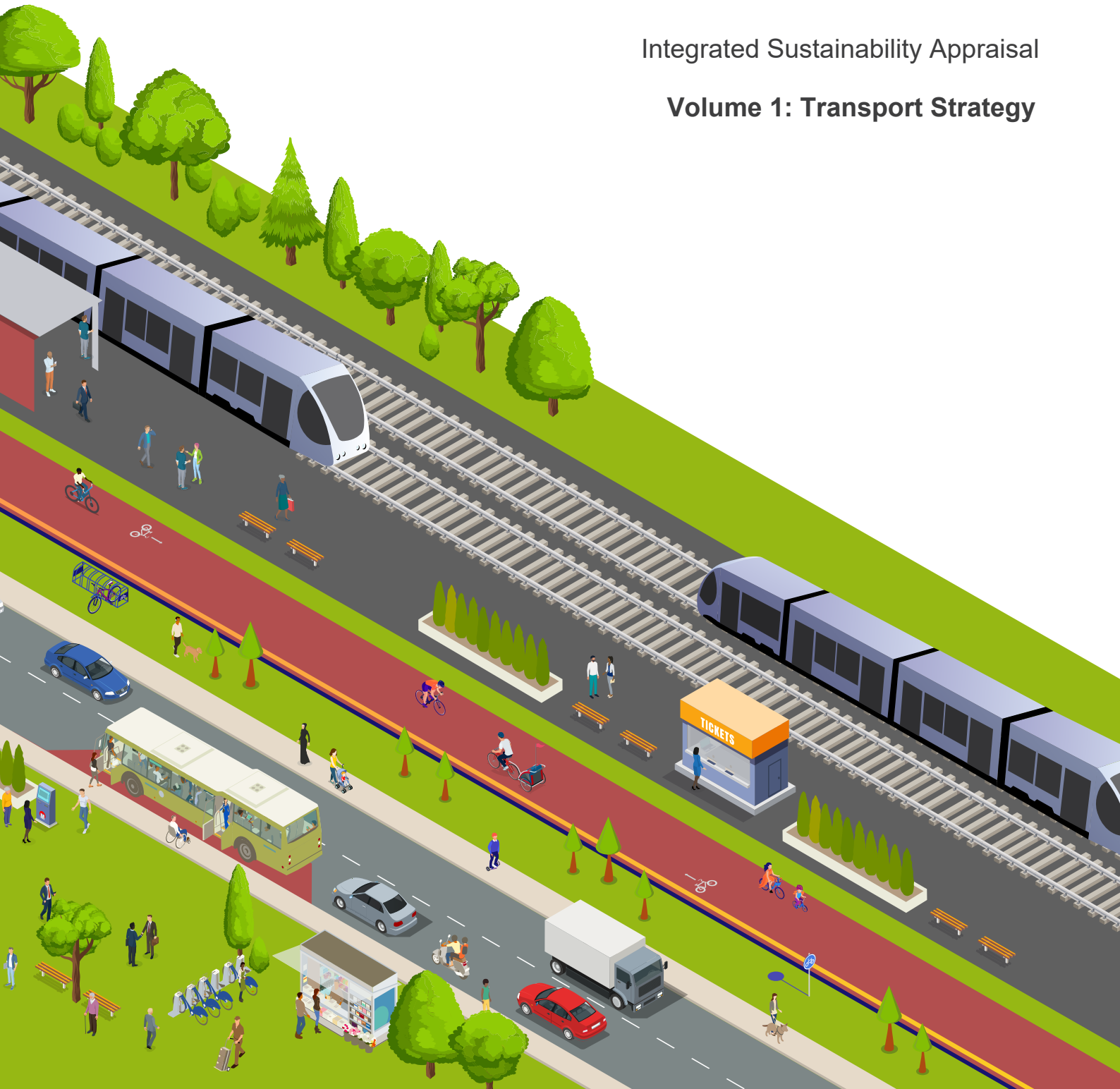
TRANSPORTEAST Jacobs

Transport East
Transport Strategy

Integrated Sustainability Appraisal

Volume 1: Transport Strategy



Transport East

Transport Strategy:

