal were made based on overall performance against the TPOs, STAG criteria, and deliverability criteria, with consideration of alignment with

established policy directives, Impact Assessments and performance against Transport Behaviour Scenarios. Appendix G of the Final STPR2 Technical Report (Jacobs AECOM, 2022b) summarises whether or not a Grouping was taken forward to the final recommendations, and the rationale behind that decision. It also sets out the options set aside at this stage in the process. The Final STPR2 Technical Report (Jacobs AECOM 2022f) includes more detail on the Transport Behaviour Scenarios.

2.7. Detailed Appraisal

The Groupings, and the interventions included in the Groupings, that were identified to be taken forward from the Preliminary Appraisal were developed into multi-modal 'Packages' for the Detailed Appraisal. The following Packages have been subject to Detailed Appraisal:

- Eleven Regional Packages;
- One Package of National Interventions (representing all of the recommendations).

The approach to Packaging has varied depending on whether the Grouping was applicable only in a specific location(s) and circumstance(s) (for example, railway stations, fixed links) or whether the Grouping may be broadly applicable to certain types of location (for example, active freeways, mobility hubs).

Groupings made up of location-specific interventions were assigned directly to regions based on the location of the component interventions, ensuring that region-specific problems and opportunities are addressed. Groupings whose component interventions were not location-specific were assigned to applicable area-based categories, which have then been mapped to regions, for consistency in the types of measures that have been considered in regions made up of similar area-based categories. Further details of the Packaging process are provided in the Final STPR2 Technical Report (Jacobs AECOM, 2022f).

Detailed Appraisal Summary Tables (ASTs) have been prepared to provide a clear and concise record of the performance of each Package under Low and High Transport Behaviour Scenarios against the relevant TPOs and STAG criteria, policy alignment, and the Statutory and other Impact Assessments, with a summary of the appraisal metrics considered under each. The two scenarios broadly capture 'high growth sensitivity with no policy ambition on car kilometres' (referred to as 'high') and 'low growth sensitivity with a 20 per cent reduction policy ambition on car kilometres' (referred to as 'low') levels of motorised traffic demand. The high Transport Behaviour Scenario is similar to a traditional 'Do-Minimum' forecast. The low Transport Behaviour Scenario reflects the same current policy ambitions of the Scottish Government. This provides a much broader context with which to appraise the STPR2 interventions. Further details on the scenario development are provided in the Final STPR2 Technical Report (Jacobs AECOM, 2022f).

Detailed Packaging ASTs are contained within Appendix H of the Final STPR2 Technical Report (Jacobs AECOM, 2022f).

2.8. STPR2 Recommendations

The role of the STPR2 is to provide the evidence base to recommend the transport investment priorities for Scottish Ministers for the next 20 years, in the face of great uncertainty and challenges. As we continue to emerge from the short-term impacts associated with the COVID-19 pandemic, it is vitally important to consider transport investments around the overall vision set out in the NTS2 to ensure that we continue, at

pace, towards the delivery of a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors.

A total of 45 recommendations are presented below. These consist of some interventions that are specific to a particular location, others apply to certain regions in the country, and finally some of the recommendations are applicable across the whole country.

Within the list of recommendations, there are no specific priorities, as each component is important in addressing the complex needs of our nation, nor are these interventions the sole responsibility of Transport Scotland to deliver; indeed many will rely on working together or for others to take forward. However, by including these in the STPR2, Transport Scotland has confirmed its commitment to supporting and working in partnership with others to develop the recommended interventions.

In many cases the interventions build on the individual investment and policy decisions taken in recent years, but the overall balance of the recommendations will help deliver the NTS2 and meet the commitments contained within the associated Delivery Plans.

A list of the recommendations is provided below. For presentational purposes the recommendations have been grouped into six themes, as follows:

- Improving active travel infrastructure;
- Influencing travel choices and behaviour;
- Enhancing access to affordable public transport;
- Decarbonising transport;
- Increasing safety and resilience on the strategic transport network;
- Strengthening strategic connections.

Improving Active Travel Infrastructure

1. Connected neighbourhoods
2. Active freeways and cycle parking hubs
3. Village-town active travel connections
4. Connecting towns by active travel
5. Long-distance active travel network

Influencing Travel Choices and Behaviour

6. Behavioural change initiatives
7. Changing road user behaviour
8. Increasing active travel to school
9. Improving access to bikes
10. Expansion of 20mph limits and zones

Enhancing Access to Affordable Public Transport

11. Clyde Metro
12. Edinburgh and South East Scotland Mass Transit
13. Aberdeen Rapid Transit
14. Provision of strategic bus priority measures
15. Highland Main Line rail corridor enhancements
16. Perth-Dundee-Aberdeen rail corridor enhancements
17. Edinburgh/Glasgow-Perth/Dundee rail corridor enhancements

18. Supporting integrated journeys at ferry terminals
19. Infrastructure to provide access for all at railway stations
20. Investment in Demand Responsive Transport and Mobility as a Service
21. Improved public transport passenger interchange facilities
22. Framework for the delivery of mobility hubs
23. Smart, integrated public transport ticketing

Decarbonising transport

24. Ferry vessel renewal and replacement, and progressive decarbonisation
25. Decarbonisation of the rail network
26. Decarbonisation of the bus network
27. Behavioural change and modal shift for freight
28. Zero emission vehicles and infrastructure transition

Increasing Safety and Resilience on the Strategic Transport Network

29. Access to Argyll (A83)
30. Trunk road and motorway safety improvements to progress towards 'Vision Zero'
31. Trunk road and motorway climate change adaptation and resilience
32. Trunk road and motorway renewal for reliability, resilience and safety
33. Future Intelligent Transport Systems
34. Traffic Scotland System renewal
35. Intelligent Transport System renewal and replacement
36. Strategy for improving rest and welfare facilities for hauliers
37. Improving active travel on trunk roads through communities
38. Speed management plan

Strengthening strategic connections

39. Sustainable access to Grangemouth Investment Zone
40. Access to Stranraer and the ports at Cairnryan
41. Potential Sound of Harris, Sound of Barra fixed link and fixed link between Mull and Scottish mainland
42. Investment in port infrastructure to support vessel renewal and replacement, and progressive decarbonisation
43. Major station masterplans
44. Rail freight terminals and facilities
45. High speed and cross-border rail enhancements

3. Policy Context

3.1. Overview

A number of Government policies, strategies and commitments set the overall context for the STPR2. It is therefore important to highlight the key issues of direct relevance to this review and outline how these have influenced and shaped the STPR2. This includes, but is not limited to, the NTS2 and its associated Delivery Plans; Climate Change Plan Update; the second Cleaner Air for Scotland strategy; the NSET; the Revised Draft NPF4; and The Bute House Agreement. This Chapter provides an overview of these policies and strategies. Consideration is also given to existing funding commitments.

3.2. NTS2 and Delivery Plans

3.2.1. NTS2 Overview

The NTS2 provides the national transport policy framework, setting out a clear vision of a sustainable, inclusive, safe and accessible transport system which helps deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors. It sets out key priorities to support that vision:

- Reduces inequalities;
- Takes climate action;
- Helps deliver inclusive economic growth;
- Improves our health and wellbeing

The NTS2 is set within the context of a climate emergency, with the Scottish Government committed to transitioning our transport system to one that is net zero in carbon emissions by 2045. Set against a backdrop of increasing amounts of travel in Scotland over recent years, particularly vehicular travel, the NTS2 clearly articulates the need for change in transport provision in Scotland. The STPR2 has a key part to play in supporting the delivery of the priorities and outcomes by outlining a range of targeted measures to achieve fundamental change in overall travel demand, a shift to more sustainable modes such as walking, wheeling, cycling and public transport, and in transitioning to a net zero economy.

The development of the NTS2 has involved a comprehensive review of the key transport challenges facing Scotland and has included extensive engagement with a network of partners and authorities across the country comprising individuals, businesses and third sector organisations, to gather the views of a wide range of users of the transport system. Through this process, it has been identified that Scotland's transport system continues to face a number of challenges: many people encounter problems when trying to access the services they need; vehicles continue to emit greenhouse gases and pollute the places residents live and work; businesses still face congestion and delays when reaching their customers; and people still face barriers when wanting to walk, wheel or cycle to their destination.

3.2.2. Embedding NTS2

Important context is provided by the Sustainable Travel Hierarchy and Sustainable Investment Hierarchy set out in the NTS2 (see Figure 3) to manage the demand for transport and support the creation of successful places in the future.
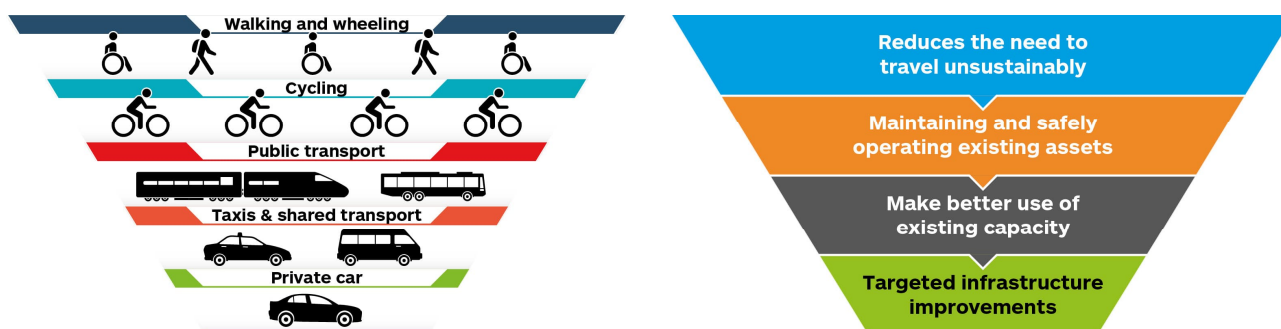
Figure 3: Sustainable Travel Hierarchy and Sustainable Investment Hierarchy

The NTS2 states that the Sustainable Transport Hierarchy should be embedded in decision-making; promoting walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use. At a national level the Sustainable Investment Hierarchy should be used to inform budgetary decisions, considering: investment aimed at reducing the need to travel unsustainably; investment aimed at maintaining and safely operating existing assets taking due consideration of the need to adapt to the impacts of climate change; investment promoting a range of measures, including innovative solutions, to make better use of existing capacity, ensuring that existing transport networks and systems are fully optimised (these may include technology-based, regulatory, fiscal or value engineering solutions to asset renewals); and investment involving targeted infrastructure improvements. In other words, there is an expectation that the STPR2 should not bring forward recommendations for infrastructure improvements without first considering the requirement for, and effectiveness of, interventions in the first three categories.

At the Option Generation and Sifting stage of the STPR2 (discussed further in **Chapter 7: The Approach to the Assessment),** the Sustainable Travel Hierarchy has been applied to promote interventions that prioritise walking, wheeling, cycling and public transport-based modes ahead of private car trips. In addition, each option considered within the STPR2 has been assessed in terms of its position within the Sustainable Investment Hierarchy, in order to ensure that budgetary decisions are informed with sustainability in mind, in line with the approach promoted in the NTS2: for example interventions that reduce the need to travel unsustainably are prioritised over targeted infrastructure measures. Consideration has been given to whether each option being assessed is either;

▪ The only option available to address the identified problems and/or opportunities; or is
▪ The option that best aligns with the Sustainable Investment Hierarchy.

3.2.3. NTS2 Delivery Plans

The first NTS2 Delivery Plan (Transport Scotland, 2020a) was published in December 2020 and covers the period to March 2022. Together with the NTS2, these documents set out the vision and priorities for the transport system covering the next two decades. The second NTS2 Delivery Plan (Transport Scotland, 2022b), covering the period 2022 to 2023, sets out the practical actions which are underway, or due to begin, across Scottish Government which will deliver the NTS2 vision, and provide a co-ordinated overview to transport investments and projects. At a local level the Regional Transport Strategies and Delivery Plans provide a detailed overview of the regional and local priorities, projects, actions and services, aligned with the NTS2 priorities.

The second Delivery Plan updates on areas around: increasing accountability, including, amongst other initiatives, the NTS2 Delivery Board which brings together senior transport

sector representatives, and reconvening of the Transport Governance and Collaboration Working Group with representation from regional transport partnerships; investing for the future, which recognises the role of the STPR2 to meet the transport challenges and changes over the next 20 years; mission zero and supporting a Just Transition, which focuses on embedding Just Transition principles through policy development and actions to support the move to net zero; and equality objectives, recognising the importance of reducing inequalities and commitments to advancing equality of opportunities across protected characteristics.

When the NTS2 was published in February 2020 it recognised the need for its implementation to be flexible to adapt to emerging and changing evidence. This is particularly relevant in light of the COVID-19 pandemic and Government response, and the impact of this on Scotland's economy and society. As a result, the NTS2 vision and outcomes remain valid in terms of a long-term strategy setting the framework for decision-making on transport in Scotland. However, given the impacts from the pandemic, it is pertinent to take account of the emerging evidence of the impact of COVID-19 on travel demand and behaviour, and its impact in terms of exacerbating existing inequalities, including around access to, and affordability of, transport, particularly for those already experiencing disadvantage. The first Delivery Plan does this and sets out a series of commitments and actions under each of the four priorities. Whilst many of these commitments are relevant to the development of the STPR2, those referencing the STPR2 specifically are:

- Strengthening evidence - continuing to embed the Sustainable Travel Hierarchy and Sustainable Investment Hierarchy in decision-making, STAG and the STPR2;
- The Appraisal Framework and investment decision-making for the STPR2 will have the Sustainable Investment Hierarchy at its heart;
- Taking a collaborative engagement approach for the STPR2, working with the ten regional working groups and a range of stakeholders during the various stages of the appraisal process, whilst recognising the critical role of local transport and regional connections to the success of diverse towns and places, supporting thriving town centres, resilient communities and 20-minute neighbourhoods.
-
- The second Delivery Plan sets out the progress made on the STPR2 and recognises that by focusing investment on sustainable transport options for individuals, families, communities and businesses, the STPR2 recommendations will make it easier to access the transport networks and systems that Scotland will need to meet the challenges and changes over the next 20 years.
-

> **Relevance for the STPR2**
>
> The NTS2 sets the vision for the country's transport system over the next 20 years. At the heart of the strategy is the recognition that we need to deliver a step-change in behaviour and provide attractive, affordable and accessible sustainable travel options. This is echoed in the second NTS2 Delivery Plan covering the period 2022 to 2023 (Transport Scotland, 2022b).

3.3. Climate Change Considerations

3.3.1. Climate Change and Transport in Scotland

Transport's contribution to the climate emergency and net zero targets means that there is a need to reduce unsustainable travel and deliver modal shift towards walking, wheeling, cycling and public transport. If we continue as we are now, forecasts suggest a 40 per cent increase in vehicular travel by 2037. The recent work by the Committee on Climate Change (2019) set out an assumption of a 10 per cent modal shift by 2030 within its net zero scenario and the commitment to reduce car kilometres by 20 per cent by 2030 was presented in the Climate Change Plan Update in December 2020. This commitment was included in Scotland's COP26 climate change commitments (Under 2° Secretariat Climate Group, 2021) and in the Route Map to achieve a 20 per cent reduction in car kilometres by 2030 (Scottish Government, 2022c).

To achieve a modal shift of the scale required to address the climate emergency will require significant changes to the complex travel behaviours of users, operators and the public and private sectors. In accordance with the Sustainable Travel Hierarchy, the STPR2 aims to prioritise interventions that increase the modal share of shorter everyday trips by walking, wheeling and cycling; short- to medium-length trips by public transport and longer trips by rail or coach and low emission vehicles.

Transport is a derived demand and therefore key decisions and investments are required across several other sectors to meet net zero targets and in so doing put 'place' at the heart of the decision making process. Land-use planning and digital connectivity are two areas not within the scope of the STPR2 that will both have a significant part to play in meeting net zero targets. This will help develop more sustainable and inclusive communities that encourage walking, wheeling and cycling as well as public transport as the preferred choice of travel. This will increase physical activity and realise health and wellbeing benefits.

The Revised Draft NPF4 is clear that development proposals will be supported where it can be demonstrated that the transport requirements necessary to facilitate development have been considered in line with the sustainable travel and investment hierarchies. This will help in the development of more sustainable, attractive, convenient, safe and inclusive communities which support local living. The Revised Draft NPF4 outlines policies which encourage, promote and facilitate developments that prioritise walking, wheeling, cycling and public transport for everyday travel and reduce the need to travel unsustainably. It also includes National Developments that facilitate the shift from vehicles to walking, cycling and wheeling for everyday journeys, thus contributing to reducing greenhouse gas emissions from transport and driving a change that is highly beneficial for health and wellbeing.

Fundamental to the delivery of an inclusive net zero economy, and thus improving health and wellbeing, is the requirement to support and accelerate the transition to low emission vehicles. A collaborative public and private sector relationship will be crucial in achieving this transition.

The policy backdrop, upon which the STPR2 has been developed, sets out an overarching and urgent imperative to address climate change and to achieve net zero carbon emissions by 2045. STPR2 has sought to embed these factors into the appraisal process from the very beginning, ensuring that interventions emerging from the STPR2 help to deliver the outcomes of the NTS2 and support wider net zero commitments.

Earlier stages of the STPR2 process, undertaken prior to the publication of the new STAG guidance, as described in **Section 2.3**, have adopted a number of approaches to strengthen the STAG-based appraisal, with a particular focus on ensuring the identification

of sustainable transport interventions that support the priorities of the NTS2, including the priority 'Takes Climate Action'. For example, at the Option Generation and Sifting stage (discussed further in **Chapter 7: The Approach to the Assessment)**, the Sustainable Travel Hierarchy and Sustainable Investment Hierarchy have been applied to promote interventions that prioritise walking, wheeling, cycling and public transport-based modes ahead of private car trips, and to ensure that interventions that reduce the need to travel unsustainably are prioritised over targeted infrastructure measures. Groupings and Packages (of interventions) assessed through the STPR2 work have been appraised against a set of TPOs (see **Section 2.5**) which have been directly informed by the priorities of the NTS2, including 'Takes Climate Action'. This includes assessing interventions against the following TPO: A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target.

Groupings and Packages taken through the appraisal process have been assessed using a Scenario approach, as noted within **Section 7.4**, with consideration given to a range of possible futures and how interventions behave in them. One scenario describes a future in which the 20 per cent reduction in car kilometres by 2030 and net zero by 2045 are achieved. Performance of the Groupings and Packages under these scenarios has informed the Preliminary Appraisal and the Detailed Appraisal.

The development of the STPR2 has also been informed by the requirements set out in Scotland's Climate Change Plan Update and Cleaner Air for Scotland, as set out in the sections below.

3.3.2. Climate Change Plan Update

The Scottish Government published "Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 – update" in December 2020 (Scottish Government, 2020a) which reflects the ambition of the new targets set in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. These comprise the reduction of Scotland's greenhouse gas emissions to net zero by 2045 at the latest, with interim targets of at least:

- 56 per cent by 2020;
- 75 per cent by 2030;
- 90 per cent by 2040.

The transport Chapter of the Plan sets out context around the current situation and how the shift to home working may become a longer-term trend. Coupled with the focus on 20-minute neighbourhoods, the Plan notes the opportunity to capitalise on these to reduce the need to travel, and, when travel occurs, for it to be focused on more sustainable modes.

The Plan includes the following statement in relation to transport: "By 2032 our roads will contain no new petrol and diesel cars and vans; we will have decarbonised our passenger railways; and we will have begun work to decarbonise challenging transport modes such as heavy goods vehicles (HGVs), ferries and aviation. Car kilometres will have reduced by 20 per cent, and sustainable transport will be the instinctive first choice for people."

This statement is accompanied by a timeline to 2032 that sets out the key milestones in the intervening years:

- 2024 – majority of new buses are zero emissions.
- 2025 – need for any new petrol and diesel light commercial vehicles in public bodies phased out. Delivery of first Active Freeways: segregated active travel routes on main

travel corridors.

- 2030 – conditions created to phase out the need for all new petrol and diesel vehicles in Scotland's public sector fleet. Need for new petrol and diesel cars and vans phased out. Car kilometres reduced by 20 per cent.
- 2032 – Scotland's passenger rail services considerably decarbonised, with just a few years to go until they are fully decarbonised.

3.3.3. Route Map to Reduce Car Use

In January 2022 the Scottish Government and the Convention of Scottish Local Authorities (COSLA) developed a Route Map to deliver the shift in travel behaviours required to meet the 20 per cent reduction target, recognising the need for ongoing collaboration and partnership working between national, regional and local Government as well as public, private and third sector partners (Scottish Government, 2021a). The Route Map sets out the suite of policies from across Government that will be implemented to support car-use reduction in order to both address climate change and deliver a healthier, fairer and more prosperous Scotland, and recognises the role of the STPR2 in setting out recommendations for future investment decisions.

Successful implementation of the actions set out in the Route Map are expected to lead to a transformational way of living in Scotland, where a new localism thrives in villages, towns and city neighbourhoods; where streets become places that are safe for people of all ages to travel by walking, wheeling and cycling whilst maintaining private vehicle access for those with disabilities; where longer journeys are made by convenient and affordable public or shared transport; and with greater use of online access to key services and opportunities. This future will both enable statutory climate change targets to be met, whilst at the same time creating better ways of living, improved health and wellbeing and the associated social and economic benefits of a society less dominated by private cars.

Relevance for the STPR2

Transport remains Scotland's biggest emitting sector (36 per cent of emissions) with cars accounting for around 40 per cent of emissions, and therefore significant action is required. It is also acknowledged that technological advances to green vehicles will not be enough and managing demand and behavioural change will be needed. Therefore, STPR2 will support the development of a programme of interventions to establish conditions that work towards a reduction in car kilometres of 20 per cent by 2030.