Integrated Sustainability Appraisal: Volume 1- Strategy

List of Abbreviations

Acronym	Terminology
ALC	Agricultural Land Use
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BA	Broads Authority
CSA	Community Safety Assessment
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
ECC	Essex County Council
EcoW	Ecological Clerk of Works
EPSML	European Protected Species Mitigation License
EqIA	Equality Impact Assessment
EV	Electric Vehicle
GVA	Gross Value Added
HE	Historic England
HIA	Health Impact Assessment
HRA	Habitats Regulation Assessment
IMD	Index of Multiple Deprivation
IROPI	Imperative reasons of overriding public interest
ISA	Integrated Sustainability Appraisal
JNCC	Joint Nature Conservation Committee
JSNA	Joint Strategic Needs Assessment
LEP	Local Enterprise Partnership
LNR	Local Nature Reserves
LPAs	Local Planning Authority
LSOA	Lower Layer Super Output Areas

Acronym	Terminology
NCA	Natural Capital Assessment
NCA	National Character Area
NEA	National Ecosystem Assessment
NERC	Natural Environment and Rural Communities
NIA	Noise Impact Area
NMVOC	Non-methane volatile organic compounds
NNR	National Nature Reserves
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NSIPs	Nationally Significant Infrastructure Projects
NTS	Non-Technical Summary
ONS	Office for National Statistics
PHE	Public Health England
PPS	Plans, Policies and Strategies
PRoW	Public Right of Way
RIGS	Regionally Important Geological Sites
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SFOE	Suffolk Friends of the Earth
SO_2	Sulphur Dioxide
SPA	Special Protection Areas
SPZ	Source Protection Zone
SSSI	Sites of Special Scientific Interest
TAN	Transport Action Network
TE	Transport East
TESIP	Transport East Strategic Investment Programme
WHO	World Health Organisation

Glossary

Term	Definition
Integrated Sustainability Appraisal	Combined environmental social and economic assessments
Accident	An accident involves personal industry occurring on the public highway (including footways) in which at least one road vehicle or a vehicle in collision with a pedestrian is involved and which becomes known to the police within 30 days of its occurrence. (Definition from Department of Transport)
Assessment	An umbrella term for description, analysis, and evaluation.
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.
Baseline	The existing conditions which form the basis of the environmental assessment
Bedrock	Hard rock that lies beneath a superficial cover of soils and sediments.
Biodiversity	Biological diversity, or richness of living organisms present in representative communities and populations.
Catchment	The area contributing flow to a point on a drainage system.
Community	Assemblage of interacting populations that occupy a given area or region.
Conservation	Preservation or restoration of the natural environment and wildlife.
Ecosystem	A biological community of organisms interacting with one another and their physical environment.
Ecosystem Services	The direct and indirect benefits provided by natural capital stocks/ assets.
Effect	The result of change on specific environmental resources or receptors.
Environmental Net Gain	Refers to taking steps to mitigate the high potential impact of infrastructure projects on natural capital, leaving the environment in a measurably better state compared to the pre-development baseline.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities
Habitat Regulations Assessment	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 Assessment (HRA).
Landscape	Human perception of the land, conditioned by knowledge and identity with a place or setting.
Lower Layer Super Output Areas	A geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.
Mitigation	Measure to avoid, reduce or offset potential adverse impacts.

Term	Definition
Natural Capital	Natural Capital is classified as the world's stock of natural resources, which includes geology, soils, air, water and living organisms.
River Basin District	The area of land and sea, made up of one or more river basins, together with the associated groundwater and coastal waters, identified by the Water Framework Directive as the main unit for the management of river basins.
Scoping Report	The purpose of a scoping stage is to describe the environmental context, by establishing the relevant baseline information, reviewing other relevant PPS and identifying environmental problems and opportunities. Scoping Reports also provide a proposed methodology to be used for assessing potential environmental effects.
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.
Soft Estate	refers to the environment (inclusive of natural habitats) which line transport infrastructure.
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 (Directive74/409/EEC) to protect important bird habitats.
Source Protection Zone (SPZ)	Protection areas around public water supply sources
Strategic Environmental Assessment	The process by which information about the environmental effects of proposed plans, policies and programmes are evaluated under the SEA regulations.
Water Quality	The chemical and biological status of various parameters within the water column and their interactions, for example dissolved oxygen, indicator metals such as dissolved copper, or suspended solids

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1 Introduction and Background – ISA process

1.1 Background to the Transport East Transport Strategy

Transport East is the Sub-national Transport Body for Norfolk, Suffolk, Essex, Southend-on-Sea and Thurrock. The partnership provides a single voice for councils, business leaders and partners on the region's transport strategy and strategic transport investment priorities. The partnership is developing its first Transport Strategy which aims to provide a sustainable strategic approach underpinning the region's future transport investment and support Transport East's ambitious and inclusive economic, social and environmental goals for the region to 2050.

Transport East currently has a pre-statutory status and while this also affects the status of the strategy and the legal requirements for environmental assessments, the intention is that preparation of the strategy will follow the same process as for a statutory transport plan. Transport East is therefore undertaking an Integrated Sustainability Appraisal to inform the development of the Strategy as part of ensuring that opportunities for enhancement are included and potential constraints are addressed by the Strategy.

The vision for the Transport East Transport Strategy is to create a thriving economy for the East, with fast, safe, reliable, and resilient transport infrastructure driving forward a future of inclusive and sustainable growth for decades to come. **Error! Reference source not found.** shows how the T ransport Strategy will help deliver the goals for the region.

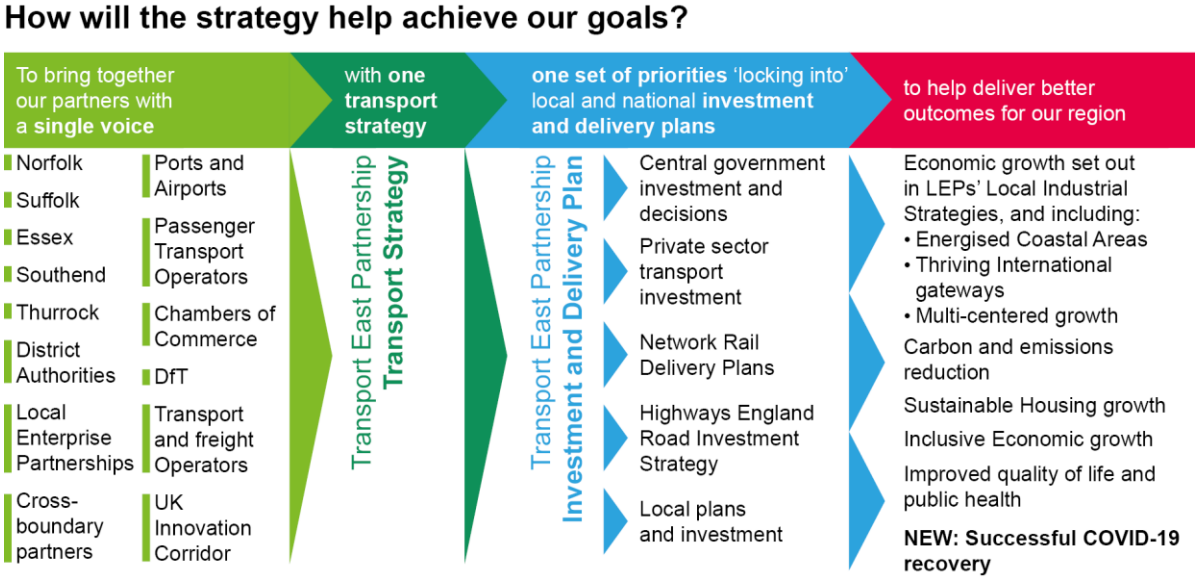

Figure 1.1 The role of the Transport Strategy

The audience for the Transport Strategy is wide-ranging and the aim is that the Strategy will provide:

- Confidence to national decision-makers and delivery bodies to invest in the region: including Government, transport delivery agencies and private sector investors.
- Clarity and co-ordination for local and regional partners: including local authorities, community groups, businesses, transport operators and the general public.