3.3.4. Cleaner Air for Scotland 2: Towards A Better Place for Everyone

In July 2021, the Scottish Government published Cleaner Air for Scotland 2 (Scottish Government, 2021b) and an associated Delivery Plan. It sets out how the Scottish Government will deliver further air quality improvements over the next five years. This is considered necessary to secure the vision of Scotland having the best air quality in Europe.

The Delivery Plan is structured around ten Priorities, including Transport, which reflect the ten high-level themes from the review of Cleaner Air for Scotland completed in 2019. Specifically relating to Transport, the Plan notes "We support a modal shift to active travel and public transport. This will mean, amongst other objectives, providing a transport system that facilitates active travel choices, better public transport provision and constraints upon private vehicle use, especially in urban centres where pollution and congestion are most acute."

The Delivery Plan refers to the Sustainable Investment Hierarchy and the role of the STPR2 in contributing to a reduction in the need to travel unsustainably, making the most of existing transport strategic systems and supporting strategic investments in sustainable, smart and cleaner transport options, in accordance with Just Transition principles (Scottish Government, 2021c).

The STPR2 will align with the Transport priority of the Delivery Plan and will indirectly align with several other priorities, including Integrated Policy, Placemaking and Behavioural Change.

Relevance for the STPR2

The Scottish Government has set ambitious targets for air quality improvements to secure the vision of Scotland having the best air quality in Scotland. Amongst other objectives, it supports a transport system that facilitates active travel choices, better public transport provision and constraints upon private vehicle use, especially in urban centres where pollution and congestion are most acute. The STPR2 will have an important role to play in contributing to a reduction in the need to travel unsustainably, making the most of existing strategic transport systems and supporting strategic investments in sustainable, smart and cleaner transport options.

3.4. National Planning Framework 4

The Scottish Government's Programme for Government highlights the significance of the National Planning Framework to put planning at the heart of delivering green, inclusive and long-term sustainable development in Scotland (Scottish Government, 2022d). The National Planning Framework includes a long-term spatial strategy to 2045. This reflects the range of Scottish Government policies, including the Infrastructure Investment Plan (IIP) 2021-22 to 2025-26. It will guide spatial development, set out national planning policies, designate national developments and highlight regional spatial priorities.

On 08 November 2022, the Revised Draft NPF4 (Scottish Government, 2022b) was laid in the Scottish Parliament. Once approved by the Scottish Parliament and adopted by the Scottish Ministers, the NPF4 will become part of the statutory development plan and will directly influence planning decisions. The Revised Draft NPF4 sets out a need to "embrace and deliver radical change to tackle and adapt to climate change, restore biodiversity loss, improve health and wellbeing, build a wellbeing economy and create great places." The NPF4 recognises the need to plan our places in a way that reduces the need to travel, especially by unsustainable modes, and promotes a shift to active and sustainable travel.

The Revised Draft NPF4 embeds, for the first time, the NTS2 Sustainable Travel Hierarchy and Sustainable Investment Hierarchy into planning decision making and development planning. The Revised Draft NPF4 spatial strategy sets out a local living approach whereby future places, homes and neighbourhoods will be connected, liveable, thriving places with sustainable travel options and where car dominance is reduced.

To meet many of the future needs of society it is crucial that services and facilities are easily and affordably accessed. Therefore, Revised Draft NPF4 advocates the infrastructure-first approach in planning for future development to provide communities with the opportunity to travel sustainably from the outset. The STPR2, and the Islands Connectivity Plan (ICP), represent the national transport investment needed to support NPF4. In turn, some Revised Draft NPF4 National Developments respond to the STPR2 recommendations.

Relevance for the STPR2

The Revised Draft NPF4 sets the context for developing a spatial strategy that is aligned with the Sustainable Travel Hierarchy and Sustainable Investment Hierarchy presented in the NTS2. It recognises that a collaborative approach that aligns interests will play a central role in delivering the spatial strategy and acknowledges the important role of the STPR2 in generating national programmes and projects to deliver improved outcomes for our places. STPR2, and the ICP, represent the national transport investment needed to support the NPF4. In turn some of the Revised Draft NPF4 National Developments respond to the STPR2 recommendations.

3.5. Investment Considerations

3.5.1. Programme for Government

The Scottish Government's - Programme for Government (Scottish Government, 2022d) is published every year at the beginning of September and sets out the actions that the Scottish Government will take in the coming year and beyond. It includes the legislative programme for the next parliamentary year to drive forward change across all levels of society.

Transport features annually in the Programme for Government as it is a devolved matter and reflects the Government's priorities in terms of policy development and transport investment priorities. Over the last six to seven years, strategic transport investment has been a particular feature of the priorities from transport given the Government's wider aims around achieving Net Zero. The STPR2 has featured heavily within recurring Programme for Government documents including in the recent 2021-22 document. The "Cost of Living Crisis" that has emerged throughout 2022 and the Scottish Government response to this has seen a significantly shortened and more focussed Programme for Government for 2022-23 (Scottish Government, 2022d). Whilst transport has featured in this most recent Programme for Government the focus has been on measures to support those using the transport network to get to work, travelling on business, shopping and going to education against the rising costs of travel. Therefore it should be noted that there are references within this report to different Programme for Government documents and this reflects the important links to other transport policy and strategy developments that have happened over the last few years.

3.5.2. Bute House Agreement

In August 2021, the Scottish Government and the Scottish Green Party Parliamentary Group agreed to work together over the next five years to build a green economic recovery from COVID-19, respond to the climate emergency and create a fairer country. A shared policy programme, known as The Bute House Agreement, details collaboration on the climate emergency, economic recovery, child poverty, the natural environment, energy and the constitution. It is recognised that bold action is needed to increase the pace of change and the scale of investment to support the priorities and outcomes set out in the NTS2, including ambitious climate goals.

In terms of transport, it is agreed that in the face of the climate emergency there is a need to shift away from investing in new road projects that encourage more people to drive, and instead focus spending and effort on maintaining roads, improving safety and providing a realistic and affordable alternative through investing in public transport and active travel.

The Agreement sets out a number of commitments which will complement the STPR2, including to:

- align transport policy with climate targets and the goal of reducing car kilometres by 20 per cent by 2030;
- increase the proportion of Transport Scotland's budget spent on active travel initiatives so that by 2024-25 at least £320 million or 10 per cent of the total transport budget will be allocated to active travel;
- during this parliamentary session, invest over £5 billion in maintaining, improving and decarbonising Scotland's rail network;
- commission a Fair Fares Review to ensure a sustainable and integrated approach to public transport fares. This will look at the range of discounts and concessionary schemes which are available on all modes including bus, rail and ferry. The review will consider options against a background where the costs of car travel are declining and public transport costs are increasing, exacerbating the impact on those living in poverty;
- progress the on-going review of transport governance in Scotland to ensure it is fully aligned with the climate and traffic reduction targets, and to ensure that the national and local capacity is in place to deliver active travel goals.

It is also agreed that new roads projects will normally only be taken forward where they reduce the maintenance backlog; address road safety concerns; adapt the network to deal with the impacts of climate change; or benefit communities such as bypassing settlements. Furthermore, it is agreed that road infrastructure will not be built to cater for forecast unconstrained increases in traffic volumes.

The shared policy programme acknowledges the role of the STPR2 to direct future transport infrastructure investment.

Relevance for the STPR2

The shared draft policy programme acknowledges the role of the STPR2 to direct future transport infrastructure investment. It is agreed that in the face of the climate emergency there is a need to shift away from new road projects that encourage more people to drive, and instead focus money and effort on maintaining roads, improving safety and providing a realistic and affordable alternative through investing in public transport and active travel.

The Agreement sets out a number of commitments which will complement the STPR2, including to reduce car km by 20 per cent by 2030; increase the proportion of Transport Scotland's budget spent on active travel initiatives; invest in the maintenance, improvement and decarbonisation of Scotland's rail network; commission a Fair Fares Review; and progress the on-going review of transport governance in Scotland.

New roads projects will normally only be taken forward where they reduce the maintenance backlog; address road safety concerns; adapt the network to deal with the impacts of climate change; or benefit communities such as bypassing settlements. Furthermore, it is agreed that road infrastructure will not be built to cater for forecast unconstrained increases in traffic volumes.

3.5.3. Infrastructure Investment Plan for Scotland

The Infrastructure Investment Plan 2021-22 to 2025-26, published on 4 February 2021, focuses on three core strategic themes for guiding investment decisions in Scotland:

- Enabling the transition to net zero emissions and environmental sustainability;
- Driving inclusive economic growth;
- Building resilient and sustainable places.

The IIP also introduces the Common Investment Hierarchy, which is aligned to Transport Scotland's Sustainable Investment Hierarchy. This thereby provides overall alignment between the outcomes of the STPR2 and the Scottish Government's investment priorities.

The investment in infrastructure is targeted to maximise wider economic benefits and the delivery of the National Outcomes. The investment is often made by the Scottish Government or in partnership with Local Government. Where possible, however, the Scottish Government looks to create opportunities and the right conditions to leverage additional private sector investment across Scotland.

Relevance for the STPR2

The IIP provides additional detail on expenditure in the next few years to support the commitments made within the Programme for Government and sets the context of future investment in transport to deliver an effective response to the COVID-19 pandemic. The themes have a good strategic fit with the STPR2 objectives. The IIP recognises the need to invest in the areas of the transport sector being considered through the STPR2, including both an effective response to COVID-19 and the key longer-term trends of climate change, technological developments and demographic change.

3.5.4. Capital Spending Review

In February 2021, the Scottish Government published a five-year Capital Spending Review

(CSR) alongside the IIP, with the aim of providing a strong and coherent framework for directing future commitments and giving confidence and certainty to sectors across Scotland.

Since publication, there have been changes in three key factors which have a bearing on the Scottish Government's infrastructure investment pipeline of projects and programmes – including changes in funding allocations, market conditions and fresh commitments outlined in the 2021 Programme for Government (Scottish Government, 2021d) and the Bute House Agreement. Consequently, a Targeted Review of the CSR was published in May 2022. The three core strategic themes for guiding investment decisions in Scotland are as follows:

- Enabling the transition to net zero emissions and environmental sustainability
- Building resilient and sustainable places
- Driving inclusive economic growth

The Targeted Review of the CSR, alongside the IIP, demonstrates how the Scottish Government will deliver the National Infrastructure Mission commitment to boost economic growth by increasing annual investment in infrastructure by one per cent of 2017 Scottish Gross Domestic Product (GDP) by 2025-26. The economic rationale for the National Infrastructure Mission is founded on the important role that infrastructure investment plays in improving the productive capacity of the economy and delivering long-term economic benefits.

At the time of writing, Scotland is facing a severe economic upheaval, already impacting people, businesses, public services and the third sector. The 2022-23 Programme for Government, published in September 2022 (Scottish Government, 2022d), sets out the immediate response to the cost crisis, as well as outlining its ambition to create a better future in the longer-term. In August 2022, the Scottish Government committed to undertaking an Emergency Budget Review (EBR) to supplement normal budget processes and determine any and all opportunities to direct additional resources to support those most in need, as well as ensuring existing resources are allocated as effectively as possible in light of changing circumstances. The EBR primarily examined the scope for change within the current 2022-23 budget, alongside an assessment of the context that will inform the forthcoming Scottish Budget 2023-24. The process has considered all devolved budgets, including capital investment in infrastructure, and determined where savings can be made. The EBR was published in November 2022 and the Scottish Budget 2023-24 is expected to be published in December 2022.

Relevance for the STPR2

The challenges outlined in the Capital Spending Review Update, published in May 2022, and the EBR, published in November 2022, have a bearing on the investment pipeline of projects and programmes which form part of the STPR2 considerations.

3.5.5. Scotland's National Strategy for Economic Transformation

Scotland's National Strategy for Economic Transformation (NSET) (Scottish Government, 2022a) published in March 2022, sets out the priorities for Scotland's economy over the ten-year period to 2032. It articulates a vision to create a wellbeing economy: an economic system within safe environmental limits that serves and prioritises the wellbeing of current and future generations. The Strategy's programmes have been chosen based on evidence and engagement to deliver fairer, greener prosperity for all Scotland's people and places,

and to make our economy more sustainable and resilient in the long-term. The programmes focus on: stimulating entrepreneurship; opening new markets; increasing productivity; developing the skills we need for the decade ahead; and ensuring fairer and more equal economic opportunities. The Strategy aims to maximise Scotland's strengths and natural assets to deliver economic growth that significantly outperforms the last decade, both in terms of economic performance and tackling structural economic inequalities, so that the Scottish economy is more prosperous, more productive and more internationally competitive.

The Strategy offers renewed clarity of vision and focus on delivery, and a robust governance structure, co-led by business, to oversee its successful implementation. On 31 October 2022, prioritised and affordable delivery plans for each of the Strategy's programmes were published, and the Scottish Government is working in partnership across the public, private and third sectors, as well as with individuals and communities, in a "Team Scotland" approach to deliver these plans.

The Strategy commits to delivering the STPR2 to help make Scotland more accessible for residents, visitors, and businesses; create better connectivity with sustainable, smart and cleaner transport options; and highlight the vital contribution that transport investment can play in enabling and sustaining Scotland's economic growth.

The STPR2 is a key project within the NSET Programme 3, "Productive Businesses and Regions". The STRP2 is wired fully into the governance arrangements for the NSET and this particular Programme, to reflect not only the importance of the transport agenda itself, but also the fact that transport is a crucial facilitator of economic growth.

Relevance for the STPR2

The NSET aims to deliver a more prosperous, more productive and more internationally competitive Scottish economy and recognises the role of the STPR2 in delivering inclusive economic growth.

3.5.6. Existing Funding Commitments

The STPR2 recommendations listed in this report do not constitute the full investment programme of Transport Scotland. They should be considered with the overall Government spending commitments on transport outlined in the above documents and Scottish Government budgets. Some of the other Scottish Government transport spending commitments are out of scope for the STPR2, for example:

- Measures to improve resilience of the rail network (for example operations, maintenance and renewal);
- Investment in public transport subsidies.

.

3.5.7. Summary

The current policy, plan and investment landscape is complex and multi-layered. There is an overarching and urgent imperative to address climate change and to achieve net zero carbon emissions by 2045. A number of approaches have been adopted to strengthen the STAG-based appraisal undertaken for the STPR2, with a particular focus on ensuring the identification of sustainable transport interventions that support the Revised Draft NPF4, priorities of the NTS2, including the priority "Takes Climate Action', and to achieve the 20 per cent reduction in car kilometres supportive of the Climate Change Plan Update. Alongside this are the needs to improve our health and wellbeing. There is also a clear need to deliver inclusive economic growth and to reduce inequalities.

The STPR2 process has taken cognisance of the constraints to funding and presents an ambitious, but realistic, set of recommendations which will set the strategic direction of transport investment in the next 20 years.

3.6. Relationship with Other Plans, Programmes or Strategies (PPS)

The SEA needs to consider the most relevant PPS to the STPR2. This helps to identify wider environmental protection objectives (not just the STPR2 SEA Objectives) and issues that STPR2 should consider, and might support, in its delivery.

A wide range of national-level policies from various PPS need to be considered in the development of the STPR2 and the SEA. The key relevant aspects of these policies are included in **Appendix B (Plans, Programmes and Strategies)**. A summary of the key environmental requirements and objectives for each SEA topic identified through the review is presented in Table 1 below.

A review of the associated environmental protection objectives highlights existing and potential problems, as well as opportunities for enhancement and benefits, and has served as an important base upon which to build the SEA Assessment Framework.

Table 1: Key environmental requirements emerging from the PPS review

SEA TOPIC	KEY ENVIRONMENTAL REQUIREMENTS
Biodiversity	Promote the maintenance, protection and restoration of biodiversity on land and in Scotland's seas at all levels;
	Connect people with the natural world to enhance their health and wellbeing and to involve them in decisions about their environment;
	Encourage the management of features of the landscape which are of major importance for wild fauna and flora;
	Implement nature-based solutions (NPF4);
	Maximise the benefits of a diverse natural environment and the services it provides to deliver multiple benefits, including social and sustainable economic growth;
	Create a natural environment resilient to the threats of climate change, invasive species, habitat fragmentation, pests and diseases.

SEA TOPIC	KEY ENVIRONMENTAL REQUIREMENTS
Population and Human Health	Eliminate discrimination and promote equality on Scotland's transport network;
	Provide safe and hygienic public transport services and facilities, to reduce the spread of infectious diseases;
	Improve the quality, accessibility and affordability of public transport;
	Improve health and wellbeing, including through the promotion of increasing levels of physical activity;
	Increase levels of access to bikes through projects that support inclusive cycling initiatives;
	Increase active travel participation for young people;
	Create a culture of walking and cycling, where everyone walks or cycles more often as part of their everyday travel - by creating better and more attractive environments which enable easy, convenient and safe active travel for everyone – including segregation from motorised traffic;
	Modernise public transport services through multi-modal, smart ticketing and electronic payment systems to make travel easier, more accessible and sustainable.

SEA TOPIC	KEY ENVIRONMENTAL REQUIREMENTS
Material Assets	Promote sustainable design and innovation to reduce material consumption;
	Re-use vacant and derelict land (NPF4);
	Integrate land use and transport (NPF4);
	Minimise waste generation;
	Maintain and enhance transport infrastructure;
	Encourage an innovative approach to heat generation/renewable infrastructure;
	Maximise investment in rail infrastructure to support surge in demand, supporting a modal shift in order to reduce emissions;
	Improve safety on Scotland's roads by prioritising initiatives aimed at preventing accidents and developing appropriate accident mitigation;
	Safeguard access to ports and harbours and encourage their sustainable growth to maximise their potential to facilitate cargo movement, passenger movement and to support other sectors;
	Safeguard essential maritime transport links to islands and remote in-land communities;
	Improve the provision and connectivity of ferry services in Scotland in order to improve reliability, maximise employment, business and leisure opportunities and to promote social inclusion;
	Improve connectivity between ferry services and sustainable modes of transport (public transport and active travel).
Soil	Safeguard and maximise the multiple benefits and functions of soils as a vital part of Scotland's economy, environment and heritage;
	Protect and promote carbon-rich soils, such as healthy peatland, due to the benefits of carbon capture and storage.
Water	Improve the environmental status of water bodies and reduce adverse effects on the water environment;
	Promote sustainable water use by reducing discharge and emissions and the pollution of groundwater.

SEA TOPIC	KEY ENVIRONMENTAL REQUIREMENTS
Air and Climatic Factors	Promote Local Authorities to review and assess air quality in their areas; Enhance health, wellbeing, environment, place-making and sustainable economic growth through improving air quality across Scotland; Ensure citizens are well informed, engaged and empowered to improve air quality; Protect citizens from the harmful effects of air pollution; Encourage local authorities to develop and implement Air Quality Action Plans in Air Quality Management Areas Reduce greenhouse gas emissions; Meet key emissions-reduction target dates (2020 and 2050), including annual targets; Largely decarbonise road transport and encourage modal shift to lower emission modes of travel.
Cultural Heritage	Enhance the cultural, social, environmental and economic value of Scotland's historic assets in order to achieve sustainable development in communities; Emphasise the positive effects of protecting these assets on building vibrant communities through good design; Detrimental effects on the historic environment should be minimised; Strengthen the collaboration between different organisations and groups in protecting the historic environment
Landscape / Townscape	Protect Scotland's landscape due to its contribution to quality of life, promoting the country's national identity and enhancing the economy; Ensure that the unique qualities of Scotland's cities, their historic environment and the character of its urban areas are safeguarded for the future; Design places that are compact, walkable and connected by sustainable modes of transport; Protect important landscape, townscape, seascape and natural environmental features.

4. Baseline Summary

4.1. Overview

Schedule 3 of the Environmental Assessment (Scotland) Act 2005 requires that the following be identified when undertaking a 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 (as described in **Section 0**).

The full national-level environmental baseline, that describes these aspects, is provided as **Appendix C (National Baseline)**, which also contains discrete sections that summarise the likely evolution of the environmental baseline if the STPR2 was not implemented (the 'do nothing' or 'without plan' scenario). The regional environmental baseline is summarised in **Appendix D (Regional Environmental Summaries)**. Information has been drawn from a range of sources, including the Scottish Government, NatureScot, HES, SEPA, and Scotland's Environment Web, amongst others.

All of the SEA topics listed in the SEA Directive have been 'scoped in' to the STPR2 SEA, as described in **Section 7.2.**

4.2. Baseline Summaries by SEA Topic

A summary of the key national-level baseline findings for each SEA topic is provided below:

Climatic Factors

Climate change is a threat to all countries and the expected impacts will affect infrastructure and its operation. Ensuring current and future infrastructure is resilient against the following anticipated impacts is vital:

- Average temperatures increasing across all seasons;

- Our weather will remain variable and may become more variable;

- Typical summers will be warmer and drier;

- Intense heavy rainfall events will increase in frequency in both winter and summer

- Rising sea levels;

- Fewer days / periods of frost and snowfall.

Air quality

- Air pollution originates from organic and human sources;

- Urban air quality has improved significantly during the past 70 years as industry has moved outside of urban areas and regulations have incentivised technological innovation in residential heating and vehicles;

- Scotland has declared 38 Air Quality Management Areas where air quality objectives are not being met. Almost all of these are located in urban areas due to emissions of nitrogen oxides and particulates primarily originating from road transport.

Population and Human Health

- There are significant numbers of people living in remote communities on the mainland and on the islands surrounding Scotland;

- The population is forecast to increase from 5.4 million (current) to 5.7 million by 2026;

- Scotland's obesity rates continue to be amongst the highest in the developed world and are a significant public health issue. Women and children in the most deprived areas are affected by extreme obesity;

- Transport is a significant contributor to poor air quality in urban areas. There are significant short and long-term air pollution impacts on human health;

- The COVID-19 pandemic led to an increase in walking, wheeling and cycling as people sought to exercise and avoid public transport. However, these walking, wheeling and cycling levels are likely to have dropped significantly due to Government restrictions to movement being lifted.