The Transport Strategy was developed following a comprehensive review of existing strategies and policy documents to identify current and future opportunities and the challenges faced by the region. This review was supported through extensive engagement with local authorities, business leaders and other partners. This process identified important wider outcomes that the Strategy should contribute to delivering, four strategic priorities and six core movement corridors.

The review included developing an evidence base comprising a series of "deep dive" studies (https://www.transporteast.org.uk/consultation-documents) covering the region's road and rail network, international gateways, rural and coastal communities, and the specific role of transport in economic growth.

The draft Transport Strategy and draft Strategic Investment Programme (SIP) approach were published for an 8 week consultation between 2nd December 2021 and 30th January 2022 together with the integrates Sustainability Appraisal (ISA) and draft HRA screening report. The consultation was supported by online engagement events.

Following the end of consultation, comments received have been reviewed and the analysis on responses are reported in a Consultation Report. The Transport Strategy and SIP have been revised and updated to take account of comments where appropriate and new information.

The ISA and draft HRA have also been updated to take account of comments received as well as the revisions to the Transport Strategy and SIP and the results of the Phase 1 carbon emissions study undertaken by Energy Systems Catapult (ESC). These documents are all available on the Transport East website.

Separate volumes of the ISA and HRA are provided for the Transport Strategy (ISA Volume 1 – this document) and the SIP (ISA Volume 2). This is in response to comments and to facilitate future updating and revision.

1.2 Geographical Scope of Transport East

The Transport East region is bordered by three other sub-national transport bodies; Midlands Connect, England's Economic Heartland and Transport for the South East (**Error! Reference source not found.**). The draft Transport Strategy addresses links to the north, west and south, as well as the needs of the Transport East area.