Material Assets

- Scotland has significant valuable material assets, encompassing those within the natural and built environments;

- The country has access to a range of crucial natural resources that underpin the operation of the country, such as water, soil, fossil fuels and minerals;

- The built environment encompasses the country's infrastructure for transport, waste management, energy and land-use, capturing a wide range of policies.

Water Environment

- Scotland has two River Basin Management Plans to improve the condition of inland water bodies and coastal waters;

- Effective protection of coastal areas and management of inland water basins is key to managing flood risk. There is a need to avoid development in areas which are or are likely to be highly vulnerable to flood risk;

- Scotland's water provides an essential resource for providing drinking water for the population and as a resource in agriculture and industry, as well as supporting a rich diversity of habitats and species.

Biodiversity, Flora and Fauna

- Scotland has a vast number of designated and undesignated areas that contain important habitats and species;

- Scotland's protected sites include 241 Special Areas of Conservation (SAC), 153 Special Protection Areas (SPA) and 51 Ramsar sites, 1,423 Sites of Special Scientific Interest (SSSI), 30 Nature Conservation Marine Protected Areas (MPAs)

Soil

- Soil is a non-renewable resource and one of Scotland's most important assets, underpinning much of the natural environment, providing the basis for food, regulating water quality and acting as a foundation for the built environment;

- Scotland has significant areas of peatlands that act as carbon sinks, playing a key role in climate change mitigation. It is important to minimise disturbance of carbon-rich soils, as disturbances can lead to significant releases of carbon.

Cultural Heritage

- Scotland has a rich historic environment with a variety of sites and assets, some of which are protected by international, national or local designations and some that are undesignated;

- Assets of historic value include buildings, sites of archaeological significance, battlefields, townscapes and landscapes;

- Scotland's heritage is a key factor in the country's significant tourism industry.

Landscape and Visual Amenity

- Scotland has an array of stunning landscapes and sceneries, including important protected sites, such as two National Parks and 40 National Scenic Areas (NSAs);

- Scotland's landscape character is very diverse. This is described and mapped in the Landscape Character Assessment of Scotland, commissioned by NatureScot (formerly SNH);

- Scotland's planning system safeguards the special qualities of NSAs, with NatureScot acting in an advisory capacity;

- Scotland's landscapes play a valuable role in Scotland's cultural heritage and contribute to the economy by attracting tourism.

4.3. Inter-relationships between SEA Topics

As set out in the Scottish Government's SEA Guidance (2013) and Scottish SEA Regulations, the inter-relationship of environmental effects between the topics has been considered within the SEA. The Guidance states that 'When considering inter-relationships and secondary effects, the assessment would only have to consider the effects that can reasonably be attributed to the plan. Interactions arising from external factors, beyond the control of the plan, do not need to be included.' Figure 4 sets out the key inter-relationships of environmental effects that could reasonably arise as a result of the STPR2. These inter-relationships have been explored in more detail in the detailed baseline review of **Appendix C (National Baseline**). These inter-relationships have been tailored to consider only what are considered significant inter-relationships for the STPR2. Some inter-relationships identified in Figure 4 have the potential to result in cumulative effects, which are discussed in **Section 7.8**.

SEA Topic	Climatic factors	Air quality	Population and human health	Material assets	Water environment	Biodiversity	Soils	Cultural heritage	Landscape and visual amenity
Climatic factors				✓	✓	✓	✓		
Air quality	✓		✓			✓			
Population and human health	✓	✓		✓		✓		✓	✓
Material Assets	✓				✓	✓	✓		
Water environment	✓		✓			✓	✓	✓	✓
Biodiversity	✓	✓			✓		✓		✓
Soils	✓		✓	✓	✓	✓		✓	✓
Cultural heritage	✓		✓				✓		✓
Landscape and visual amenity	✓	✓			✓	✓	✓	✓	

Figure 4: SEA topic inter-relationships

5. Stakeholder Engagement

5.1. Overview

Effective collaboration with stakeholders and engagement with the public has been vital to the STPR2 and a considerable programme of activities has been undertaken at a national and regional level throughout the STPR2 process. A comprehensive Engagement Plan was developed during the inception phase to guide engagement and communications with principles agreed to set the tone of the message portrayed to key stakeholders and ensure the project team adhered to best practice and offered a consistent approach across all engagement activities. The principles agreed were as follows:

- A fully transparent and auditable approach to capturing engagement through promotion of fair access - an equal opportunity to become involved - using a range of engagement and communications approaches;
- A proactive approach to elicit responses from diverse stakeholders, including hard to reach groups;
- A consistent approach whilst responding to the diverse geography of Scotland;
- An efficient approach to make best use of finite resources and timescales and minimise engagement/consultation fatigue;
- An integrated approach between engagement on the NTS2, STPR2 and the Revised Draft NPF4 where possible and appropriate.

As part of Transport Scotland's commitment to collaborative working, Regional Transport Working Groups (RTWGs), were established across Scotland with local authorities, National Park authorities, Regional Transport Partnerships (RTPs) and other regional stakeholders, such as Enterprise Agencies and Growth Deal representatives, to inform and guide the review in their respective areas. RTWGs feature representatives covering a variety of remits, including transportation, planning and economic development. The STPR2 RTWGs and the STPR2 regions

they cover, as shown in
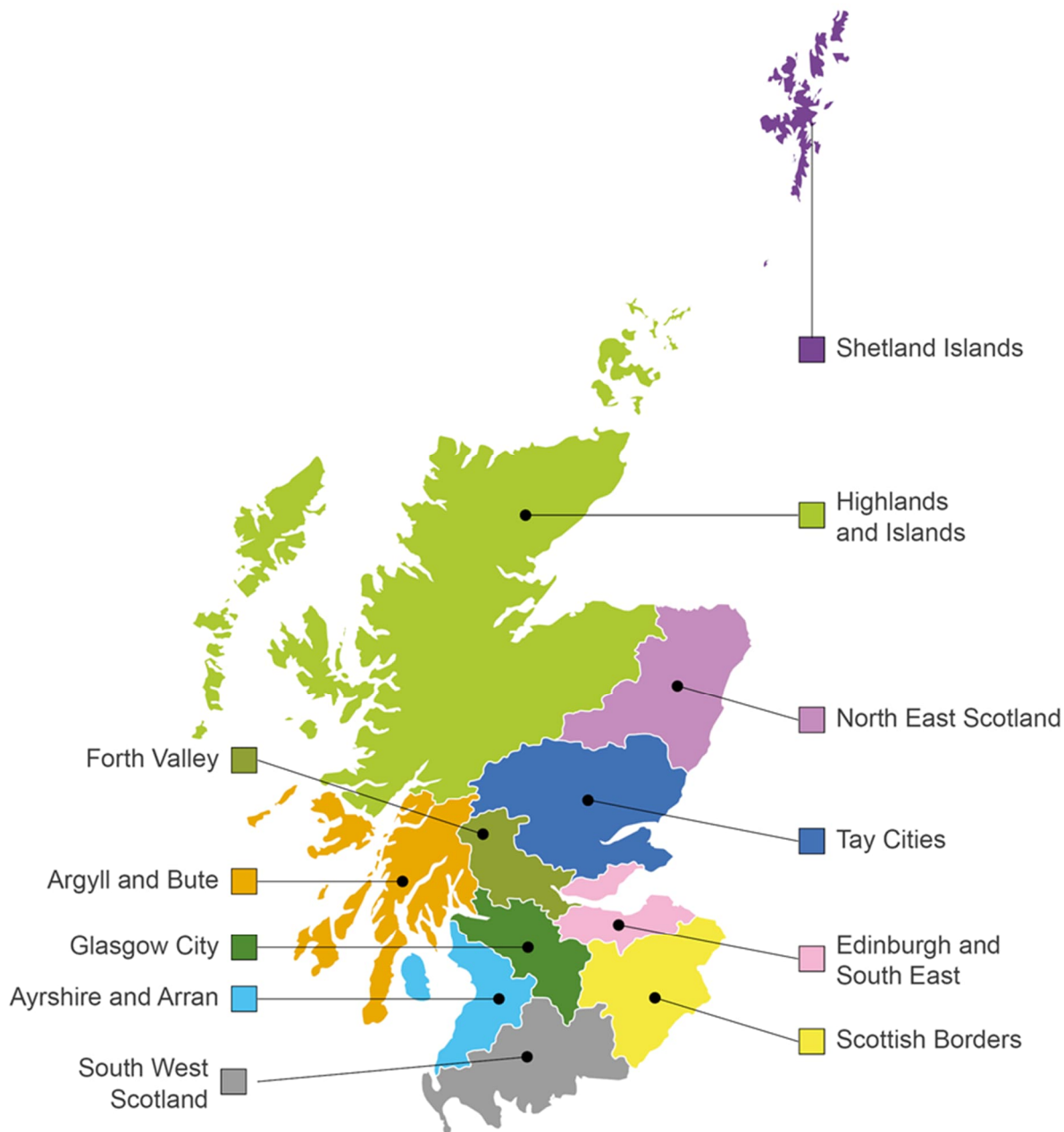
Figure 2, are as follows:

- Argyll and Bute RTWG – Argyll and Bute Region;
- Ayrshire and Arran RTWG – Ayrshire and Arran Region;
- Edinburgh and South East RTWG - Edinburgh and South East Region;
- Forth Valley RTWG – Forth Valley Region;
- Glasgow City Region RTWG – Glasgow City Region;
- Highlands and Islands RTWG – Highlands and Islands Region;
- North East RTWG – North East Region;
- Shetland Islands RTWG – Shetland Islands Region;
- South of Scotland RTWG – South West Scotland Region and Borders Region;
- Tay Cities RTWG – Tay Cities Region;

Before the COVID-19 pandemic, the engagement with the RTWGs was complemented by a comprehensive programme of stakeholder and public engagement activities building on the engagement work undertaken for the NTS2. Regional workshops played a very important role in bringing together transport users, business, equality and other representative groups to provide their input on problems and opportunities in the first round of sessions and into potential interventions in the second round of sessions. Structured interviews were also undertaken with a range of key stakeholders to provide additional inputs.

A number of national workshops were arranged, focussing on all the key modes of transport, including active travel, bus, rail, maritime, road and freight transport. There was also a national equalities workshop and a national environmental workshop. Breakfast seminars were arranged in different parts of Scotland for organisations representing key business sectors. Engagement activities were also undertaken with schools in different parts of Scotland.

An online survey to capture the views of the wider public, community councils and organisations with an interest in transport was available from 02 December 2019 to 10 January 2020. Similar surveys were undertaken as part of the three earlier Pre-Appraisal studies in the South West, the Scottish Borders and North East Regions.

All the information from the various workshop sessions and the online survey was captured and fed into the Case for Change and option generation phases of work.

From March 2020 stakeholder engagement required to be paused due to COVID-19, with Transport Scotland resources being focussed on supporting Ministers' response to the pandemic. Stakeholder engagement was re-started in October 2020 to feed into the remainder of the STPR2 process.

Following the publication of the Phase 1 Recommendations Report (Jacobs AECOM 2021a), and the updated regional Case for Change reports, comment forms were published in February 2021 to capture feedback. In total 276 Individuals and 118 Organisations provided. The comments received were considered and helped to inform the recommendations and options taken forward for more detailed appraisal.

The STPR2 Draft Final Report was consulted on for 12 weeks, starting 20 January 2022. All feedback received was collated and reviewed and findings and recommendations used to shape the Final Technical Report. In addition, the feedback received was used to inform this final version of the Environmental Report and the SEA Post Adoption Statement. The publication of the draft STPR2 report, associated documents and draft impact assessments in January 2022 launched a 12-week public consultation period, hosted on the Scottish Government's consultation platform Citizen Space. The public consultation was publicised through various means including email correspondence to a wide range of organisations and authorities from across Scotland, via the Transport Scotland website and through both press and social media coverage. Organisations and authorities were also requested to publicise the consultation through their own channels. A summary of the consultation responses is provided in the STPR2 Consultation Summary Report (Jacobs AECOM, 2022e). Gaelic and Easy Read versions of the STPR2 report were also produced for consultation.

A total of 454 responses to the 12-week consultation were received, including from RTPs and Local Authorities. Responses were also received from professional/trade bodies, charity groups/organisations, single-issue campaign groups, and Community Councils and

other local groups with an interest in transport.

6. SEA Consultation Requirements

The SEA consultation is an integral part of the plan-making process. Consultation Authorities and the public are consulted in ways and at times which give them an early and effective opportunity within appropriate timeframes to express their opinions on the draft STPR2 Technical Report and SEA. The consultation requirements for plans such as the STPR2 (based on ODPM, 2005) are as follows:

▪ Screening and Scoping - Consult Consultation Authorities (NatureScot, Historic Environment Scotland, Scottish Environmental Protection Agency) (completed);
▪ Environmental Report and draft plan or programme - Consult Consultation Authorities and public. Normally this is one web-based consultation (SEA Gateway), for a 12-week period (completed);
▪ During preparation of plan or programme - Take account of Environmental Report and opinions expressed (completed);
▪ Adopted plan or programme: statement and measures concerning monitoring - Issue to Consultation Authorities and public for information (to be published in 2023).

6.1. Feedback from SEA Consultation Authorities

The SEA has been developed to incorporate the feedback from the three statutory Consultation Authorities in Scotland:

▪ Scottish Environment Protection Agency (SEPA);
▪ NatureScot;
▪ Historic Environment Scotland (HES).

The role of the Consultation Authorities within SEA is to bring their individual environmental expertise to the assessment process. This can help to ensure that the future consultation process undertaken by a Responsible Authority (in this case Transport Scotland) is more robust. This in turn means that the public can gain a better understanding of the likely effect of a plan on the environment and meaningfully contribute to the plan's preparation process by offering an informed view (Scottish Government, 2013).

The Consultation Authorities have provided feedback at various workshops throughout the project (see **Section 6.2**) and on the SEA Scoping Report (Jacobs AECOM, 2019), Progress Report (Jacobs AECOM, 2021a) and Draft Environmental Report (Jacobs AECOM, 2022d). The full SEA response to the feedback from the Consultation Authorities is provided in **Appendix E (Consultation Feedback).**

6.1.1. SEA Scoping Report Feedback

A Scoping Report was issued to the Consultation Authorities between December 2019 and February 2020 for comment. Feedback was sought on whether the baseline and policy information presented was comprehensive and the proposed methodology appropriate. In their responses (HES, 2020; SEPA 2020 and SNH 2020) The three statutory Consultation Authorities were content with the approach but provided further detail on additional baseline and policy, which have since been updated and are presented in this Final Environmental Report (**Appendices B, C and D**). Specific comments were made on the assessment objectives (hereafter referred to as SEA objectives) and these were taken on board when finalising the assessment framework. It was highlighted that any reasonable

alternatives identified during the preparation of the plan should be assessed as part of the SEA process and the findings of the assessment should inform the choice of the preferred transport interventions.

6.1.2. SEA Progress Report Feedback

An STPR2 SEA Progress Report was issued to the Consultation Authorities between February and April 2021. This report provided a summary of the STPR2 and SEA work undertaken to date. It also included an update to the proposed SEA assessment methodology and signposted the next phase of assessment and opportunities for input into the final STPR2 Recommendations and Final SEA Environmental Report. Consultation feedback was received from NatureScot and HES in March 2021 (HES, 2021a; NatureScot 2021).

NatureScot supported the publication of the Progress Report as it was considered helpful due to the lengthy process of the STPR2 and the impacts of the COVID-19 pandemic.

The plan to embed natural capital principles into appraisal mapping requirements, as well as placing a stronger focus on place and placemaking, was also supported by NatureScot. They believed that it would be useful for the SEA process to address areas for embedding nature-based solutions for all interventions. NatureScot recommended that the three-point scoring system should be replaced by the seven-point system described in **Section 0** of this report.

NatureScot also welcomed the mitigation and enhancement measures provided in the SEA Progress Report. However, they requested that the SEA should make specific reference to opportunities which would deliver Positive Effects for Biodiversity and nature-based solutions.

HES submitted a response on 30 March 2021 to the Phase 1 Recommendations for the STPR2 and updates on the SEA issued on the 04 February 2021. The following text provides a summary of the main points.

In relation to the STPR2 update and Phase 1 Recommendations, HES agreed with the general phasing approach for the STPR2 and the general themes and transport investment priorities. However, HES commented that that the implications to the historic environment in Phase 1 do not encompass the full potential range of impacts, particularly in relation to:

- Enhancing Major Rail Stations (now included as Recommendation 43 – Major Station Masterplans);
- Infrastructure to provide access for all at rail stations (Recommendation 19);
- Delivery of Rail Decarbonisation Programme (Phase 1) (Recommendation 25);
- Infrastructure to encourage rail freight

HES are engaging with stakeholders in attempt to look at design options to help improve access at historic stations. They also seek to continue collaboration to ensure the interventions are implemented in a way which minimises impact to historic assets and HES wish to be involved at a strategic stage.

In response to the SEA Progress Report, HES discussed how they were unable to comment on the effectiveness of the assessment process due to lack of detail of the high-level findings presented to them. The summaries of the potential interactions of the interventions with the SEA objectives were supported by HES, however, due to a lack of detail, further comments could not be provided. HES mention how the approach lacks in recognising the complexity of environmental implications for the historic environment across several of the interventions. Some examples of potentially significant effects which

the summaries failed to include are the implications of access work and electrification.

HES recommended that the proposed matrix approach for the preliminary appraisal should recognise that proposed interventions such as major rail station enhancement may contribute positively and negatively to the SEA objectives. The scoring system for the detailed appraisal stage should therefore be flexible enough to allow the scoring of positive and negative effects.

SEPA were unable to provide feedback to the SEA Progress Report due to a cyber-attack in December 2020 that affected SEPA's systems for several months.

6.1.3. SEA Draft Environmental Report Feedback

The Draft Environmental Report (Jacobs AECOM, 2022d) was consulted on alongside the STPR2 Draft Technical Report (Jacobs AECOM, 2022b) for 12 weeks. The feedback received was used to inform and finalise this final version of the Environmental Report and the SEA Post Adoption Statement.

HES provided comments on the Draft Environmental Report (Jacobs AECOM, 2022d) and had no comments on the baseline data, mapping or PPS Review. HES noted that most recommendations included a very high level of detail and therefore the environmental assessment reflected this level of detail. However, HES requested that, where recommendations were put forward for specific assets such as railway stations, the SEA should refer to environmental receptors in the vicinity of these assets to help inform the assessment. In response to this feedback, the narrative that accompanies the assessment of the 45 recommendations in the Detailed ASTs and Environmental Report **Appendix F: Assessment Matrices** has been updated to refer to specific environmental and cultural heritage receptors where relevant. HES also recommended that instead of the uncertain scores in the SEA assessment, there would be a benefit in recording many of these as positive or negative scores and HES listed the benefits that this approach would have. The SEA scoring of the 45 recommendations has subsequently been updated to either positive or negative scores and the accompanying narrative has also been updated accordingly. Finally, HES commented on a specific heritage monitoring regime that may not be useful to include in the SEA. References to this monitoring regime have been removed.

NatureScot also provided comments on the Draft Environmental Report (Jacobs AECOM, 2022d). Their consultation response requested the inclusion of additional information about the links between biodiversity and other SEA topics. In response, **Appendix C: National Baseline** of this Final Environmental Report now includes additional text regarding the importance of the relationships between Climate, Biodiversity, Soils and Landscape in the respective topic sections of the appendix and the Interrelationships sections. NatureScot requested that additional detail should be added to the Environmental Report (Jacobs AECOM, 2022d) relating to mitigation and enhancement measures for biodiversity, soil and landscape character and monitoring measures for climatic factors, air quality, population and human health, material assets, biodiversity and landscape. The suggested changes were added to the mitigation (**Chapter 9**) of this version of the Environmental Report and all feedback relating to monitoring will be considered in the monitoring framework to be included in the SEA Post Adoption Statement. As requested by NatureScot, reference to the Scottish Biodiversity Strategy has also been added to **Appendix B (Plans, Programmes and Strategies).**

Additional consultation feedback relating to the SEA was also received via the STPR2 consultation questionnaire responses. This consultation feedback did not require significant changes to the Draft Environmental Report (Jacobs AECOM, 2022d). However, various clarifications relating to each of these responses have been added to **Appendix E (Consultation Feedback).** In particular, various cross-references have been added to signpost where information can be found in either the STPR2 technical reports or the SEA and Impact Assessment reports and appendices.

6.2. SEA Workshops

Ten national workshops were held throughout August and September 2019, with an Environment-Specific Workshop held on 22 August 2019. These workshops built on existing relationships established for the NTS2 Review but were tailored to ensure that attendees were the best fit for the purposes of the STPR2. The workshops provided an opportunity to identify any data gaps and understand work being undertaken by a wide range of organisations. The National Environment Workshop was attended by various national bodies in Scotland whose remit includes environmental issues, including:

- The SEA Consultation Authorities (SEPA, NatureScot, HES);
- NTS2 team;
- Crown Estate;
- Marine Scotland;
- Architecture and Design Scotland;
- Crofters Commission.

Feedback received from these bodies has been incorporated into the SEA methodology (see **Chapter 7: The Approach to the Assessment)** through an expanded discussion of 'problems' in the SEA baseline (see **Chapter 4 (Baseline Summary)** of this report) and improved description of 'opportunities', which are provided in the mitigation and enhancement included in **Chapter 9 (Strategic Mitigation and Enhancement)** of this report.

Other national-level workshops also produced useful environment-related information to inform the SEA. The most relevant workshops with useful outputs for the SEA were those dedicated to active travel and EqIA. The active travel workshop identified:

- Data on modal share statistics, physical activity, health inequalities and safety to consider in the SEA baseline data under the 'Population and Human Health' topic;
- Funding mechanisms that could be considered in the STPR2 enhancement recommendations at this Final Environmental Report stage.

The EqIA workshop identified:

- Data on socio-economic inequalities in relation to CO_2 emissions;
- Socio-economic inequalities in relation to active travel;
- Opportunities that have been considered in the STPR2 enhancement recommendations are provided in the EqIA report (Jacobs AECOM 2022a).

A second workshop with the Consultation Authorities was held in September 2019 to refine the SEA methodology (see **Chapter 7: The Approach to the Assessment)**. Feedback from the Consultation Authorities on these was incorporated into the SEA objectives presented in **Section 0** of this report.

During the course of the STPR2, there has been extensive stakeholder and public

engagement to identify problems and opportunities around the country. Feedback from all of the regional and national workshops was reviewed to identify environmental issues and opportunities which would be pertinent to the SEA.

These workshops were followed up with a similar number of regional sessions in late 2019/early 2020 to explore potential options. A comprehensive school engagement programme with over 600 pupils from across Scotland also resulted in a range of options being identified. In parallel with these general sessions, a number of more targeted national workshops were held in August 2019, focusing on particular modes or sectors of the community. An online national public survey also took place in summer 2019 to identify problems and opportunities, for which in excess of 3,000 responses were received.

An HRA-focused workshop was held with NatureScot in November 2020, to discuss the proposed approach to the HRA.

An SEA and EqIA webinar was also held for the Regional Transport Working Groups on 12th May 2021 to provide an update on Impact Assessment progress and approach to the preliminary and detailed appraisals.

Further workshops were held with the SEA Consultation Authorities in November and December 2021 to provide an update on the STPR2 and SEA progress.

The final engagement activities relating to the SEA were aimed at summarising the SEA process, describing the key findings and directing consultees to the consultation on the Draft Environmental Report (Jacobs AECOM, 2022d), which finished on 15 April 2022. These engagement activities comprised:

- A focused workshop with the SEA Consultation Authorities held on 10 March 2022;
- A combined SEA and EqIA stakeholder information live webinar, held on 28 March 2022.
- The full consultation feedback from these engagement activities and on the Draft Environmental Report (Jacobs AECOM, 2022d) and the SEA response to this feedback is provided in **Appendix E (Consultation Feedback).**

Relevant feedback received from all these engagement activities has been incorporated into the SEA, primarily through an expanded discussion of constraints and opportunities in the SEA policy review and baseline, provided in **Appendix B (Plans, Programmes and Strategies), Appendix C (National Baseline) and Appendix D Regional Environmental Summaries)** of this Final Environmental Report.

7. The Approach to the Assessment

7.1. Assessment Overview

The SEA process provides robust inputs to consider in the 'Environment' criterion within wider STAG appraisal. It is considered that this is the best way to ensure SEA influence throughout the development of the STPR2 and has also facilitated the identification and assessment of reasonable alternatives at each stage of the STAG process.

The SEA process and programme aligns with the EQIA (and related assessments, described in **Section 1.3**) and in some cases matches the approach used for both the NTS2 SEA and the NPF4 SEA to ensure consistency. For example, the NPF4 also produced an Integrated Impact Assessment progress update in November 2020.

Due to the high importance of the climate change topic, the importance of greenhouse gas emissions in the transport sector and the need to achieve net zero targets (as set out in **Section 3.3**), the specific SEA approach for carbon is also discussed in this chapter.

7.2. Scope of Assessment

Following the baseline and PPS review, it was determined that there could be positive and/ or negative effects on all of the SEA topics. As a result, they were all scoped into the assessment. The SEA topics and their justification for inclusion in the scope of the SEA is shown in Table 2**.** This table was presented in the Scoping Report (Jacobs AECOM, 2019) and reflects comments made through the scoping consultation responses provided in **Appendix E (Consultation Feedback).**

Table 2: Scoping of SEA Topics

TOPIC	SCOPED IN/OUT	COMMENT
Air Quality	In	As the STPR2 is transport-focused, it has the potential to cause negative effects on air quality through transport emissions. However, it also has the opportunity to deliver significant positive effects with reduced emissions through encouraging modal shift to more sustainable, low-carbon modes of transport.
Climatic Factors	In	As the STPR2 is transport-focused it has the potential to influence the future levels of greenhouse gas emissions associated with Scotland's transport network. It also has the potential to improve the resilience of the network to the impacts of climate change.
Population and Human Health	In	The STPR2 has the opportunity to deliver significant positive effects on physical health through policies related to active travel and a shift to more sustainable modes of transport. The STPR2 also has the opportunity to consider and respond to demographic changes and reduce social inequalities.

TOPIC	SCOPED IN/OUT	COMMENT
Cultural Heritage	In	The STPR2 has the potential to have both significant positive and negative effects on designated or undesignated heritage assets – for example, through the implementation of physical transport interventions in proximity to them. It also has the potential to have positive effects on improving access to and understanding of the historic environment.
Material Assets	In	The STPR2 has potential to have significant positive effects on existing transport infrastructure and green infrastructure through policies that reduce the need to travel, encourage a modal shift to more sustainable modes of transport or otherwise influence the environmental impacts of the transport network. Any physical interventions on the ground will also have implications for mineral, aggregate and fossil fuel resources.
Landscape	In	The STPR2 has the potential to have both significant positive and negative effects on designated or undesignated landscapes, for example through the implementation of physical transport interventions in proximity to them.
Water	In	The STPR2 has potential to have a positive effect on resilience/ flood protection measures for existing and proposed transport infrastructure, for example through interventions that improve the use of Sustainable Drainage Systems on the transport network or increase green infrastructure that could aid pollutant filtration.
Biodiversity, Flora & Fauna	In	The STPR2 has the potential to have both significant positive and negative effects on designated or undesignated biodiversity sites. For example, through the implementation of physical transport interventions in proximity to them.

TOPIC	SCOPED IN/OUT	COMMENT
Soil	In	The STPR2 has potential to have a positive effect on soil resources for existing and proposed transport infrastructure, for example through interventions that improve the use of Sustainable Drainage Systems on the transport network or increase green infrastructure that could aid pollutant filtration. The STPR2 interventions could also negatively affect Scotland's soil resources, for example causing compaction, sealing or erosion. Soil also interacts with various other aspects of the environment – in particular, it supports biodiversity.
		It could also potentially promote the use of brownfield vs. greenfield sites for new transport interventions and therefore influence the environmental, agricultural and soil carbon storage implications of the interventions.

7.3. SEA Objectives and Assessment Guide Questions

The SEA assessments have been carried out using a set of SEA objectives and assessment criteria, that cover each of the environmental topics. These form the assessment framework which has been used to determine the likely significant effects of the STPR2. The SEA objectives and assessment criteria identified in Table 3 have been developed from:

- A comprehensive review of the baseline issues and policy requirements;
- A gap analysis review of the STAG criteria;
- Recent feedback received from the SEA Consultation Authorities (NatureScot, SEPA and HES) – **see Appendix E (Consultation Feedback).**

Table 3 below provides an overview of the SEA objectives and guide questions used to determine the likely significant effects of the STPR2 according to each SEA topic, and also lists the overarching data sources used to aid these assessments.

Table 3: SEA Objectives and Assessment Criteria

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
Climatic Factors	Reduce emissions from Scotland's transport sector by reducing the need to travel and encouraging modal shift and help meet Scotland's wider targets to reduce greenhouse gas emissions.	Contribute to achievement of Scotland CO_2 emissions reduction target of net zero by 2045? Commit to a monitoring programme for reviewing international low carbon best practice and emerging technologies? Promote and support the best use of clean fuels/technologies (for example, strategic planning of EV charging points or hydrogen refuelling considerations)? Promote and facilitate reduction of car kilometres and modal shift to more sustainable transport options? Promote behavioural change within workplaces, including car sharing, flexible work patterns and supporting opportunities for home working? Facilitate ongoing co-ordination with spatial development planners to ensure communities are close to key services and places of employment, to the maximum extent possible?	Transport Scotland modal share data, workplace travel plans and similar data

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
	Adapt the transport network to the predicted effects of climate change.	Help adapt the transport network to direct and indirect risks associated with climate change projections for Scotland? Prioritise adaptation of transport infrastructure in locations that are more vulnerable to the projected impacts of climate change, including coastal and isolated locations? Prioritise adaptation of transport connections to critical infrastructure, including transport interchanges, hospitals, power, fuel supply and digital infrastructure? Maintain or improve access to and within disadvantaged areas or isolated communities at risk from climate change impacts for example, flooding, slope instability?	UK Climate Change Risk Assessment 2017 Evidence Report: https://adaptationscotland.org/why-adapt/legislation/uk-climate-change-risk-assessment. SNH 'Dynamic Coast' guidance: https://gateway.snh.gov.uk/natural-spaces/dataset.jsp?dsid=NCCA. Indices of Multiple Deprivation: https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/ Transport Scotland's 'Fitting Landscapes' policy (Aim 4: Build in adaptability to change): https://www.transport.gov.scot/media/33663/j279083.pdf NTS2 Second Delivery Plan: https://www.transport.gov.scot/publication/national-transport-strategy-nts2-second-delivery-plan-2022-2023/

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
Air Quality	Reduce all forms of transport-related air pollution and improve air quality throughout Scotland.	Encourage and facilitate the use of active travel, particularly for short journeys? Help to reduce traffic congestion? Limit the more polluting vehicles in sensitive areas, for example, AQMAs? Improve or at least maintain air quality in disadvantaged areas? Help to limit polluting traffic growth? Reduce emissions of key air pollutants (NOx, particulates, SO_2) from all forms of transport, but focusing on the most polluting vehicles and areas of known poor air quality, for example, diesel emissions in urban areas? Promote green infrastructure at all spatial scales, to help remove pollutants from the air?	AQMAs – location and reasons for designation. Other areas known to have poor air quality but as yet undesignated Areas mapped for the Indices of Multiple Deprivation
Population and Human Health	Improve quality of life and human health and increase sustainable	Encourage sustainable access to the natural and historic environment? Reduce and avoid community severance or other detriment to existing active travel routes, including maintaining or improving pedestrian	Mapping of open spaces Mapping of significant walking and cycling routes

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION...?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
	access to essential services, employment and the natural environment.	crossings? Ensure safe and sustainable access for all users to essential services and employment? Increase and enhance provision of non-motorised transport, especially walking and cycling links and facilities? Promote linking up existing or planned new communities through the active travel network? Plan for future capacity of active travel network, taking into account demographic or other changes? Provide increasing transport choice that meet the needs of the population? Allow for greater journey time reliability? Support changing demographics by providing appropriate transport facilities to meet their needs? Improve accessibility to open spaces and the path network for physical recreational purposes?	

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
		Improve access to healthcare facilities?	
	Reduce noise and vibration associated with the transport network.	Reduce noise and vibration on the transport network particularly at sensitive locations?	
	Promote, invest in, build and maintain infrastructure to support the development of high-quality places.	Support the development of places that feel safe to all users? Prioritise pedestrians in the public realm? Support the creation and maintenance of an attractive public realm, with a focus on the contribution of transport infrastructure?	
	Improve safety on the transport network.	Reduce the likelihood of transport-related road accidents and casualties?	

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
Material Assets	Promote and improve the sustainable use of the transport network.	Support improvements to transport technology, interchanges and timetabling? Plan for future travel arrangements where journeys are made by a number of different modes (for example, electric vehicle for most of the journey, which is then parked and left to charge at a hub, cycle and walking assets, such as connected off-road paths, bike/e-bike share infrastructure)? Plan for future capacity of public transport, taking demographic and other societal changes into account? Promote sustainable use and management of existing infrastructure, for example, water, heat, energy or flood protection infrastructure?	Mapping of existing transport interchanges
	Reduce use of natural resources.	Ensure transport infrastructure and innovation delivers/contributes to the circular economy?	

Water Environment	Protect, maintain and improve the quality of water bodies and wetlands that could be directly or indirectly affected by transport infrastructure (with respect to Water Framework Directive targets) and protect against the risk of flooding.	Support and enhance the network of blue and green infrastructure?	Mapping of green and blue infrastructure
		Ensure transport network resilience to climate change and flood risk?	Maps showing the WFD status of water bodies adjacent to transport infrastructure
		Constrain any water bodies from achievement of Good Ecological Status/Good Ecological Potential under the Water Framework Directive (WFD)?	
		Increase the risk of diffuse pollution from current or increasing traffic volumes?	
		Improve the quality of surface water draining from the transport network (for example, reducing salt spreading in winter, expanded or improved Sustainable Drainage System network)?	
		Increase development that physically impacts on a waterbody, watercourse or the coastline?	
		Promote removal of artificial transport-related structures in water bodies (for example, bridge piers, concrete slipways)?	
		Promote natural flood management techniques?	
Biodiversity	Protect, maintain and	Protect and/ or enhance the integrity of any site of biodiversity or geological	Mapping of designated biodiversity and geological sites
			Mapping of green and blue infrastructure

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
	enhance biodiversity and ecosystem services, avoiding damage to or loss of designated and undesignated wildlife or geological sites.	value that has been designated at international, national or local levels (for example, land take, fragmentation or indirect degradation)? Protect and or enhance the integrity of existing habitat and green/blue networks and other wildlife corridors (including the ecological connections between separate Natura 2000 sites and 'landscape-scale' corridors)? Maintain or upgrade transport network to remove barriers to wildlife movement? Reduce the risk of spreading invasive non-native species? Provide opportunities to provide positive effects for biodiversity for example, habitat creation or enhancement? Align with the strategic goals of the Aichi Biodiversity Targets and 2020 outcomes for Scotland?	Aichi Biodiversity Targets and 2020 outcomes for Scotland: https://www.nature.scot/scotlands-biodiversity-progress-2020-aichi-targets-conserving-genetic-diversity-development-national
Soil	Safeguard and improve soil quality in Scotland,	Avoid and minimise disturbance of rare soils, high-carbon (including peat) and wetland soils and productive agricultural land?	SNH peat map classification Mapping of significant brownfield and/or contaminated sites

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
	particularly high value agricultural land and carbon-rich soil.	Avoid indirect impacts on off-site peat and wetland soils to maintain natural processes of hydrological and ecological regimes? Avoid or minimise land take of greenfield sites? Reduce risk of soil sealing, contamination or erosion on a significant scale?	Maps of soil erosion risk (partial coverage of the country) available on Scotland's soils website Land capability for agriculture maps (partial coverage) Carbon and peatland map 2016
Cultural Heritage	Protect and enhance (where appropriate) historic and archaeological sites and other culturally and historically important features, landscapes and their settings.	Avoid significant effects (direct or indirect) on designated or undesignated archaeological sites, as well as other culturally and historically important features, including Conservation Areas, inventory sites for Battlefields and Gardens and Designed Landscapes? Protect key views to and from heritage assets? Improve access to the historic environment?	Mapping of designated heritage sites or known areas of historic significance or archaeological potential

SEA TOPIC	SEA OBJECTIVE	SEA ASSESSMENT GUIDE QUESTIONS DOES THE STPR2 OPTION…?	OVERARCHING DATA SOURCES TO AID ASSESSMENT (OTHER THAN THOSE IDENTIFIED IN THE STPR2)
Landscape and Visual Amenity	Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape.	Align with the four key aims of Transport Scotland's 'Fitting Landscapes' policy (1. Ensure high quality of design and place; 2. Enhance and protect natural heritage; 3. Use resources wisely; 4. Build in adaptability to change)? Avoid significant effects (direct or indirect) on National, Regional and Local Landscape designations and mitigate where appropriate? Protect wild land areas?	Transport Scotland's 'Fitting Landscapes' policy Mapping of designated landscapes, including National Parks and National Scenic Areas https://www.nature.scot/wild-land-area-descriptions SNH Landscape Character Assessment: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

7.4. Consideration of Reasonable Alternatives

The Act requires the Environmental Report to identify and assess any reasonable alternatives to the plan or programme, taking into account its objectives and geographical scope. According to Scottish Government (2013) guidance, alternatives must be realistic and are likely to emerge from the plan-making process.

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 STPR2 are not considered "reasonable alternatives" to delivering the main objectives of the strategy. Instead, reasonable alternatives have been considered at the key (STAG) stages of the STPR2, particularly at the following stages:

▪ Preliminary Appraisal – Consideration of impacts of grouped options (Groupings) against alternative appraisal scenarios;
▪ Detailed Appraisal – consideration of alternative Packages of Groupings/interventions

At the Preliminary Appraisal stage, reasonable alternatives were primarily focused on refinements to policy/ wording, transport options, caveats and monitoring controls, based on the SEA Objectives and their underlying assessment guide questions. At this stage, many draft options that would be considered to be reasonable alternatives were removed from further consideration as they did not score well against the TPOs or the SEA Objectives.

At the Detailed Appraisal stage, the principal consideration of reasonable alternatives has been in the assessment of mode-based Packages of transport interventions against alternative appraisal scenarios. These are based on the two Transport Behaviour Scenarios described in Section 2.7 of this report. Further detail on these Transport Behaviour Scenarios is also provided in the STPR2 Final Report.

Appendix F (Assessment Matrices) of this Final Environmental Report shows the alternative interventions considered and how the Transport Behaviour Scenarios were assessed in the matrix, using the SEA objectives and their underlying guide questions, as listed in **Section 0.**

7.5. Stages of Assessment

It is recognised that the environmental topics of STAG do not fully cover the full range of SEA topics and sub-topics, as described in **Section 7.2** and **Section 0**. However, the SEA, EqIA and other supporting assessments will continue to align with each STAG stage, as this ensures the SEA is able to maximise its influence in the overall assessment process. Table 4 sets out how the SEA process aligns with STAG's four-stage assessment process, as described in **Section 2.3**.

Following each stage of assessment, any potentially negative effects identified have been discussed with the project team to consider reasonable alternatives, effective mitigation and enhancement recommendations. The final 45 recommendations include refinements based on the SEA assessment of the long list of options and Groupings at the Preliminary Appraisal stage and Packages of Groupings at the Detailed Appraisal stage.

Cumulative effects have been considered at both intra-plan (the impact of a combination of the STPR2 elements) and the inter-plan level (the impact of the plan alongside other plans and policies), as described in **Section 7.8.**

Following the SEA assessments, relevant findings and recommendations are recorded in summary form for inclusion in **Chapter 8 (Assessment Results)** of this report, with assessment matrices provided in **Appendix F (Assessment Matrices).**

Table 4: SEA inputs at each stage of STAG

STAG	SEA INPUT
Initial Appraisal: Case for Change (Early 2020 to February 2021)	While the environment is not traditionally considered in any depth at this stage, the SEA team provided sufficient information on the baseline national and regional environmental constraints and environmental policy to influence the development of both national and regionally specific TPOs. This ensured that the TPOs were compatible with the SEA objectives.
	The TPOs developed for the three STPR2 Advanced Studies: Borders, North East Scotland and South West Scotland were also reviewed and checked against the SEA objectives to ensure compatibility.
	This approach was reinforced by the Scottish Government's declared Climate Emergency in 2019, and the contribution from transport to national emissions, highlighting the importance of embedding environmental considerations at this stage.
	This Initial Appraisal: Case for Change took place alongside the SEA Scoping Stage.
	SEA input and high-level environmental commentary of each transport 'option' was provided during the initial sift in August 2020, to highlight any significant environmental constraints or opportunities. Key environmental constraints and opportunities, including mapping, were also provided in discrete sections of the regional Case for Change reports published in February 2021 (Transport Scotland, 2021a).

STAG	SEA INPUT
Preliminary Appraisal (May to October 2021)	During Preliminary Appraisal, a matrix-based assessment was undertaken using the SEA objectives/assessment questions to guide the assessment of the long list of the STPR2 draft transport interventions. This long list included the options from the three Advanced Studies. The matrix utilised a seven-point scoring system, as presented in **Section 7.6,** to align with SEA requirements. The scoring scale used at Preliminary Appraisal was a departure from STAG, but consistent with the assessment scale applied as part of the Impact Assessments. This is standard practice for scoring Options/Groupings against SEA objectives and scores were applied ranging from the Groupings being likely to contribute significantly to achieving an objective to it having a significant long-term negative effect on the objective. The assessment considered likely significant effects, mitigation, assumptions and uncertainties where relevant. A narrative was provided alongside the assessment score for each Grouping. This provided the rationale for the scoring and covered each relevant SEA topic. Tables were provided to show any differences in the assessment for each of the 11 STPR2 regions and a national summary was provided for each SEA topic. The SEA objectives and assessment of mode-based Groupings are provided in full in **Appendix F (Assessment Matrices)**.

STAG	SEA INPUT
Detailed Appraisal (Late 2021)	The SEA has undertaken the environmental component of the STAG assessment with a more detailed assessment against aligned STAG/SEA topics using SEA objectives/assessment questions to guide assessment.
	The assessment at the Detailed Appraisal stage used a seven-point scoring system as defined by STAG but also meeting SEA requirements. The scale ranged from major positive (+3) to major negative (-3) impacts, in line with STAG guidance.
	The Detailed Appraisal has focused on Packages of interventions and the final STPR2 'recommendations.' The Detailed Appraisal is provided in **Appendix F (Assessment Matrices)** and is summarised in **Chapter 8 (Assessment Results)** of this report.
	At the Detailed Appraisal stage, 45 recommendation ASTs, eleven regional package ASTs and one package of national interventions (representing all of the recommendations) were produced. The SEA team has responded to consultation feedback on the 45 STPR2 recommendations that related to the SEA topics or wider environmental considerations. This included making updates to the SEA scoring and/or narrative in each of the recommendation ASTs, the eleven regional ASTs and the national AST.
	Mitigation measures have been identified, and the assessment considers indirect, direct and cumulative effects. Enhancement opportunities are also described. Mitigation and enhancement measures are provided in **Chapter 9 (Strategic Mitigation and Enhancement)** of this report.
Post Appraisal: Monitoring and Evaluation (Early-2023)	The SEA will publish a Post Adoption Statement in early-2023.This will include the finalised, detailed environmental Monitoring Framework. This will take account of the consultation comments and provide a narrative as to how the SEA has influenced the STPR2.