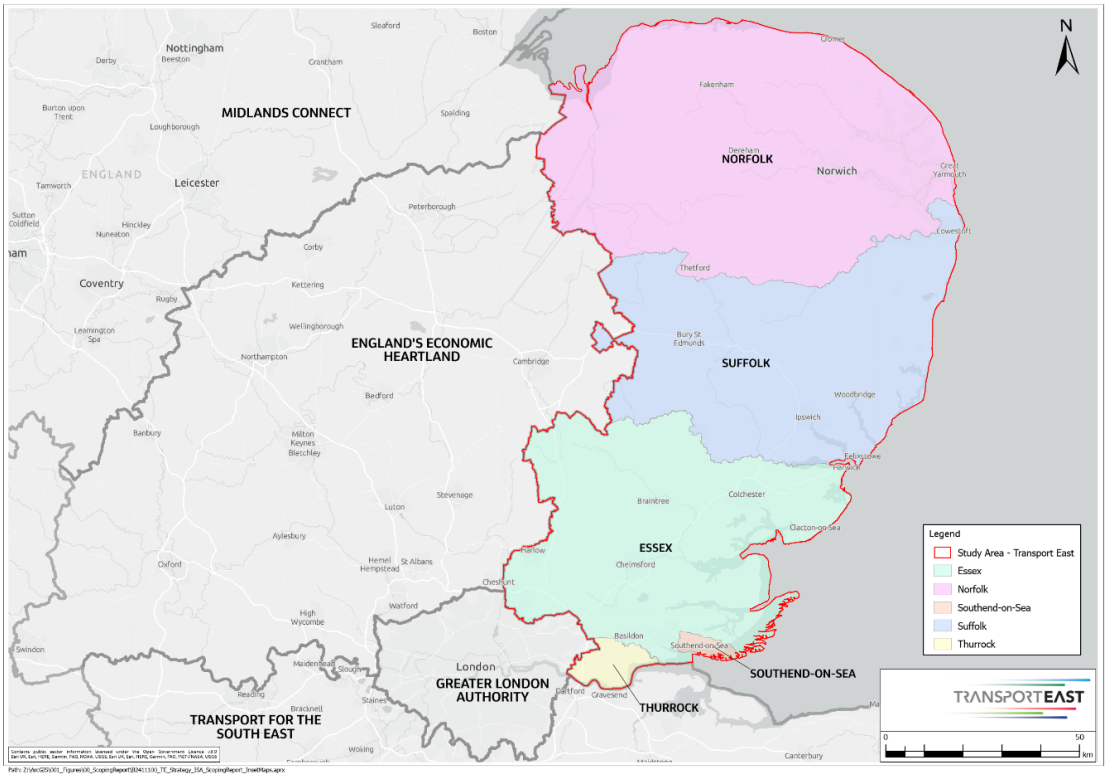

Figure 1.2 Location of Transport East

Transport East comprises of three county councils (Essex, Norfolk and Suffolk) as well as two Unitary Authorities (Southend-on-Sea and Thurrock), these five authorities are also transport authorities. It also comprises of 24 district/borough authorities and two Local Enterprise Partnerships (New Anglia LEP and South East LEP).

The region also has a number of significant designations, including three Areas of Outstanding Natural Beauty (AONBs – Norfolk Coast, Suffolk Coast & Heaths, and Dedham Vale), and The Broads which has status equivalent to a National Park.

1.3 Temporal Scope of Transport East

The Transport East Transport Strategy will be a plan to 2050. The best performing solutions to achieve the strategic actions of each of the four pathways are identified as priority schemes in a draft Strategic Investment Programme (SIP) for the Region, which sets out clear timescales for the creation of a pipeline of solutions to come forward over the strategy's lifetime. It is currently proposed that this will be updated annually and reviewed every 3 – 5 years to enable the strategy and delivery programme to adapt to the latest government objectives, funding approach and reflect new scheme proposals and progress against identified priorities.

1.4 Integrated Sustainability Appraisal (ISA) Process

Transport East is committed to improving the environmental, social, and economic wellbeing of the Region as indicated in the wider outcomes studies outlined in Section 2. As part of this commitment, Transport East is undertaking an Integrated Sustainability Appraisal (ISA) to inform the development of the Transport Strategy.

An ISA is a process for assessing the social, economic, and environmental impacts of a plan or strategy in a systematic and transparent way with the aim that sustainable development principles will underpin the strategy.

What are sustainable development principles?

According to the Brundtland Commission's report, Our Common Future, (1987), sustainable development means "*meeting the needs of the present without compromising the ability of future generations to meet their needs.*" The concept is often broken into three core concepts or "pillars": economic, environmental, and social.

"economic sustainability" focuses on the portion of natural resources that provide physical inputs for economic production, including renewable and exhaustible resources.

"environmental sustainability" adds greater emphasis on the "life support systems," such as the atmosphere or soil, that must be maintained for economic production or human life to even occur and this includes the need for example to address climate change, avoid loss of biodiversity, prevent pollution and reduce waste.

'social sustainability' focuses on the human effects of economic systems, and the quality of life, well-being and health, promoting inclusion and combating inequality.

How is sustainable transport defined?

Transport enables the mobility of people and goods, enhancing economic growth and livelihoods while improving access to quality services, such as health, education and finance. It strengthens connectivity at all levels, helping integrate economies, improving social equity, enhancing rural-urban linkages and building resilience. There is also recognition of negative environmental, social and health impacts.

Sustainable transport seeks to fully realize the benefits while avoiding or alleviating the negative effects and can be defined as:

"*the provision of services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today's and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts*" (UN, October 2016)

Sustainable transport also needs to reflect commitments to achieve net zero carbon emissions, support nature recovery, provide biodiversity and environmental net gain and ensure access to transport is inclusive and equitable.

The ISA is based around the Strategic Environmental Assessment (SEA) process and has five key stages (**Error! Reference source not found.**), including an initial scoping stage providing context a nd focus for the assessment, and iterative assessment of the developing plan, followed by consultation on the assessment and draft strategy documents. Consultation responses are taken into account in the finalisation of the strategy and a statement is then published identifying how the ISA has been taken into account. The final stage is to monitor the implementation of the strategy and environmental and social impacts.