7.6. Matrix Approach

The assessment for the SEA has used a matrix-based approach, with a qualitative scoring system to identify likely significant effects on the SEA objectives. The seven-point scoring system used for the assessment of environmental effects in the preliminary and detailed appraisal stages is described in Table 5. This approach has several advantages, including the systematic recording of potential effects and their significance, with a narrative accompanying each score to explain the rationale for scoring and the predicted effects. The term 'option' has been used in Table 5 for the sake of brevity, but the scoring method also applied to the assessment of Groupings.

Table 5: SEA scoring system for each stage of the STPR2

SCOPE	DESCRIPTIONS	SYMBOL
Significant Positive Effect	The proposed option contributes significantly to the achievement of the SEA objective.	++
Minor Positive Effect	The proposed option contributes to the achievement of the SEA objective but not significantly.	+
Neutral Effect	The proposed option is related to but does not have any effect on the achievement of the SEA objective	0
Minor Negative Effect	The proposed option detracts from the achievement of the SEA objective but not significantly.	-
Significant Negative Effect	The proposed option detracts significantly from the achievement of the objective. Mitigation is therefore required.	--
Uncertain Effect	The proposed option has an uncertain relationship to the SEA objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?
No or negligible relationship	There is no clear relationship between the proposed option and the achievement of the SEA objective or the relationship is negligible.	~

Following each stage of assessment, any potentially negative effects identified have been discussed with the project team to consider reasonable alternatives, effective mitigation and enhancement recommendations. Recommendations respond not only to direct effects but also indirect, secondary and cumulative effects.

7.7. GIS Mapping

ProjectMapper, a Geographic Information Systems (GIS) tool developed by Jacobs, is an interactive mapping tool which shows environmental constraints, such as designated and undesignated sites. The data which fed into the map have been gathered from publicly available sources and through consulting with the Consultation Authorities and other consultees. ProjectMapper has been used to determine where environmental constraints were present in relation to the STPR2 interventions and this has informed the assessment provided in **Appendix F (Assessment Matrices)**.

7.8. Cumulative Effects Assessment

Annex I of the SEA Directive requires that the assessment of effects include secondary, cumulative, and synergistic effects (defined in the Glossary at the start of this report). Scottish SEA Guidance (2013) states that 'Cumulative effects can be considered in terms of synergistic effects, additive and secondary effects.' For the purposes of this SEA, the term 'cumulative effects' also encompasses synergistic effects.

As stated in the UK Government SEA Guidance, 'Cumulative effects arise, for instance, where several developments each have insignificant effects but together have a significant effect; or where several individual effects of the plan (for example, noise, dust and visual) have a combined effect.' (Office of the Deputy Prime Minister 2005).

Cumulative effects have been considered at both intra-plan (the impact of a combination of the STPR2 interventions) and the inter-plan (the impact of the plan alongside other plans and policies). The inter-plan assessment has been undertaken towards the end of the assessment, when the final draft set of the STPR2 recommendations was available to consider alongside relevant national level policy/strategy, including the draft NPF4 and the Climate Change Plan Update.

The cumulative assessment across all SEA topics used the following assessment approach to provide an average (modal) score for each package of interventions assessed:

- If more uncertain (?) than + and – then the average score would be + or -, whichever has the next highest count after ?
- If more neutral (0) than + and – then the average score would be 0
- If more + than – and ? then the average score would be +
- If more – than + and ? then the average score would be -
- If + or – is equal to ? or 0, then the average score would be + or -, as applicable.
- If more negligible (~) than all other scores, then the average score would be whichever score has the next highest number count after ~
- If there are the same number of + and – with the highest equal count this would represent an exception and have a +/- rating

The assessment matrices showing cumulative effects are provided in **Appendix F (Assessment Matrices).** This approach to deriving average scores has also been used for the final compatibility check of the STPR2 recommendations with the SEA objectives – see **Section 8.4**.

To align with the scoring used for the detailed appraisal of the 45 recommendations undertaken by the wider STPR2 team, it was agreed that the 'uncertain' category was no longer required for the cumulative effects assessment in this Final Environmental Report. Although there are still many uncertainties about the environmental effects of the STPR2, these uncertainties are described in the narrative associated with the scoring of each of the recommendations.

The 'no relationship' category was combined with the 'neutral' category, such that where there was considered to be no relationship at detailed appraisal, then this was scored as neutral.

7.9. Climatic Factors and Carbon Assessment Approach

At a strategic level, assessing the carbon impact of multi-modal transport interventions would take the form of a qualitative assessment as opposed to quantitative calculations, which would not be accurate at the strategic planning stage. To carry out a quantitative assessment on an intervention would require detailed information on resource requirements for construction materials, earthwork volumes, construction methods and expected levels of construction traffic. This type of information does not tend to be available until any such intervention is at the preferred option stage, where designers are able to provide the level of detail that would feed into a carbon assessment tool. Due to the long lead in time of projects and the constantly evolving landscape, information can quickly become out of date, particularly now with the push for decarbonisation. With regard to the STPR2, this makes conducting assessments for a project that could be 20 years away from commencement unreliable and supports the approach to utilise a qualitative method.

Figure 5 shows that the accuracy of carbon assessment is lowest at the strategic planning stage while the ability to influence carbon reduction is highest.
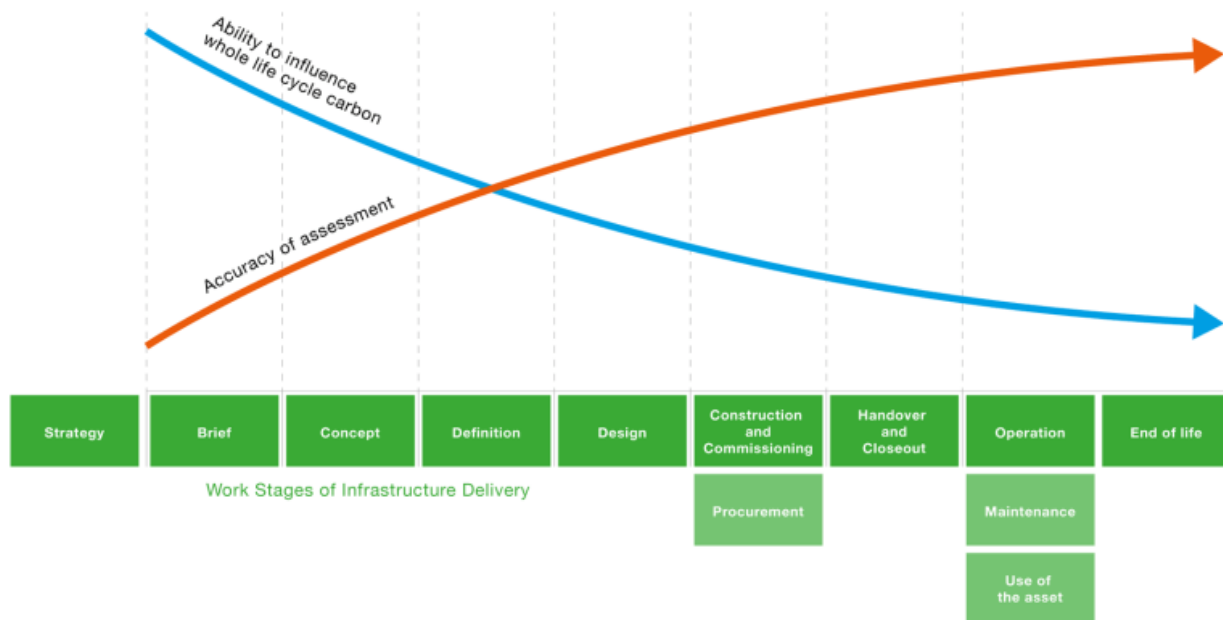
Figure 5: Timing of carbon assessment and ability to influence (The Fifth Estate, 2020)

The assessment of transport interventions for the Climatic Factors topic follows the same objective-led approach as for the other SEA topics, as described in **Section 0**. However, detailed mitigation and enhancement measures in relation to Climatic Factors are provided in **Chapter 9 (Strategic Mitigation and Enhancement)**.

Carbon modelling has also been undertaken for the STPR2 in relation to different transport modes, as described in Section 7.10.

7.10. Carbon Modelling

In 2021, the Scottish Government commissioned Element Energy (2021) to model the policy scenarios needed to achieve the emissions reductions necessary from the transport

sector to meet the net-zero by 2045 target, which is included in the SEA Objective 1 criteria for reducing greenhouse gases (see Table 3). Element Energy modelled four policy scenarios. Of these, only Policy Scenario 3 (PS3) achieved the net-zero by 2045 target. PS3 includes:

- Rapid introduction of low and zero-emission technologies;
- Reduction in vehicle kilometres through modal shift to public and active transport;
- Reduced demand through trip shortening and trip avoidance.

The policy outcomes within the Element Energy (2021) report are reflected in the STPR2 both in the high and low Transport Behaviour Scenarios considered and among the Groupings taken forward to the Detailed Appraisal stage. As part of the STPR2, Jacobs and AECOM were required to estimate the carbon emissions for potential future transport interventions – consistent with Element Energy's PS3. This covered buses and coaches, rail and road-based emissions generally. The forecasted change in yearly Carbon Dioxide Equivalent (CO_2e) emissions from buses and coaches and rail between 2022 and 2045 were estimated.

The steps taken to achieve CO2e emissions forecast for 2022, 2030 and 2045 involved first considering transport demand projections, before constructing six technology transition scenarios based on government net-zero targets and available information on uptake of electricity and hydrogen technology. The six technology transition scenarios are:

1) Low transition to electric, high transition to hydrogen
2) Medium transition to electric, low transition to hydrogen
3) Medium transition to electric, high transition to hydrogen
4) High transition to electric, low transition to hydrogen
5) High transition to electric, high transition to hydrogen
6) Medium transition to electric, medium transition to hydrogen

7.10.1.   *Buses and Coaches*

For buses and coaches, emissions in most technology transition scenarios significantly decrease at around 2028. The decrease in emissions is driven by a reduction in demand for diesel powered buses and coaches. Average diesel emissions for buses and coaches reach zero in 2043. The remaining emissions from the bus and coach fleet in 2045 consists mostly of Battery Electric Vehicle emissions, contributing 60 percent of emissions due to the grid failing to reach net-zero in the same year. Forty percent of emissions are contributed by Fuel Cell Electric Vehicle emissions, mostly due to upstream emissions from blue hydrogen production, in addition to a contribution from grid emissions via the production of green hydrogen.

Coach emissions decrease at a slower rate than buses, as it was assumed in all technology transition scenarios that they take longer to replace than buses. Emissions in 2045 are comparable across all scenarios, ranging from 6.1 to 8.3 ktCO$_2$e, with an average of 7.1 ktCO$_2$e. No scenarios for buses and coaches are forecast to reach net-zero by 2045.

7.10.2.   Rail

For rail, total CO_2e emissions fall at a slow rate between 2022 and 2029, before decreasing more rapidly between 2029 and 2035. The rate of emissions reduction slows from 2035 to 2045. Average yearly CO_2e emissions reduce by 40 percent between 2022 and 2030, with an 86 percent decrease between 2030 and 2045. This results in CO_2e emissions of 24,303 tonnes in 2045. Emissions do not reach zero in 2045 across any of the six technology transition scenarios. Due to the major decrease in CO_2e emissions from diesel between 2028 and 2032, emissions from electricity consumption comprise around half of total emissions in 2030, increasing until 2045. The contribution to emissions from hydrogen are zero until 2028, with a relatively minor contribution between 2028 and 2045 as hydrogen demand increases.

Diesel emissions from rail reduce to zero by 2045 across all scenarios. The total emissions from rail in 2045 are composed almost entirely of emissions from electricity consumption, due to the inability of the grid to fully decarbonize by 2045. Ten percent of total emissions come from upstream emissions released in the production of blue hydrogen.

7.10.3.   Road-based emissions

The Scottish national road transport model was used to calculate annual total emissions, and the associated economic valuations for local air quality and CO_2 damage costs. Both local and greenhouse gas pollutants were quantified and compared to the projected baseline conditions and proposed future scenarios in 2030 and 2045 to inform the evidence-base used in the update to the STPR2.

Traffic flow data for the following scenarios was used to calculate emissions wherein the 'high' and 'low' scenarios incorporate both different traffic flow data with corresponding projected fleet fuel technology profiles for each package:

- 2030 Baseline High Travel Demand (HTD) Scenario
- 2030 Do-Something HTD Scenario
- 2030 Baseline Low Travel Demand (LTD) Scenario
- 2030 Do-Something LTD Scenario
- 2045 Baseline HTD Scenario
- 2045 Do-Something HTD Scenario
- 2045 Baseline LTD Scenario
- 2045 Do-Something LTD Scenario

These data comprised annual average daily traffic (AADT), divided into car, Light Goods Vehicles (LGV), Heavy Goods Vehicles (HGV) and bus, average speed, region and road classification (urban, rural or motorway) for individual road links representing the extent of the entire road network in the Transport Model for Scotland (TMfS).

The projected fleet fuel technology profiles were provided by Element Energy (2021) and represent the different levels of adoption of alternative fuel technologies associated with the package for the High and Low Travel Demand scenarios. Therefore, no 'central' projection was appraised.

The results show that total CO_2e emissions are greatest for the HTD scenarios in 2030 (approx. 5.7 Mt/year), followed by the 2030 LTD scenarios (approx. 4.6 Mt/year). The 2045 HTD scenarios represent a substantial decrease in total emissions relative to 2030 HTD,

although this decrease is not nearly as large as the change from the 2030 LTD scenarios to 2045 LTD scenarios. In each case, there are minor decreases in emissions in the Do Something scenario compared to the baseline. For the 2030 HTD scenarios, HGVs and cars produce approximately equal majorities of the total, with LGVs contributing a smaller but still significant amount to the total, and Buses provide a minor contribution. In 2045, cars and LGVs contribute a smaller amount and proportion of the total, while HGVs and Buses contribute a greater proportion of the total.

Total CO_2e emissions for the 2030 LTD scenarios are approximately 4.2 Mt/year, falling sharply to approx. 0.4 Mt/year in the 2045 LTD scenarios. For both years, there is a small decrease in emissions in the Do-Something scenario relative to the baseline. HGVs account for approximately half of total emissions in 2030, with much of the remainder from cars, and progressively smaller contributions from LGVs and then Buses. In 2045, most of the remaining emissions are from cars, with a small contribution from LGVs, and virtually zero emissions from HGVs and Buses.

8. Assessment Results

8.1. SEA Findings

In order to assess and finalise options for assessment as potential Phase 1 measures, a proportionate approach was developed, considering options that could potentially meet the short-term requirements, whilst being guided by the overall STPR2 options list. As stated in **Chapter 1 (Introduction)**, Phase 1 was introduced in order to help expedite the development of interventions that could embed, support and extend the increase in travel by sustainable travel modes, and those that could be brought forward to support economic recovery. The assessment approach was based on STAG, adopting a multi-criteria assessment based on each option's:

- Contribution to the STPR2 Objectives (including Environmental and Equality objectives);
- Performance against the COVID-19 priorities for short-term measures;
- Performance of Deliverability criteria (feasibility, affordability and public acceptability).

Following this approach, the Phase 1 process resulted in 20 interventions being recommended, against eight themes.

A summary of the eight themes and associated interventions recommended from the Phase 1 process is set out within Table 6. Further details can be found within the STPR2 Update and Phase 1 Recommendations Report (Jacobs AECOM 2021a).

Table 6: STPR2 Phase 1 Themes and Recommendations

STPR2 PHASE 1 THEME	THEME DESCRIPTION	RECOMMENDATIONS
Supporting smart and sustainable travel across Scotland	National measures that will support active and sustainable travel choices and placemaking principles	Development and delivery of Active Freeways Expansion of 20mph zones Influencing travel choices
Creating smart and sustainable towns and villages	Packages of sustainable transport improvements to enhance attractiveness and sustainability of our towns and villages	Transport's contribution to placemaking principles in neighbourhoods Guidance and framework for delivering mobility hubs
Improving accessibility in rural and peripheral areas and for vulnerable groups	Improved public transport offering where fixed timetable services do not satisfactorily cover the needs of individuals, including consideration of demand responsive travel	Investment in Demand Responsive Transport and Mobility as a Service

STPR2 PHASE 1 THEME	THEME DESCRIPTION	RECOMMENDATIONS
Transforming Cities	Measures that will support active and sustainable travel alongside placemaking principles to help transform cities and neighbourhood centres	Reallocation of road space for active travel Enhancing facilities at major rail stations (Rail Station Redevelopment) Development of Glasgow Metro and Edinburgh Mass Transit strategies
Enhancing public transport provision	A range of measures to improve the accessibility and reliability of public transport and stimulate a sustainable recovery post COVID-19	Reallocation of road space for buses Supporting integrated journeys at ferry terminals Infrastructure to provide access for all at rail stations
Supporting transition to low-carbon transport	Measures that will increase the development and further transition of Scotland's transport fleet to low carbon	Investment in low carbon and alternative fuel transport systems Delivery of Rail Decarbonisation Programme (Phase 1)
Supporting a viable freight industry	Measures to improve conditions for the freight and haulage industry to deliver a modal shift	Strategy for improving rest and welfare facilities for hauliers Infrastructure to encourage rail freight
Enhancing safety and resilience on the strategic transport network	Package of measures on the strategic transport network focusing on improving safety and resilience	Investment in the trunk road network asset Access to Argyll and Bute (A83) Investment in ferries and ports Speed Management Plan

Since the publication of the Phase 1 Report, further work has been carried out to provide additional detail against some of the recommendations listed above, and these have been considered within the SEA findings presented in **Section 8.3.**

The SEA undertook a high-level review of the key STPR2 Phase 1 themes and recommended interventions. This was undertaken to identify whether they each align with the NTS2 and IIP and likely compatibilities / incompatibilities with the SEA objectives.

This high-level review identified that each of the current STPR2 themes and most of the interventions largely align with priorities and key themes set out within the NTS2, IIP and

the STPR2 SEA objectives.

A secondary scoping of each of the themes and interventions was undertaken to consider potential for significant environmental effects. This determined that a number of the interventions need further detail before they can be assessed. A small number of these interventions were highlighted at this stage as having potential for significant effects on the achievement of the SEA objectives. These interventions have been subject to further consideration and assessment in the SEA. It is noted that for each of these interventions, there is potential for a positive contribution to the achievement of SEA objectives for air quality, climatic factors and population and human health. However, there is uncertainty regarding the potential for some interventions to detract from SEA objectives, depending on their physical location. Some interventions will also require Environmental Impact Assessment at the project level.

8.2. Detailed Appraisal Stage Assessment

Section 8.3 summarises the Detailed Appraisal stage assessment of the final packages of interventions provided as **Appendix F (Assessment Matrices).** These are summarised for each of the SEA topics. Assessment summaries for each of the 11 STPR2 regions are provided in **Appendix D (Regional Environmental Summaries).** The regional assessment summaries are also derived from the detailed assessment provided as **Appendix F (Assessment Matrices).**

Section 8.4 summarises the compatibility assessment of the final 45 STPR2 recommendations against the SEA Objectives.

8.3. Detailed Appraisal: Cumulative effects by SEA Topic

8.3.1. Climatic factors

Overall, most of the recommendations are anticipated to result in minor positive effects on reducing greenhouse gas emissions as the interventions proposed seek to promote a modal shift to more sustainable transport options. Specifically, the rail and bus interventions proposed will also help reduce emissions from Scotland's transport sector through the decarbonisation of the rail and bus networks respectively. These interventions will also contribute to the achievement of Scotland's CO_2 emissions reduction target of net zero by 2045, whilst promoting and supporting the best use of clean fuels and technologies. Some of the interventions related to safety and resilience and strengthening strategic connections are anticipated to result in uncertain effects on greenhouse gas emissions as they are not likely to encourage modal shift. In addition, some of the new fixed links recommendations have the potential to increase motorised traffic to and from the mainland, potentially increasing emissions. However, the decarbonisation of ferry networks is likely to result in major positive effects on reducing greenhouse gas emissions as this will directly contribute to the achievement of Scotland's CO_2 emissions reduction target. Recommendations relating to the road network are anticipated to result in minor negative effects on greenhouse gas emissions as several of the interventions proposed have the potential to increase capacity for the number of vehicles on the trunk road network, thus increasing associated transport emissions and use of natural resources.

Many recommendations will also help adapt the transport network to the predicted effects of climate change by prioritising transport connections to critical infrastructure, islands and coastal communities that are more vulnerable to the projected impacts of climate change. In particular, there is a recommendation that is focused on trunk road and motorway

climate change adaptation and resilience.

8.3.2. Air Quality

Overall, the majority of the recommendations are anticipated to result in minor positive effects on air quality as the interventions proposed seek to promote a modal shift to more sustainable transport options and consequently will help reduce transport-related air pollution and improve air quality throughout Scotland. This will be achieved by reducing traffic congestion, limiting more polluting vehicles, limiting polluting traffic growth, decarbonising the rail and bus network, decarbonising freight deliveries and improving the modal shift of freight from road to rail. The recommendations relating to strategic connections and increasing safety and resilience are anticipated to result in uncertain effects on air quality as it is not clear whether the proposed interventions would result in a reduction or increase in transport-derived air pollutant emissions or, consequently, any improvements in air quality across Scotland. Furthermore, the fixed link interventions proposed have the potential to increase motorised traffic to and from the mainland, potentially increasing emissions and reducing air quality. Recommendations relating to the road network are anticipated to result in minor negative effects on air quality as several of the interventions proposed have the potential to increase capacity for the number of vehicles on the trunk road network, thus increasing associated transport emissions and potentially reducing air quality. Conversely, air quality could improve in other locations, for example where traffic flow is improved.

The decarbonisation of ferry networks could result in major positive effects on air quality by reducing emissions of key air pollutants (NO_x, particulates, SO_2) from ferry transport, helping to limit polluting traffic growth, and potentially limiting more polluting vehicles in sensitive areas.

8.3.3. Population and Human Health

A significant majority of recommendations are anticipated to result in minor positive effects on quality of life and human health, as the interventions proposed will improve quality of life and human health and increase sustainable access to essential services, employment and the natural environment. They will achieve this through improved access to more sustainable forms of transport, provision of active travel connections and related interventions between villages and nearby towns and regional centres, and improvements to existing roads for the purpose of active travel (for example, improved crossing points, surfacing and lighting). The active travel recommendations are also likely to generally improve perceptions of road safety and encourage more people to use active travel choices. They will also align with Transport Scotland's Active Travel Framework (Transport Scotland, 2020c), which sets out a vision that "Scotland's communities are shaped around people, with walking or cycling the most popular choice for shorter everyday journeys.

The decarbonisation of the bus and rail networks will also potentially encourage sustainable access to the natural and historic environment and ensure safe and sustainable access for all users to essential services and places of employment. The freight-related interventions are anticipated to result in neutral effects on quality of life and human health as the relationship between most interventions and the achievement of the SEA objectives is unclear. However, it should be noted that several of the freight-related interventions proposed are anticipated to result in minor positive effects on these aims by potentially ensuring safe and sustainable access to essential services and employment and allowing for greater journey time reliability. Recommendations relating to the road network are generally anticipated to result in uncertain effects on quality of life and human

health. While some of the interventions proposed may improve access to essential services, employment and the natural environment, this access will be achieved via the road network and therefore will not be sustainable, at least in the short-term (until a greater proportion of cleaner vehicles use the road network), due to air pollutant emissions.

It is unclear if the proposed interventions will reduce noise and vibration and this will depend on the location and nature of the interventions adopted. The active travel and behavioural change recommendations are generally anticipated to result in minor positive effects on noise and vibration as most of the interventions proposed will help encourage a modal shift to more sustainable modes of travel. The technology recommendations are anticipated to result in neutral effects on noise and vibration as the interventions proposed are not expected to have any notable effect on this topic. The strategic connections recommendations are generally anticipated to result in minor negative effects on noise and vibration as most of the interventions proposed will potentially increase noise and vibration on the transport network during both the construction and operation of any improvements to the transport network.

The public transport recommendations are anticipated to result in neutral effects on developing high quality places as the various interventions proposed are unlikely to have a notable effect on this objective. The influencing travel choices recommendations are anticipated to result in uncertain effects on developing high quality places, as, although they are likely to improve safety on the transport network, they will not directly help promote, invest in, build or maintain infrastructure to support the development of high-quality places. The active travel recommendations are anticipated to result in minor positive effects on developing high-quality places as the interventions proposed will help to support the development of high-quality places by prioritising pedestrians in the public realm. Some of the interventions will also help support the development of places that feel safe to all users through improvements to active travel routes, including road crossings and lighting, and measures to reduce traffic volumes and/or speeds and campaigns to promote better driver behaviour.

The vast majority of the recommendations are anticipated to result in minor positive effects on safety as they will help improve safety on the transport network by potentially reducing the likelihood of transport-related road accidents and casualties by; encouraging a modal shift to more sustainable modes of travel, including the expansion of 20mph zones and limits; a modal shift of freight from road to rail; proposals for freight rest stops and upgrades to existing mobility hubs and public transport facilities. The bus and mass transit recommendations are anticipated to result in uncertain effects on safety. While several of the proposals (for example, delivery of faster and more reliable journey times for bus passengers and expansions to the tram network) will support the development of places that feel safe to all users by reducing road traffic, it is unlikely that the other proposals (for example, the decarbonisation of the bus and rail networks) would significantly contribute to safety.

8.3.4. Material Assets

Most of the recommendations are anticipated to result in minor positive effects on the sustainable use of the transport network by promoting or improving the sustainable use of the transport network through planning for future travel arrangements where journeys are made by a number of different modes (including active travel modes), for example, improvements to the ferry network. Some of the interventions proposed also support improvements to transport technology and promote the sustainable use and management

of existing infrastructure, including upgrades to or replacement of vessels, and the decarbonisation of the ferry network. The behavioural change and mass transit recommendations are anticipated to result in uncertain effects on the sustainable use of the transport network as there is not a clear link between several of the interventions proposed (for example, expansion of 20mph zones and limits across Scotland) and sustainable use of the transport network. However, one of the mass transit interventions is considered to result in major positive effects on the sustainable usage of the transport network as it involves proposals for bus rapid transit, rail conversion and tram network extension, thereby potentially helping plan for future travel arrangement where journeys are made by a number of different modes and help with planning for the future capacity of public transport.

The strategic connections (island connectivity) and safety and resilience recommendations are generally anticipated to result in minor negative effects on the SEA's key environmental requirement/objective to reduce material consumption. This is because they will require the use of natural resources as several of the interventions proposed may require significant quantities of materials and construction-related trips. It should also be noted that there is a potential opportunity for road schemes to improve surface conditions, and, alongside advancement in the types of materials used, reduce overall maintenance needs in the longer-term, with associated positive effects. In addition, the decarbonisation of the ferry network is anticipated to result in uncertain effects on the use of natural resources and contributions to the circular economy; this is dependent on the methods and technologies adopted. The technology-related recommendations are generally anticipated to result in negligible effects on reducing use of natural resources. The remainder of the recommendations are anticipated to result in uncertain effects on reducing use of natural resources. Depending on the source and type of materials/natural resources used to construct some of the new infrastructure associated with several of the proposed recommendations, there is potential for negative effects on material assets in terms of natural resources usage. However, there is not a clear link between other interventions proposed (for example, the expansion of 20mph zones and limits across Scotland) and the reduction in the use of natural resources.

8.3.5. Water Environment

The vast majority of the recommendations are anticipated to result in uncertain effects on the water environment, as there is potential for negative environmental effects during construction and operation of the various interventions proposed. The effects will be dependent on their location and/or design. It is therefore recommended that further environmental assessment is undertaken as the interventions develop in order to identify potentially significant location-specific environmental effects and mitigation where appropriate. It should also be noted that there is potential for positive effects on the water environment associated with the bus recommendations. This is due to potential reductions in diffuse pollution on key receptors associated with the decarbonisation of the bus network; however, the significance of effects are uncertain at this stage. Overall, the active travel and technology-related recommendations are anticipated to result in neutral effects on the water environment as minimal hard infrastructure is required for most of the interventions proposed. The fixed link recommendations are generally anticipated to result in neutral to minor negative effects on the water environment as most of the interventions are largely confined to proposed improvement of the existing ferry network, and therefore have only limited additional potential to directly affect the water environment. However, the decarbonisation of the ferry network may result in minor positive effects on the water

environment as this intervention has the potential to protect or improve water quality by replacing older vessels.

8.3.6. Biodiversity

Most of the recommendations are anticipated to result in uncertain effects on biodiversity, as there is potential for negative environmental effects during construction and operation of the improvements, depending on the location and design of the interventions proposed. The active travel and technology-related recommendations are generally anticipated to result in neutral effects on biodiversity as minimal hard infrastructure is required for most of the interventions proposed. The strategic connections (fixed link) recommendations are generally anticipated to result in at least minor negative effects on biodiversity as the construction of these interventions could result in direct effects on biodiversity (for example, through pollution or construction noise disturbance), including potential damage to or loss of designated and undesignated wildlife or geological sites. However, the decarbonisation of the ferry network (for example, the use of alternative fuel sources or transition to zero carbon emissions) is anticipated to result in minor positive effects on biodiversity as this intervention could potentially protect or enhance the integrity of existing habitat, and/or protect or enhance the integrity of designated biological or geological sites.

8.3.7. Soil

The vast majority of the recommendations are generally anticipated to result in uncertain effects on soil, as there is potential for negative environmental effects during both the construction and operation of the various interventions proposed, although this will be dependent on the location and design of these interventions. The active travel and technology-related recommendations are generally anticipated to result in neutral effects on soil as minimal hard infrastructure is required for most of the interventions proposed.

8.3.8. Cultural Heritage

Most of the recommendations are anticipated to result in uncertain effects on cultural heritage as there is potential for a range of effects associated with the various interventions proposed. For example, the fixed link interventions have the potential for at least minor negative effects on designated and undesignated archaeological sites and other culturally and historically important features. These interventions could also affect key views to and from heritage assets. Several of the road interventions proposed could also result in negative environmental effects during both the construction and operation phases; however, the scale of the effects is uncertain at this stage, particularly for junction improvements, realignment, widening and overtaking opportunities. There is no clear relationship between the decarbonisation of the bus, rail and ferry networks and the protection or enhancement of cultural heritage. Any redevelopment of railway stations could also potentially lead to negative effects on cultural heritage, including cumulative effects across Scotland. Mitigation measures are listed in **Section 9.8** of this report.

8.3.9. Landscape and Visual Amenity

The technology-related recommendations are anticipated to result in neutral effects on landscape and visual amenity as the proposed interventions will require minimal hard infrastructure. The remainder of the recommendations are anticipated to result in uncertain effects on landscape and visual amenity as there is potential for a range of effects associated with the various interventions proposed. However, urban realm improvements, for example, associated with some active travel interventions could lead to (post-construction) improvements to the landscape in some locations.

There is also potential for negative environmental effects during both the construction and operation of several of the road interventions proposed. However, the scale of the effects is uncertain at this stage, particularly for junction improvements, realignment, widening and overtaking opportunities.

There is no clear relationship between the decarbonisation of the rail, bus and ferry networks (at this strategic level) and landscape and visual amenity.

8.4. Compatibility of STPR2 Recommendations with the SEA Objectives

The 45 STPR2 Recommendations, listed in **Section 2.10**, have been checked for compatibility with the SEA objectives listed in **Section 0**. The detailed assessment of the recommendations across all SEA Objectives, with an accompanying narrative to explain the scoring, is provided in **Appendix F (Assessment Matrices).** Table 7 provides a list of the STPR2 recommendations and a cumulative 'average' score for each recommendation across all SEA Objectives. This average score was based on the methodology provided in **Section 7.8**.

Table 7: Compatibility Assessment of the STPR2 Recommendations and SEA Objectives

STPR2 RECOMMENDATIONS	RECOMMENDATION NUMBER	SEA CUMULATIVE SCORE
Connected neighbourhoods	1	+
Active freeways and cycle parking hubs	2	+
Village-town active travel connections	3	+
Connecting towns by active travel	4	+
Long-distance active travel network	5	+
Behavioural change initiatives	6	+
Changing road user behaviour	7	+
Increasing active travel to school	8	+
Improving access to bikes	9	+
Expansion of 20mph limits and zones	10	+
Clyde Metro	11	+
Edinburgh and South East Scotland Mass Transit	12	+
Aberdeen Rapid Transit	13	+
Provision of strategic bus priority measures	14	+
Highland Main Line Rail corridor enhancements	15	+

STPR2 RECOMMENDATIONS	RECOMMENDATION NUMBER	SEA CUMULATIVE SCORE
Perth-Dundee-Aberdeen rail corridor enhancements	16	+
Edinburgh/Glasgow-Perth/Dundee rail corridor enhancements	17	+
Supporting integrated journeys at ferry terminals	18	+
Infrastructure to provide access for all at rail stations	19	+
Investment in DRT and MaaS	20	+
Improved public transport passenger interchange facilities	21	+
Framework for the delivery of mobility hubs	22	+
Smart, integrated public transport ticketing	23	+
Ferry vessel renewal and replacement and progressive decarbonisation	24	+
Decarbonisation of the rail network	25	+
Decarbonisation of the bus network	26	+
Behavioural change and modal shift for freight	27	+
Zero emission vehicles and infrastructure transition	28	+
Access to Argyll (A83)	29	-
Trunk road and motorway network safety improvements to progress towards 'Vision Zero'	30	-

STPR2 RECOMMENDATIONS	RECOMMENDATION NUMBER	SEA CUMULATIVE SCORE
Trunk road and motorway network climate change adaptation and resilience	31	+
Trunk road and motorway network renewal for reliability, resilience and safety	32	0
Future Intelligent Transport Systems	33	+
Traffic Scotland system renewal	34	0
Intelligent Transport System renewal and replacement	35	+
Strategy for improving rest and welfare facilities for hauliers	36	0
Improving active travel on trunk roads through communities	37	+
Speed Management Plan	38	0
Sustainable Access to Grangemouth Investment Zone	39	+
Access to Stranraer and the ports at Cairnryan	40	-
Potential Sound of Harris, Sound of Barra Fixed Link and Fixed Link between Mull and Scottish mainland	41	--
Investment in port infrastructure to support vessel renewal and replacement, and progressive decarbonisation	42	+
Major station masterplans	43	+
Rail freight terminals and facilities	44	+
High speed and cross-border rail enhancements	45	-

The compatibility check found that the majority of recommendations are compatible with the SEA Objectives and their underlying guide questions. Overall, there are more positive cumulative scores than any other scores. Many of the recommendations also received neutral scores, where the recommendations did not directly relate to the SEA objectives. The uncertain scores are largely due to the uncertainty associated with where and how a recommendation might eventually be implemented 'on the ground.' Further, project-level environmental assessment will be undertaken to allow these effects to be better understood, as described in **Section 9.9**.

8.5. In-Combination Assessment

Table 8 lists the PPS that were considered to have in-combination cumulative effects with the STPR2 and provides a summary description of these effects. The table does not provide a comprehensive list of PPS but focuses on the national-level PPS that were considered most likely to have in-combination effects at the strategic level. A wider list of PPS is provided in **Appendix B (Plans, Programmes and Strategies)** and summary descriptions of key PPS are also provided in **Chapter 3 (Policy Context).**

Table 8: STPR2 in-combination effects with other PPS

PPS	COMBINED EFFECTS WITH THE STPR2
Securing a green recovery on a path to net zero: climate change plan 2018–2032 – 2021 update Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 Securing a Green Recovery on a Path to Net Zero Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme 2019-2024 Carbon Account for Transport No. 12: 2020 Edition A Low Carbon Economic Strategy for Scotland Low Carbon Scotland – Meeting Our Emissions Reduction Targets 2013-2017: Second Report Climate Change Adaptation Plan 2020 Decarbonising the Scottish Transport Sector Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme 2019-2024 Clean Air Strategy 2018 (DEFRA) Cleaner Air for Scotland 2 Cleaner Air for Scotland – The Road to a Healthier Future (2015) Air Quality Strategy for England, Scotland, Wales and Northern Ireland Scotland's National Marine Plan (2015) Future Intelligent Transport Systems Strategy	Many STPR2 recommendations (for example, active travel, influencing travel choices, public transport and decarbonising transport themes) align with PPS related to climate change, low carbon, clean air and decarbonising the transport sector. The recommendations align with the commitments to reduce greenhouse gases and air pollutants, identifying and reducing sources of air pollution, protect nature and boost the economy. For example, transport-related greenhouse gas emissions are expected to fall as a result of the STPR2 active travel and decarbonisation-focused interventions being implemented. These effects will be enhanced by the PPS listed. Combined positive effects are predicted for Population and Human Health, Climatic Factors, Air Quality and Water Environment.

PPS	COMBINED EFFECTS WITH THE STPR2
Revised Draft NPF4 National Developments	Many recommendations align and support the Revised Draft NPF4 National Development enhancement plans to provide multifunctional green infrastructure that provides greatest environmental, lifelong physical and mental health, social wellbeing and economic benefits. In particular, the NPF4 'National Walking, Cycling and Wheeling Network' National Development and STPR2 active travel recommendations will help to achieve or provide opportunities to realise these benefits. The NPF4 focuses on those areas where greening and development can be mutually supportive, helping to improve equity of access to quality green space, and supporting communities where improving wellbeing and resilience is most needed, including to help people adapt to future climate risks. Combined positive effects are predicted for Population and Human Health, Climatic Factors, Air Quality and Material Assets.
Going Further: Scotland's Accessible Travel Framework	Some of the STPR2 recommendations support Scotland's Accessible Travel Framework which provides a national vision and outcomes for accessible travel, new ways of working to include disabled people and a high-level action plan to tackle issues. The framework seeks to improve the mobility of passengers and access for all to essential services with a focus on improved safety and reducing barriers for passengers with reduced mobility and creating an attractive public realm. STPR2 recommendations 19, 20, 21 and 22 are focused on improving the accessibility of the transport network. Combined positive effects are expected for Climatic Factors, Air Quality and Population and Human Health.

PPS	COMBINED EFFECTS WITH THE STPR2
Revised Draft NPF4 National Development: High Speed Rail Consultation on Scotland's Rail Infrastructure Strategy 2019 Rail Enhancement & Capital Investment Strategy 2018 Scotland's Railways	The STPR2 recommendations related to the development of rail services align with the national developments which support the implementation of increased infrastructure to improve rail capacity and connectivity on the main cross-border routes and the east and west coast mainlines. Combined positive effects are predicted for Population and Human Health, Climatic Factors and Air Quality.
Let's Get Scotland Walking: The National Walking Strategy (2014) A More Active Scotland: Scotland's Physical Activity Delivery Plan A Connected Scotland: our strategy for tackling social isolation and loneliness and building stronger social connections A Long-Term Vision for Active Travel in Scotland 2030 Cycling Action Plan for Scotland 2017-2020 Revised Draft NPF4 National Development: National Walking, Cycling and Wheeling Network	Many of the STPR2 recommendations, particularly those under the active travel theme, align with supporting modal shift from private vehicles to walking, cycling and wheeling for everyday journeys. This will help reduce greenhouse gas emissions from transport and will also be highly beneficial for health and wellbeing. Positive combined effects are predicted for Population and Human Health, Climatic Factors and Air Quality.
Island Connectivity Plan (to be developed in 2022/2023) Scotland's National Marine Plan (2015) Scottish Ferry Services: Ferries Plan (2013-2022)	The STPR2 recommendations that relate to ferries and island connectivity support other plans that aim to meaningfully improve outcomes for island communities. The recommendations seek to improve accessibility, reduce severance and increase transport choice as well as support plans for future capacity of public transport, taking demographic and other societal changes into account. Positive combined effects are predicted for Population and Human Health and Material Assets.

PPS	COMBINED EFFECTS WITH THE STPR2
Realising Scotland's full potential in a digital world: a digital strategy for Scotland (2017) Smart and Integrated Ticketing and Payments – Delivering Strategy 2018	The STPR2 'Technology' recommendations support a vision for Scotland as a vibrant, inclusive, open and outward-looking digital nation with smart and integrated ticketing and payment across Scotland. The recommendations and PPS listed are likely to encourage more people to use public transport and enable greater accessibility to essential services, employment and the natural environment. There are likely to be combined positive effects on Population and Human Health, Climatic Factors and Air Quality.
Scotland's Road Safety Framework to 2030 Scottish Trunk Road Network Asset Management Strategy	Many of the STPR2 recommendations, particularly those under the 'increasing safety and resilience on the strategic transport network' theme align with the plans that are committed to ensuring that Scotland's transport network is able to serve its function in addition to being safe, resilient and in the best condition. The focus of the recommendations is on road safety but there are also possible combined positive effects relating to network resilience and adaptation. Combined positive effects are also predicted for Population and Human Health, particularly through improved safety of the transport network.

9. Strategic Mitigation and Enhancement

9.1. Overview

The environmental assessment aims to prevent, reduce or offset any significant adverse effects as far as possible before mitigation measures are proposed. In addition to preventing or minimising adverse effects, mitigation measures have also been provided for SEA topics where many uncertain effects were predicted in the assessment.

Undertaking the SEA process alongside the STPR2 development process helps ensure that modifications can be made at the strategic level, for example via alternatives and identifying issues which can be addressed through other relevant PPS policies/strategies.

Where location-specific mitigation requirements are identified, these are described with appropriate recommendations for implementation at a project level.

In addition to mitigation measures, recommendations for STPR2 enhancement opportunities have been provided wherever possible.

The mitigation measures and enhancement opportunities consider:

- the environmental baseline data provided in Appendix C (National Baseline) and D (Regional Environmental Summaries);
- the environmental requirements emerging from the PPS review, provided in Table 1
- the SEA Objectives and Assessment Guide questions provided in Table 3;
- feedback received from the regional and national workshops, described in **Section 6.2** respectively, including local context and feasibility;
- key issues and opportunities identified during the continuing development of the STPR2, the EqIA and other Impact Assessments;
- feedback from the SEA Consultation Authorities.

9.2. Climatic Factors and Material Assets

9.2.1. Strategic Opportunities to Reduce Greenhouse Gas Emissions

The regional workshops for the STPR2 held from May to June 2019 identified a number of strategic opportunities to reduce greenhouse gas emissions. These opportunities, and the STPR2 response to them, are shown in Table 9.

Table 9: Strategic opportunities in relation to climate change

STRATEGIC OPPORTUNITY	STPR2 RESPONSE
Technology – Electric vehicles and Mobility as a Service (MaaS), electric or low emission trains, more charging points, electric car sharing, digitisation	MaaS is included as a Grouping in the STPR2 final recommendations (Recommendation 20: Investment in Demand Responsive Transport and MaaS). Decarbonisation of the rail and bus networks are both part of the final STPR2 recommendations (Recommendations 25 and 26). Recommendation 28 is focused on providing a national framework for zero emission vehicles, to enable investment in fleets, facilities and emerging technologies.
Alternative fuels	The objective of Recommendation 28 is to bring together key industries and sectors and work strategically with the private sector to facilitate the planning, management and delivery of the required alternative refuelling network and expansion/improvements to the charging network.
More fuel-efficient ferries	Recommendation 42 (Investment in port infrastructure to support vessel renewal and replacement, and progressive decarbonisation) is focused on an investment programme in port infrastructure including power, to support vessel renewal and replacement and progressive decarbonisation of the Clyde and Hebrides Ferry Services (CHFS) and Northern Isles Ferry Services (NIFS) ferry networks by 2045.
All new taxi licences to be electric / hybrid	Not included in the final STPR2 recommendations.
Demand responsive transport	Demand Responsive Transport is included in the STPR2 final recommendations (Recommendation 20: Investment in Demand Responsive Transport and Maas).
Opportunity to make climate change targets 'real' at a local level – calculate mode shift required in each area and corridor.	Carbon calculations for different transport modes are included in this final (post-consultation) version of the Environmental Report and are taken into account in the monitoring framework to be included in the SEA Post Adoption Statement.