Figure 1.3 Key Stages in the ISA process

ISA Assessments

The Integrated Sustainability Appraisal (ISA) incorporates:

- Strategic Environmental Assessment (SEA) in accordance with the Environmental Assessment of Plans and Programmes Regulations 2004 (SI 2004/ 1633, "2004 Regulations" as amended) (SEA regulations).
- Health Impact Assessment (HIA) using guidelines set out by the Public Health Observatories.
- Equality Impact Assessment (EqIA), as required by section 149 of the Equality Act 2010, as amended.
- Community Safety Assessment (CSA) as required by the Crime and Disorder Act 1998 and the Police and Justice Act 2006, as amended.
- Habitats Regulations Assessment (HRA) as required by the Conservation of Habitats and Species Regulations 2017, as amended.
- Natural Capital assessment to meet requirements in Government's 25 Year Environment Plan and the 2021 Environment Act in relation to biodiversity net gain.

Further detail for each type of assessment is provided below.

Strategic Environmental Assessment

SEA is a means of systematically assessing the likely impact of a public plan, programme or strategy on the environment. SEA aims to offer greater protection to the environment by ensuring public bodies and those organisations preparing plans of a 'public character' (in this case, Transport East) consider and address the likely significant environmental effects.

SEAs are required under the SEA regulations[1], which transpose the SEA Directive (2001/42/EC). An SEA is mandatory for any plans, programmes or strategies which cover the following sectors: agriculture, forestry, fisheries, energy, industry, transport, waste or water management, tourism, town and country planning or land use and which set the framework for future development consent of projects subject to EIA regulations.

Qualifying plans under the SEA regulations as those which are 'subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government and required by legislative, regulatory or administrative provisions'. Currently Transport East and the Transport Strategy under development does not have this formal status but there is commitment to undertake assessment complying with the regulatory requirements as part of supporting sustainable development objectives.

SEA is an iterative process involving collecting relevant data and establishing evidence of current baseline conditions and future trends, assessing potential environmental effects and proposing mitigation measures and recommendations to address the environmental effects identified at a strategic level.

Key guidance on SEA followed for the assessment approach for the TE Transport Strategy is set out in the *Planning Practice guidance on SEA and Sustainability Appraisal (2015)*[2] and the *Practical Guide to SEA (2005)*[3]. In addition, consideration is given to the Department for Transports Transport Analysis Guidance (TAG) including *TAG A3 Environmental Impact Appraisal (2019)*[4] and *TAG A4.1 Social Impact Appraisal (2020)*[5] in so far as they address qualitative assessments and define topic area issues and also *TAG Unit 2.1 Strategic Environmental Assessment for Transport Plans and Programmes*[6].

An assessment framework is developed comprising objectives and assessment criteria relevant to the area and strategy proposals based on an understanding of environmental issues and opportunities from the policy and baseline review. This also forms the framework for integrating the requirements of each of the assessments below.

Natural Capital Assessment

The Government's 25-year Environment Plan and the Environment Act 2021 introduce requirements for the use of natural capital assessment and the concept of infrastructure development providing biodiversity and environmental net gain. These requirements and their implications for schemes will be considered in the ISA and recommendations for the draft Transport Strategy on how these can be taken forward.

A natural capital approach can be used to understand the interdependencies between the natural environment, society and the economy, so that natural capital is considered holistically and integrated appropriately within decision making.

There are several policy and guidance documents which have identified the potential for transport infrastructure to contribute to the restoration and enhancement of natural capital and ecosystem services (particularly through proactive management of the 'soft estate') and these include:

- A Natural England report in 2014, investigating how land within or adjacent to transport corridors could be used or enhanced for green infrastructure that delivers biodiversity gain, ecological connectivity, and ecosystem services.
- The Environment Agency's Achieving Net Zero document [7], containing information on grassland management, with a focus on road verges. It identifies management measures that could improve the ecosystem service provision of road verges, including carbon sequestration.
- The National Infrastructure Commissions' Natural Capital and Environmental Net Gain discussion paper, considering the impact of infrastructure development on natural capital assets, identifying current approaches to natural capital and environmental net gain, and setting out next steps to ensure the impact of infrastructure on natural capital is understood and addressed.[8]

Health Impact Assessment

Health Impact Assessment (HIA) is a process in which the likely or potential health effects on populations of a proposed plan or project are identified along with the potential mitigation methods to reduce or avoid any negative impacts. The process will also seek to identify opportunities to maximise benefits.