STRATEGIC OPPORTUNITY	STPR2 RESPONSE
More investment in public transport and active travel, incentivise employers to promote behavioural changes	The STPR2 Final Technical Report (Jacobs AECOM, 2022f) includes various recommendations that will promote increased use of public transport and active travel. These include interventions focused on: • Improving active travel infrastructure • Enhancing access to affordable public transport • Increasing safety and resilience on the strategic transport network • Strengthening strategic connections
Spatial planning - Need higher density and well-located developments to reduce the need to travel by car	The STPR2 and the Revised Draft NPF4 have been developed over a similar timeline and close collaboration between the two teams, both for the respective plans and their associated impact assessments. A key concept that is included in the Revised Draft NPF4 and the STPR2 is 20-minute neighbourhoods. This is included in the STPR2 as part of Recommendation 1 (Connected Neighbourhoods). Connected Neighbourhoods would provide high quality streetscapes in town and/or suburban district centres, along with high quality active travel routes to connect nearby (typically within around 800m) residential areas to those centres.

9.2.2. Early Planning to Avoid or Reduce Greenhouse Gas Emissions

Planning to avoid or reduce greenhouse gas emissions at this strategic planning stage is essential for improving the carbon outcomes of the STPR2 recommendations. Figure 6 shows the general opportunities to avoid or reduce carbon through project planning.

Carbon reduction curve

100% Build nothing – challenge the root cause of the need; explore alternative approaches to achieve the desired outcome

80% Build less – maximise the use of existing assets; optimise asset operation and management to reduce the extent of new construction required

50% Build clever – design in the use of low carbon materials; streamline delivery processes; minimise resource consumption

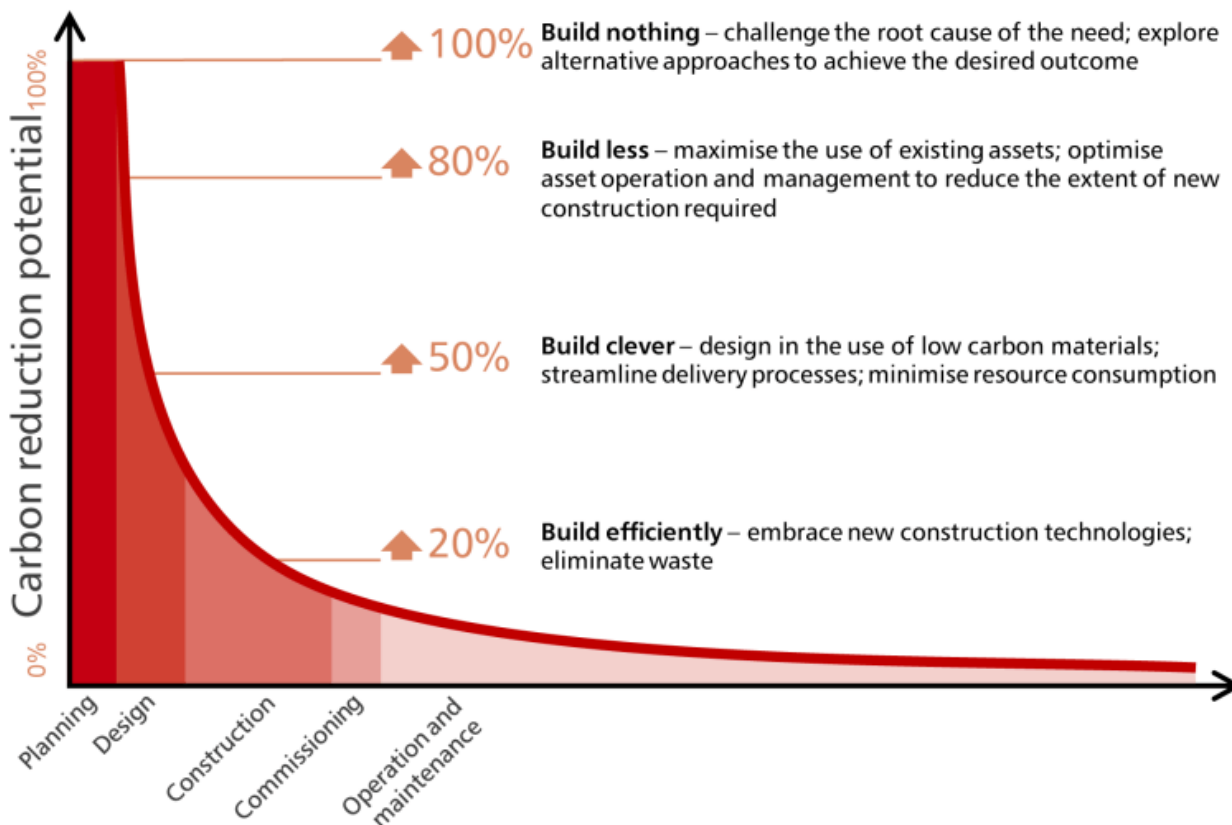**20% Build efficiently** – embrace new construction technologies; eliminate waste

Figure 6: Carbon Reduction Curve (The Fifth Estate, 2020)

The opportunities associated with early planning for carbon reduction include the following:

- Challenge the root cause of the need for a new transport asset – explore alternative (no build) solutions to deliver objectives;
- Hold carbon opportunities workshops from the earliest planning stage onwards;
- Identify strategic carbon reduction opportunities across Scotland and in each of the 11 STPR2 regions;
- Close collaboration with the NPF4 team and local authority planners to ensure travel demand and trip lengths are reduced;
- Consider the potential for wider use of behavioural change and other policy solutions and funding instead of providing new infrastructure, for example, the commitment to reduce car kilometres by 20 per cent by 2030;
- Re-use and refurbish transport assets, extending their life rather than replacing them;
- Support modal shift to active travel and public transport;
- Future-proof transport infrastructure to allow the introduction or wider roll-out of emerging zero or low-carbon technologies;
- Plan for the wider usage of zero-emission vehicles in line with the Element Energy (2021) recommendations;
- Select 'soft' rather than 'hard' engineering solutions where possible, for example,

nature-based solutions;

- Identify the key emission sources associated with each intervention, and how they can be reduced;
- Avoid disturbance of vegetation and soils, particularly those with high carbon value for example, peat and carbon-rich soils, wetlands and ancient woodland;
- Opportunities for offsetting should be considered where appropriate to contribute towards the national legislative target of achieving net zero emissions by 2045.

Recognising and implementing the strategic opportunities listed above and in Table 9 will enable the STPR2 to meet Scotland's greenhouse gas reduction targets (as described in **Section 3.3**) and also address recommendations from Element Energy (2021) and Scotland's Climate Assembly (Scottish Government, 2021h). The design and delivery of any STPR2 interventions should also consider opportunities and plan for emerging renewable energy technologies that could potentially be deployed alongside transport infrastructure and opportunities associated with alternative fuel sources, such as green and blue hydrogen.

9.2.3. *Choice of Materials for Transport Interventions*

Although the choice of construction materials is not necessarily a consideration at the strategic planning stage, the decision to construct is often taken at the strategic planning stage. Early planning could potentially avoid the need to use materials with a high embedded carbon content at the construction stage. Each material that could potentially be used in the construction of a new transport asset or in the maintenance of an existing asset has an embodied carbon content associated with it. Figure 7 shows the sources of carbon emissions during the lifecycle of construction materials.
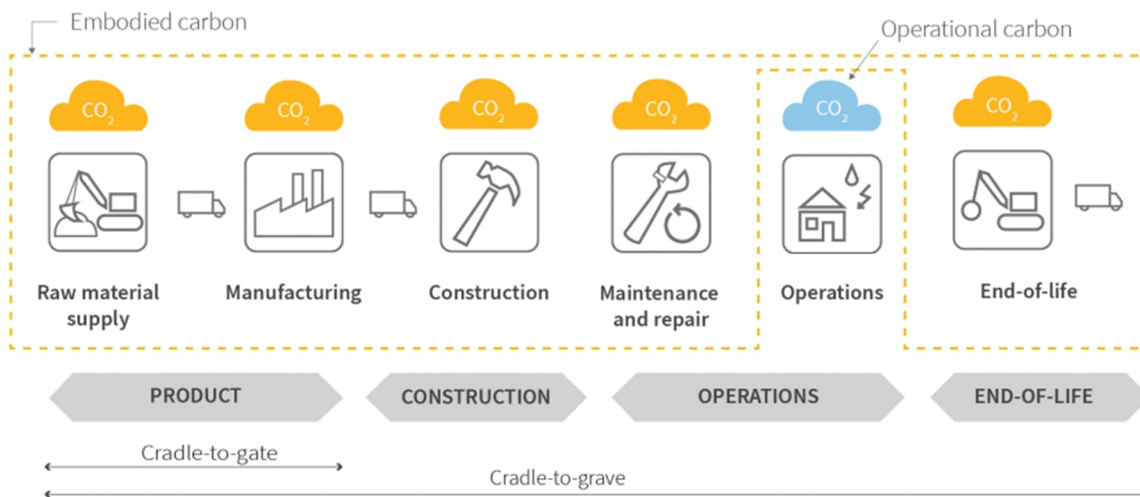

Figure 7: Sources of carbon for construction materials (Carbon Leadership Forum, 2020)

The relative impact of each stage shown in Figure 7 above will depend upon the material choice. Recycled material will often have a lower carbon footprint as less energy and transport may be required. Heavier products may have more impact in transport and more highly processed materials may have most emissions within the manufacturing process (The Fifth Estate, 2020).

To minimise emissions from potential future interventions, designers should take cognisance of the latest best-practice, which is evolving due to advancements in material

science, manufacturing and construction processes. This best practice should include identifying low-carbon materials and durable materials that require less maintenance, repair or replacement, in order for the operational emissions of transport assets to be minimised.

From a qualitative perspective, emissions from proposed multi-modal interventions would be dependent on location, scale, primary materials and construction methods. For instance, interventions requiring significant volumes of concrete and steel such as bridges, junctions and viaducts would have a high embodied carbon content due to the carbon intensity of the manufacture of the materials used in their construction.

Carbon life cycle assessment should be employed to reflect embodied carbon from demolition, materials, transport and maintenance, as well as the operational carbon associated with heat and power. Carbon life cycle models should calculate the whole life carbon for 2030 and 2045 carbon reduction target dates, as well as the industry standard of 60 years (HES, 2021b).

The delivery of any future STPR2 interventions should include provisions for sustainable procurement that accounts for the carbon footprint of materials and products (including country of origin, transport requirements, production process). Consideration should be given to assessing the carbon benefit of prolonged lifespan arising from adequate maintenance (HES, 2021). Sustainable procurement provisions should include circular economy principles that prioritise the reuse of materials in construction, use low-carbon construction materials and design principles that allow for materials to be re-used or recycled upon decommissioning. Consideration should also be given to the location of suppliers, to minimise transportation distances, subject to any procurement limitations.

9.2.4. Construction Methods

In addition to embedded carbon considerations, construction activities also need to be considered and planned for. Interventions requiring significant earthwork movements will have a high energy demand from earth moving equipment and tipper trucks moving earth around/off/to the site. The source of power supply is a significant factor when assessing emissions from construction – whether the machine is power by diesel generators or can be plugged into the electricity grid.

Operational maintenance and refurbishment emissions also need to be considered for an asset throughout its operational life. For example, a road will require periodic re-surfacing or a bridge could require replacement of cables. These emissions tend to be assessed based on assumptions made on the design life of materials to determine how many times they will be replaced during the lifespan. The final consideration for materials is end of life emissions, which captures dismantling and disposal. PAS 2080 (Construction Leadership Council, 2019) provides useful guidance on how to manage carbon emissions throughout the life of an infrastructure project.

9.2.5. Carbon Sequestration Opportunities

The delivery of the STPR2 interventions should consider how to protect carbon rich soils, wetlands and other natural resources that are important for carbon sequestration. The Plan should also require the identification of opportunities to create habitats and plant trees (for example, alongside linear transport infrastructure) that will also have carbon sequestration benefits.

9.2.6. Climate Adaptation Opportunities

The potential impacts of climate change on existing and proposed infrastructure need to be planned for and considered in the delivery of the STPR2 interventions where possible. For example, sufficient space may need to be allowed for additional SuDS and permeable surfacing that can accommodate projected trends in rainfall and surface water flooding. Transport infrastructure will also need to be future proofed for projected changes to flood risk from other sources and changes to temperature (variations and extremes) and storminess. Consideration should also be given to how climate change could affect the spread of invasive species and tree diseases and could therefore have implications for vegetation management and access arrangements associated with the strategic transport network.

The third climate change risk assessment (CCRA3, SNIFFER, 2021) report recommends that more adaptation is particularly needed in relation to the increased risks to transport from high and low temperatures, high winds and lightning. The CCRA also calls for more action to ensure that projected increases in heavy rainfall are factored into long-term renewal programmes, especially for the rail network. Additional adaptation actions include:

- Improved numerical tools for infrastructure asset owners to predict failures.
- Improved instrumentation and monitoring systems to detect pre-failure slope behaviour linked to decision support systems.
- More detailed characterisation of engineered soil assets.
- Continued use of slope inspection programs.
- Greater use of soft engineering techniques such as vegetation management to reinforce vulnerable slopes.
- Enhanced maintenance of drainage systems for roads and railways and increasing drainage capacity in new road infrastructure.

9.3. Population and Human Health

Many of the final STPR2 recommendations will have beneficial effects on Population and Human Health, as shown in the assessment summary of **Chapter 8 (Assessment Results).** However, there remain some strategic opportunities to enhance these beneficial effects. In particular, the SEA recommends that:

- All of the active travel recommendations are taken forward and implemented in order to maximise the potential modal shift from private vehicles to walking, wheeling and cycling.
- Transport Scotland's active travel investment is prioritised towards locations and areas in which it can help local authorities and their partners deliver comprehensive, high-quality active travel networks, with appropriate supporting measures. This prioritisation should be given to investments which will result in high-quality, attractive, dense and safe networks for people to walk, wheel and cycle to places of work, essential services, community facilities and spaces and public transport hubs. These should be provided within communities and link with other communities.
- Seek opportunities to implement active travel measures in, or close to areas with concentrations of poor health, low levels of physical activity, areas of deprivation or areas where the air quality is poor.
- The development of the STPR2 recommendations should prioritise the provision of high-quality green or blue infrastructure, or improve accessibility to existing green and blue infrastructure. This is likely to lead to significant benefits for mental and physical health as well as sense of place and local pride.

9.4. Water

The STPR2 recommendations that focus on climate change adaptation (Recommendation 31) will provide opportunities to reduce flood risk and increase the installation of SuDS which will help maintain or improve water quality. The implementation of climate adaptation measures (see **Section 9.2.6**) and nature-based solutions, as described in **Section 9.5**, will also help maintain or improve water quality through the protection of soil and reduction of erosion.

The design of any STPR2 recommendations should be undertaken in line with best practice and relevant guidance, considering the requirements of The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) and in consultation with SEPA. Site specific flood risk assessments should be undertaken in accordance with Design Manual for Roads and Bridges (DMRB), SEPA and other relevant guidance, as more localised detail becomes available at each design stage.

9.5. Biodiversity

The following mitigation measures will be required for the STPR2 in relation to biodiversity:

- Further environmental assessment will need to be undertaken to ensure site-level biodiversity constraints and opportunities are identified and thereby allow any negative effects on biodiversity to be avoided or minimised. This includes consideration of designated and undesignated biodiversity. This environmental assessment will need to prioritise delivering nature-based solutions with multiple benefits and achieving positive effects for biodiversity, such as the Scottish Government's agreement to protect at least 30 per cent of Scotland's land and seas by 2030 (also known as the '30 by 30' commitment) and to highly protect 10 per cent (NatureScot, 2022a).
- Where new transport infrastructure is proposed, particularly linear infrastructure, opportunities to provide green or blue infrastructure for biodiversity benefits and climate resilience should be explored – for example to provide new wildlife corridors between biodiversity sites. Careful design will be required to ensure any new wildlife corridors support connectivity without facilitating the spread of invasive non-native species. This green or blue infrastructure is also likely to provide benefits for other SEA topics – for example, tree planting can provide shading and cooling and potentially intercept airborne particulate matter.
- Opportunities to enhance habitats with a high carbon sink value should be explored.
- New transport projects should also look to deliver Positive Effects for Biodiversity by integrating nature into new or retro-fitted infrastructure projects.
- Where new transport infrastructure is proposed, this should seek to reduce overall land-take and avoid sites designated for their biological interest, particularly sites of international and national importance.
- Further engagement with NatureScot will be required in relation to the development of any new infrastructure, improvements to existing infrastructure or provision of green and blue infrastructure. This will allow any biodiversity opportunities to be maximised.

9.6. Soil

The following mitigation measures will be required for the STPR2 in relation to soil:

- Further environmental assessment will need to be undertaken to ensure site-level development avoids any adverse effects on carbon-rich soils, areas important for carbon sequestration and sites designated for their geological interest, such as

Geological Conservation Review (GCR) sites.

- Further environmental assessment will also help identify opportunities to protect and/or enhance the health and biodiversity of soils, and their role in helping control biochemical processes for nutrient cycles, greenhouse gas emissions, pollution amongst other ecosystem services.
- Where new transport infrastructure is required, prioritise the development of vacant and derelict land to avoid or minimise loss of undisturbed soils.

9.7. Cultural Heritage

The role that the historic environment plays in existing transport infrastructure needs to be recognised in the planning of any future upgrades of this infrastructure - this issue was highlighted by HES in their response to the STPR2 SEA Progress Report in March 2021. For example, some rail stations have Listed Building status (for example, Edinburgh Waverley) or contain important historic assets, such as cast iron footbridges. Transport infrastructure can therefore play a key role in local pride and sense of history and place, and future development needs to take these factors into account. This is most likely to apply to the following STPR2 recommendations:

- 11 (Clyde Metro)
- 12 (Edinburgh and South East Scotland Mass Transit)
- 16 (Perth – Dundee – Aberdeen Rail Corridor Enhancements)
- 17 (Edinburgh/Glasgow-Perth/Dundee Rail Corridor Enhancements)
- 19 (Infrastructure to provide access for all at rail stations)
- 21 (Improved public transport passenger interchange facilities)
- 22 (Framework for the delivery of mobility hubs)
- 25 (Decarbonisation of the rail network)
- 42 (Investment in port infrastructure…)
- 43 (Major station masterplans)
- 44 (Rail freight terminals and facilities).

The following mitigation measures will be required for the STPR2 in relation to cultural heritage:

- Further environmental assessment will need to be undertaken to ensure site-level heritage constraints and opportunities are identified. This includes consideration of designated and undesignated heritage assets. For rail infrastructure, the environmental assessment will also need to consider the potential impacts associated with access work, electrification and issues for historic bridges and other heritage assets relating to gauge clearance work. Consultation with HES is likely to be required for site-specific work at heritage assets on the transport network, such as railway stations and road bridges.
- At the project level, the location and design of transport interventions should avoid direct effects on cultural heritage resources or their setting, where feasible.
- At the project level, opportunities should be sought to maintain, restore and repurpose historic assets to support sustainable placemaking (in line with the NPF4). This includes adherence to circular economy principles – for example, some historic assets could potentially be restored or deconstructed and re-used or repurposed rather than demolished and disposed of. This will align with the HES (2020b) Climate Action Plan and help meet Scotland's Zero Waste targets of 70 per cent recycling by 2025 and no more than 5 per cent to landfill by 2025. An emphasis on maintenance, repair and re-use would also align the STPR2 with the Sustainable Investment Hierarchy in the

Infrastructure Investment Plan (Scottish Government, 2021e) and the Skills Investment Plan (Skills Development Scotland, 2019).

- Consider how to maintain or improve existing historic infrastructure, such as the canal network, former railway lines and military roads, to allow it to continue playing a key role in the active travel network. This may require reuse, repair and maintenance, in consultation with HES.
- Consider how to maintain or improve active travel access to cultural heritage resources.
- Further engagement with HES will be required in relation to the development of any new infrastructure or improvements to existing infrastructure.

9.8. Landscape and Visual Amenity

The following mitigation measures will be required for the STPR2 in relation to Landscape and Visual Amenity:

- Embed landscape mitigation into design of the STPR2 interventions, including careful route selection and alignments, input into the design of structures and form and extent of earthworks, woodland planting and cutting slopes, with suitable cognisance of the surrounding landscape, and avoiding or reducing the loss of existing natural landscapes.
- Opportunities to maximise landscape benefits should be explored, for example through focusing development on vacant and derelict land.
- Transport infrastructure development proposals should be designed to a high quality so that the scale and nature of the development contributes positively to the character and sense of place of the area.
- Minimise the loss of existing vegetation wherever practicable and in particular retain mature trees and woodland and ancient woodland. Where loss of existing vegetation is unavoidable, seek to provide replacement planting which corresponds to, or exceeds, the natural capital value of the landscape elements and ecosystem services lost as a result of the intervention in keeping with landscape character.
- Ensure the design of SuDS features considers opportunities for multi-functionality and delivers amenity and biodiversity benefits as well as attenuation and treatment. Mitigate adverse landscape and visual effects by integrating with surrounding topography, using natural characteristics in design and planting with native aquatic and terrestrial species suitable to local context to provide wildlife habitat and visual interest in keeping with landscape character.
- Take account of local species composition, forest and woodland strategies, landscape character, climate change adaptation and biosecurity threats when developing planting proposals.
- Develop planting and landscape proposals that integrate with the surrounding landscape and secure positive effects for biodiversity and landscape character. Maintain and, where feasible, enhance ecological, landscape, active travel and recreational connectivity and minimise fragmentation. Consider and contribute towards local and strategic biodiversity priorities through planting proposals. Ensure long-term maintenance and management.
- Preserve vistas / focal points from key viewpoints and maintain or enhance the evolving narrative of any existing scenic routes (walking, wheeling, cycling, hiking or driving), and ensure long-term management of these facilities to maintain views.
- Consider dark skies, wild land and perceived wildness in Scotland and seek to avoid significant effects on them. Avoid or minimise light pollution to reduce any negative

landscape, visual and biodiversity effects.

▪ Consult with NatureScot, National Park Authorities and local authorities about potential landscape constraints and opportunities associated with specific interventions.

9.9. Further Environmental Assessment

As discussed in the sections above, further environmental assessment will be required at the project level. At the STPR2 strategic level, where locations of interventions are sometimes unknown or where design detail is not yet available, many uncertain effects were assessed in this SEA. This applied to most of the SEA topics. Individual development proposals that arise from the STPR2 should be subject to the usual consideration through the relevant consenting process, supplemented where appropriate by Environmental Impact Assessment (EIA), Habitats Regulations Appraisal (HRA), and via site controls and Environmental Management Plans. This environmental assessment will therefore enable the clear identification of constraints, opportunities and ecosystem services at the site/ project level, which in turn will allow the development of targeted and detailed mitigation, enhancement and monitoring measures.

10. Monitoring

Section 19 of the 2005 Environmental Assessment (Scotland) Act requires the Responsible Authority, Transport Scotland, to monitor significant environmental effects arising as a result of the implementation of the plan, programme or strategy. The purpose of the monitoring is to identify any unforeseen adverse effects at this early planning stage and to enable appropriate remedial action to be taken.

There are a wide range of existing monitoring programmes in place at the national and local level to monitor environmental status and assess performance against established environmental indicators, many of which are relevant to the STPR2. Table 10 shows the existing monitoring programmes in Scotland in relation to each SEA topic.

Table 10: Existing monitoring programmes

SEA TOPIC	EXISTING MONITORING PROGRAMMES
Climatic Factors: Greenhouse Gas Emissions	Scottish greenhouse gas emissions data are collected as part of the Scottish Government statistics series. The Annual Compendium of Scottish Energy Statistics (2019b) reports on energy consumption from transport. The collation and collection of data on greenhouse gas emissions is also considered in various plans, including the Climate Change Plan Update and Carbon Account for Transport.
Climatic Factors: Climate Adaptation	Scotland's Second Climate Change Adaptation Programme.
Air Quality	Monitoring and reporting of air quality currently takes place at 98 monitoring sites throughout Scotland and in some instances, includes real time monitoring data. Air pollution levels across Scotland are updated hourly (Scotland's Environment, 2021).[1]
	The Air Pollution Information System (APIS) monitors air pollution trends in the UK (including deposition values of sulphur and nitrogen, and concentration levels for ammonia (NH_3), sulphur dioxide (SO_2) and nitrogen oxide (NO_x), and their effects on habitats and species (UK Centre for Ecology & Hydrology, 2022).
	Key performance indicators aligned to Cleaner Air for Scotland: The Road to a Healthier Future are also monitored (Scottish Government, 2015).
	Environmental Standards Scotland (2021) are currently investigating Scotland's compliance with statutory air quality limit levels for nitrogen dioxide.

---

[1] It should be noted that the Air Quality in Scotland monitoring network does not monitor ammonia emissions.

SEA TOPIC	EXISTING MONITORING PROGRAMMES
Population and Human Health	Key sources of transport-related noise are reported via local authority environmental noise mapping and Marine Scotland collects data on the impacts of marine noise, including the construction of infrastructure and the operation of infrastructure and boats. Noise monitoring is also relevant to the Biodiversity SEA Topic. Road safety is monitored by Transport Scotland (2021b). Transport Scotland also publishes annual statistics on participation in active travel (2020b). National and regional data on income, employment, education, health, access to services, crime and housing is reported via the Scottish Index of Multiple Deprivation (SIMD) tool every four years.
Material Assets: Sustainable Use of the Transport Network	Monitoring of transport trend data in Scotland is undertaken by Transport Scotland (2021c).
Material Assets: Natural Resources	Proportions of recycled or secondary aggregates used in the construction of transport infrastructure is monitored by Transport Scotland. The total quantities of these aggregates used also need to be monitored. Natural resources are also monitored through Scotland's Natural Capital Index, which monitors a variety of habitat types in terms of their ecosystem services potential (NatureScot, 2022b).
Water Environment	The water environment is monitored through a combination of surveillance, operational and investigative monitoring as set out in SEPA's WFD Aquatic Monitoring Strategy (2007). SEPA's monitoring responsibilities also include nitrates and protected areas, the results of which are maintained in a register of protected areas (SEPA, n.d.). To monitor surface water flooding and coastal erosion, Flood Risk Management Strategies are available for each of the 14 Local Plan Districts in Scotland. Local Flood Risk Management Plans have also been developed in parallel with the Flood Risk Management Strategies, and projects such as Dynamic Coast have been developed to assess coastal change and identify assets at risk.

SEA TOPIC	EXISTING MONITORING PROGRAMMES
Biodiversity	Biodiversity reporting is undertaken both nationally and locally via a number of mechanisms, including via the State of Nature Scotland (NatureScot, 2019) reports and the requirement for public bodies to report every three years to demonstrate compliance with the biodiversity duty. This includes reporting on progress on Scotland's Biodiversity Strategy.
	Biodiversity reporting is also undertaken via channels such as NatureScot's Site Conditioning Monitoring Programme and Site Check Monitoring Method (2018a) which are supplemented by the Joint Nature Conservation Committee (JNCC) Seabird Monitoring Programme (2021) and the British Trust for Ornithology (BTO) Wetland Bird Survey (n.d.).
	Changes in habitat (for example, woodland, grassland or wetland converted into artificial sites) is monitored via the Habitat Map of Scotland (HabMoS) (NatureScot 2022c), and changes to habitat connectivity can be measured by NatureScot's Ecosystem Health Indicator 8: Connectivity (2018b).
Soil	The Soil Monitoring Action Plan (Soil MAP) collects and displays data on Scotland's soils, including soil erosion, peatland, soil carbon and soil sealing. The Soil MAP Implementation Plan has been developed in conjunction with the Soil MAP and identifies additional monitoring needs for Scotland's soils (Scotland's Soils, 2018).
	Scotland's Environment Web (2021) also publishes information on ecosystem health indicators, including indicators for soil carbon and soil sealing.
	A number of organisations also collect and publish data and information on soil in Scotland, including The James Hutton Institute, Scotland's Rural College, British Geological Survey, Forestry and Land Scotland, and Scottish Forestry.
Cultural Heritage	HES monitors Scotland's heritage assets through regular condition assessments and measures as set out in the Asset Management Plan (HES, 2018).
Landscape and Visual Amenity	Scotland's Landscape Monitoring Programme is led by NatureScot in collaboration with others such as HES. It aims to provide a framework to monitor aspects of landscape change in Scotland. The programme monitors indicators currently across four landscape themes: landscape qualities, public perception, land cover, and built development (NatureScot, 2017).

The final high-level monitoring framework for the STPR2 will be included in the SEA Post

Adoption Statement. This will refer to existing monitoring regimes such as those included in Table 10 above.

11. Next Steps

The feedback received in relation to the Draft Environmental Report (Jacobs AECOM 2022d) and the STPR2 Draft Technical Report (Jacobs AECOM 2022b) consultation has been reviewed, used to shape the final STPR2 recommendations and will be used to inform the delivery of future STPR2 interventions.

The consultation feedback received will also be used to inform the SEA Post Adoption Statement. The SEA Post Adoption Statement outlines how the assessment findings and the comments received at the main consultation stage, both on the STPR2 Draft Technical Report (Jacobs AECOM, 2022b) and the Draft Environmental Report (Jacobs AECOM, 2022d), have been taken into account. It will also include the final environmental monitoring programme for STPR2 implementation. The statement is designed to improve the transparency of the decision-making process within plans.

The SEA Post Adoption Statement is expected to be published in early 2023.

12. References

British Trust for Ornithology (BTO) (n.d.) Wetland Bird Survey. Available at: https://www.bto.org/our-science/projects/wetland-bird-survey, accessed 16 December 2021.

Climate Change Committee, Net Zero: The UK's contribution to stopping global warming, 2019, https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/, accessed 12 October 2021.

Carbon Leadership Forum (2020). Looking Ahead to Embodied Carbon Policy Action in 2021. Available at: https://carbonleadershipforum.org/looking-ahead-to-embodied-carbon-policy-action-in-2021/ accessed 07 January 2022.

Construction Leadership Council and the Green Construction Board (2019). Guidance Document for PAS 2080. Available at: https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2019/06/Guidance-Document-for-PAS2080_vFinal.pdf, accessed 12 October 2021.

Directive 2001/42/EC (2001) Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the Assessment of the Effects of Certain Plans and Programmes on the Environment. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:197:0030:0037:EN:PDF, accessed 18 October 2019.

Element Energy (2021) Decarbonising the Scottish Transport Sector. Final Report for Transport Scotland, accessed 16 September 2021.

Environmental Standards Scotland (2021) Air Quality Investigation. Available at: https://environmentalstandards.scot/wp-content/uploads/2021/11/ESS-Investigations-Air-quality-website-information-Nov21.pdf , accessed 07 January 2022.

The Fifth Estate (2020) How to Disembody your Carbon. Available at: https://thefifthestate.com.au/innovation/building-construction/how-to-disembody-your-carbon/ , accessed 04 November 2021.

HES (2018) Asset Management Plan 2018. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=bb46bde1-518e-4590-8fca-a882010e711f, accessed 16 December 2021.

HES (2020a) Strategic Transport Projects Review 2 - Environmental Assessment (Scotland) Act 2005 – 01511 Scoping. HES response sent to Transport Scotland and SEA Gateway, accessed 6 February 2020.

HES (2020b) Climate Action Plan, Historic Environment Scotland. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=94dd22c9-5d32-4e91-9a46-ab6600b6c1dd , accessed 11 March 2022.

HES (2021a) Strategic Transport Projects Review 2 - Update and Phase 1 Recommendations - February 2021. HES response sent to Transport Scotland and SEA Gateway, accessed 30 March 2021.

HES (2021b) Infrastructure Investment Plan Consultation. HES response sent to

Infrastructure Investment Plan team (Scottish Government) and SEA Gateway, 19 November 2020.

Infrastructure Commission for Scotland (2020) Phase 2 Delivery Findings Report (Appendix A: Summary of Phase 1 Recommendations. Available at: https://infrastructurecommission.scot/storage/261/Phase2_Appendix_A.pdf, accessed 21 June 2021.

Jacobs AECOM (2019) STPR2 SEA Scoping Report. Available at https://www.strategicenvironmentalassessment.gov.scot/PublicSearch.aspx accessed 04 October 2022.

Jacobs AECOM (2021a) STPR2 SEA Progress Report. February 2021. Available at: https://www.transport.gov.scot/media/49074/strategic-environmental-assessment-sea-progress-report.pdf, accessed 21 June 2021.

Jacobs AECOM (2021b) STPR2 Phase 1 Recommendations Report. Available at: https://www.transport.gov.scot/publication/update-and-phase-1-recommendations-february-2021-stpr2/, accessed 30 September 2022.

Jacobs AECOM (2021c) National Case for Change Report, Jacobs/AECOM, February 2021.

Jacobs AECOM (2021d) Regional Case for Change Reports (8 No.), Jacobs/AECOM, February 2021.

Jacobs AECOM (2022a) STPR2 Equalities Impact Assessment (EqIA) Report. Available at: https://www.transport.gov.scot/media/50908/equality-impact-assessment-draft-report-january-2022-stpr2.pdf, accessed 30 September 2022.

Jacobs AECOM (2022b) STPR2: Draft Technical Report. Available at: https://www.transport.gov.scot/media/50946/draft-technical-report-january-2022-stpr2.pdf, accessed 30 September 2022.

Jacobs AECOM (2022c) Habitats Regulations Appraisal of STPR2, December 2022.

Jacobs AECOM (2022d) STPR2 SEA Draft Environmental Report. Available at: https://www.transport.gov.scot/publication/strategic-environmental-assessment-draft-environmental-report-january-2022-stpr2/, accessed 30 September 2022.

Jacobs AECOM (2022e) STPR2 Consultation Summary Report, December 2022.

Jacobs AECOM (2022f) STPR2: Technical Report (final version, December 2022).

Joint Nature Conservation Committee (JNCC) (2021) Seabird Monitoring Programme. Available from: https://jncc.gov.uk/our-work/seabird-monitoring-programme/, accessed 16 December 2021.

NatureScot (2017) Scotland's Landscape Monitoring Programme. Available at: https://www.nature.scot/professional-advice/landscape/scotlands-landscape-monitoring-programme, accessed 16 December 2021.

NatureScot (2018a) How we monitor features. Available from: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/site-condition-monitoring/how-we-monitor-features, accessed 16 December 2021.

NatureScot (2018b) Indicator 8: Connectivity. Available from:

https://www.environment.gov.scot/our-environment/state-of-the-environment/ecosystem-health-indicators/function-indicators/indicator-8-connectivity/#:~:text=for%20this%20indicator%3F-,What%20is%20it%3F,to%20as%20the%20landscape%20matrix , accessed 29 April 2022.

NatureScot (2019) State of Nature Report Scotland 2019. Available from: https://www.nature.scot/sites/default/files/2019-10/State-of-nature-Report-2019-Scotland-full-report.pdf, accessed 16 December 2021.

NatureScot (2021) STPR2 – Update and Phase 1 Recommendations – SEA Progress Report. NatureScot response sent to Transport Scotland and SEA Gateway, accessed 31 March 2021.

NatureScot (2022a) 30 by 30 explained: Background on 30x30 to help inform the co-design of Scotland's 30x30 framework. Available from: https://www.nature.scot/professional-advice/protected-areas-and-species/30-30-and-nature-networks/30-30-explained, accessed 29 April 2022.

NatureScot (2022b) Scotland's Natural Capital Asset Index – 2021 Summary. Available from: https://www.nature.scot/doc/scotlands-natural-capital-asset-index-2021-summary, accessed 24 May 2022.

NatureScot (2022c) Habitat Map of Scotland. Available from: https://www.nature.scot/landscapes-and-habitats/habitat-map-scotland, accessed 29 April 2022.

ODPM (2005) A Practical Guide to the SEA Directive. Office of the Deputy Prime Minister. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf accessed 15 October 2021.

Scotland's Environment (2021) Available from: http://www.scottishairquality.scot/ accessed 24 November 2021.

Scotland's Soils (2018) Soil monitoring. Available from: https://soils.environment.gov.scot/soils-in-scotland/soil-monitoring/, accessed 16 December 2021.

Scottish Environment Protection Agency (SEPA) (n.d.) Protected areas – Water. Available from: https://www.sepa.org.uk/environment/water/monitoring/protected-areas/, accessed 16 December 2021.

SEPA (2007) Scotland's WFD aquatic monitoring strategy. Available from: https://www.sepa.org.uk/media/38220/wfd_aquatic_monitoring_strategy-scotland_river_basin.pdf, accessed 16 December 2021.

Scottish Government (2013) Strategic Environmental Assessment Guidance. August, 2013.

Scottish Government (2015) Cleaner Air for Scotland: The Road to a Healthier Future Available from: http://www.gov.scot/Resource/0048/00488493.pdf, accessed 24 November 2021.

Scottish Government (2018) Climate Change Plan: Third Report on Proposals and Polices

2018-2032 Summary Document.

Scottish Government (2019a) National Islands Plan. Available from: https://www.gov.scot/publications/national-plan-scotlands-islands/pages/7/, accessed 10 December 2021.

Scottish Government (2019b) Annual Compendium of Scottish Energy Statistics. Available from: https://www.gov.scot/publications/annual-compendium-of-scottish-energy-statistics/, accessed 16 December 2021.

Scottish Government (2020a) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032. Available from: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/, accessed 10 December 2021.

Scottish Government (2020b) Protecting Scotland, Renewing Scotland: The Government's Programme for Scotland 2020-2021. Available from: https://www.gov.scot/publications/protecting-scotland-renewing-scotland-governments-programme-scotland-2020-2021/documents/, accessed 10 December 2021.

Scottish Government (2020c) Investing for Jobs: Capital Spending Review Framework 2021-2022 to 2025-2026. Available from: https://www.gov.scot/publications/investing-jobs-capital-spending-review-framework-2021-22-2025-26/, accessed 10 December 2021.

Scottish Government (2021a) Creating Better Ways of Living: Taking Climate Action to Reduce Car Use by 2030.

Scottish Government (2021b) Cleaner Air for Scotland 2: Towards a Better Place for Everyone. Available from: https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/, accessed 10 December 2021.

Scottish Government (2021c) Just Transition Commission: A National Mission for a fairer, greener Scotland. Available from: https://www.gov.scot/publications/transition-commission-national-mission-fairer-greener-scotland/pages/5/#:~:text=%20Just%20Transition%20Commission%3A%20A%20National%20Mission%20for,supply%20chain%20and%20embed%20quality%20work...%20More%20 , accessed 10 December 2021.

Scottish Government (2021d) A Fairer, Greener Scotland: Programme for Government 2021-22. Available from: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/, accessed 9 November 2022.

Scottish Government (2021e) Infrastructure Investment Plan for Scotland 2021-2022 to 2025 -2026. Available from: https://www.gov.scot/policies/government-finance/infrastructure-investment/, accessed 10 December 2021.

Scottish Government (2021f) National Performance Framework. Available from: https://nationalperformance.gov.scot/, accessed 10 December 2021.

Scottish Government (2021g) Investing for jobs: Capital Spending Review 2021-2022 to 2025-2026. Available from: https://www.gov.scot/publications/investing-jobs-capital-spending-review-2021-22-2025-26/, accessed 10 December 2021.

Scottish Government (2021h) Scotland's Climate Assembly – recommendations for action: SG response. Available from: https://www.gov.scot/publications/scottish-government-

response-scotlands-climate-assembly-recommendations-action/pages/3/ accessed 17 December 2021.

Scottish Government (2021i) Scottish Government and Scottish Green Party - Shared Policy Programme. Available from: https://www.gov.scot/publications/scottish-government-scottish-green-party-shared-policy-programme/documents/, accessed 21 April 2022.

Scottish Government (2022a) Scotland's National Strategy for Economic Transformation, Available from: https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/ accessed 09 November 2022.

Scottish Government (2022b) National Planning Framework 4 (Revised Draft). Available from: https://www.transformingplanning.scot/national-planning-framework/, accessed 9 November 2022.

Scottish Government (2022c) Reducing Car Use for a Healthier, Fairer and Greener Scotland: A Route Map to Achieve a 20 Per Cent Reduction in Car Kilometres by 2020, Scottish Government and COSLA, January 2022. Available from: https://www.transport.gov.scot/news/reducing-car-use-for-a-healthier-fairer-and-greener-scotland/ , accessed 09 November 2022.

Scottish Government (2022d) A Stronger and More Resilient Scotland. The Programme for Government 2022-23. Available from: https://www.gov.scot/publications/stronger-more-resilient-scotland-programme-government-2022-23/ accessed 30 November 2022.

Skills Development Scotland (2019). Skills Investment Plan for Scotland's historic environment sector. Available from: https://www.skillsdevelopmentscotland.co.uk/media/45467/historic-environment-sip.pdf, accessed 31 May 2022.

SNH (2020) Strategic Transport Projects Review 2 - Environmental Assessment (Scotland) Act 2005 – 01511 Scoping. SNH response sent to Transport Scotland and SEA Gateway, 7 February 2020.

Transport Scotland (2018) STAG Technical Database. Available from: https://www.transport.gov.scot/publication/stag-technical-database/, accessed 10 December 2021.

Transport Scotland (2020a) National Transport Strategy (NTS2) – Second Delivery Plan – 2020 to 2022. Available from: https://www.transport.gov.scot/publication/national-transport-strategy-nts2-second-delivery-plan-2022-2023/, accessed 17 November 2022.

Transport Scotland (2020b) Transport and Travel in Scotland – All editions. Available from: https://www.transport.gov.scot/our-approach/statistics/#42764, accessed 16 December 2021.

Transport Scotland (2020c) Active Travel Framework.   Available from: https://www.transport.gov.scot/publication/active-travel-framework-1/ accessed 30 November 2022.

Transport Scotland (2021a) Initial Appraisal: Case for Change – (National and Regional) – STPR2. Available from: https://www.transport.gov.scot/our-approach/strategy/strategic-transport-projects-review-2/, accessed 14 January 2022.

Transport Scotland (2021b) Reported Road Casualties Scotland 2020. Available from:

https://www.transport.gov.scot/our-approach/statistics/#42762, accessed 16 December 2021.

Transport Scotland (2021c) Scottish Transport Statistics No 39 2020. Available from: https://www.transport.gov.scot/our-approach/statistics/#42763, accessed 16 December 2021.

Transport Scotland (2022) National Transport Strategy (NTS2) - Second Delivery Plan - 2022-2023. Available from: https://www.transport.gov.scot/publication/national-transport-strategy-nts2-second-delivery-plan-2022-2023/ accessed 17 November 2022.

Transport Scotland (n.d.) The Trunk Road Network. Available from: https://www.transport.gov.scoat/transport-network/roads/the-trunk-road-network/, accessed 10 December 2021.

UK Centre for Ecology & Hydrology (UKCEH) (2022). Air Pollution Information System (APIS). Available from: http://www.apis.ac.uk/app, accessed 25 April 2022.

Under 2° Secretariat Climate Group (2021). Further, Faster, Together: Under2 Leaders Actions at COP26. Available from: https://www.theclimategroup.org/further-faster-together-under2-leaders-actions-cop26, accessed 20 December 2021.