There is no formal requirement for HIA or specific methodology to be followed but there is good practice and policy guidance which can be applied. The approach taken for this ISA is to include and combine the HIA assessment within the ISA 'Health' topic throughout the assessment. The approach used for the HIA follows guidelines set out by the Public Health Observatories[9].

Community Safety Assessment

Community Safety Assessments (CSA) are used to identify where possible community safety issues could occur. CSAs can also address potential issues by identifying opportunities to improve design function for future development, such as lighting design considerations to reduce road traffic collisions. In addition, personal security risks are considered such as how to improve personal security through either the reduction of opportunities for crime or through improvements to perceptions of security (where this perception would otherwise prevent potential users from travelling). Community Safety Assessments are required by the Crime and Disorder Act 1998 and the Police and Justice Act 2006, as amended.

Community Safety is included as an ISA topic for the assessment of the Transport Strategy.

Habitats Regulations Assessment

Habitats Regulations Assessments (HRA) are required in respect of any plan or project which, either alone or in combination with other plans or projects would be likely to have a significant effect on a site designated within the Natura 2000 network. An HRA is required by the Conservation of Habitats and Species Regulations 2017, as amended. Guidance on the Habitats Directive[10] sets out four distinct stages for assessment:

- Stage 1: Screening: the process which initially identifies the likely impacts upon a Natura 2000 site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts are likely to be significant – this is undertaken without considering mitigation;
- Stage 2: Appropriate Assessment: the detailed consideration of the impact on the integrity of the Natura 2000 sites of the plan or project, either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This is to determine whether there will be adverse effects on the integrity of the site;
- Stage 3: Assessment of alternative solutions: the process which examines alternative ways of achieving the objectives of the plans or projects that avoid adverse impacts on the integrity of the Natura 2000 site; and
- Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain: an assessment of whether the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of Natura 2000 network.

The HRA requirements are incorporated into the ISA objectives and will be considered as part of the development of the strategy. In addition, to meet HRA requirements a Stage 1 assessment will be undertaken once the range of potential strategy interventions and proposals are identified and this will determine the requirement for a Stage 2 strategic level appropriate assessment to be undertaken for the Transport Strategy.

Equalities Impact Assessment

An Equalities Impact Assessment (EqIA) assesses the likely equalities effects of a policy, project or plan, as required by section 149 of the Equalities Act 2010, as amended. Its primary aim is to ensure that the policy project or plan does not cause disadvantages or discriminate against anyone whilst also considering potential opportunities for improving equality. The following protected characteristics are covered:

- Age
- Disability
- Sex and Gender
- Gender Reassignment
- Marriage and Civil Partnership
- Pregnancy and maternity
- Race
- Religion or belief; and
- Sexual Orientation

Equality and Diversity will be included as an ISA topic throughout the assessment of the Strategy.

1.5 ISA and HRA and development of the Transport Strategy

A summary of how the development of the Transport Strategy and the ISA and HRA processes interact is provided in **Error! Reference source not found.**.

1.6 Purpose and structure of this Report

The purpose of an ISA is to ensure the sustainability of a strategic plan is considered, by assessing the environmental, social and economic impacts. The ISA considers the policy and legislative context, as well as identifies the current baseline of the Region. Following this the ISA aims to assess interventions and alternatives, as well as both cumulative and synergistic effects. The ISA will also recommend mitigation and monitoring plans.

ISA Volume 1 Transport Strategy

This report is volume 1 of the ISA and covers the Transport Strategy. ISA volume.2 covers the SIP.

This ISA report takes account of the consultation on the draft Transport Strategy and ISA Undertaken between 2nd December 2021- 30th January 2022 and provides updated assessments based on the finalised Transport Strategy and amendments to respond to consultation feedback.

ISA Volume 1 and 2 are provided together with the ISA Post Adoption Statement summarising the ISA and consultation process and are published with the final Transport Strategy and SIP.

This report sets out:

Chapter 1: Introduction and Background;

Chapter Error! Reference source not found.**:** Transport Strategy Proposals

Chapter 3: Review of plans, policies and strategies;

Chapter 4: An overview of Consultation;

Chapter 5: A summary of the baseline environment, identifying issues and opportunities;

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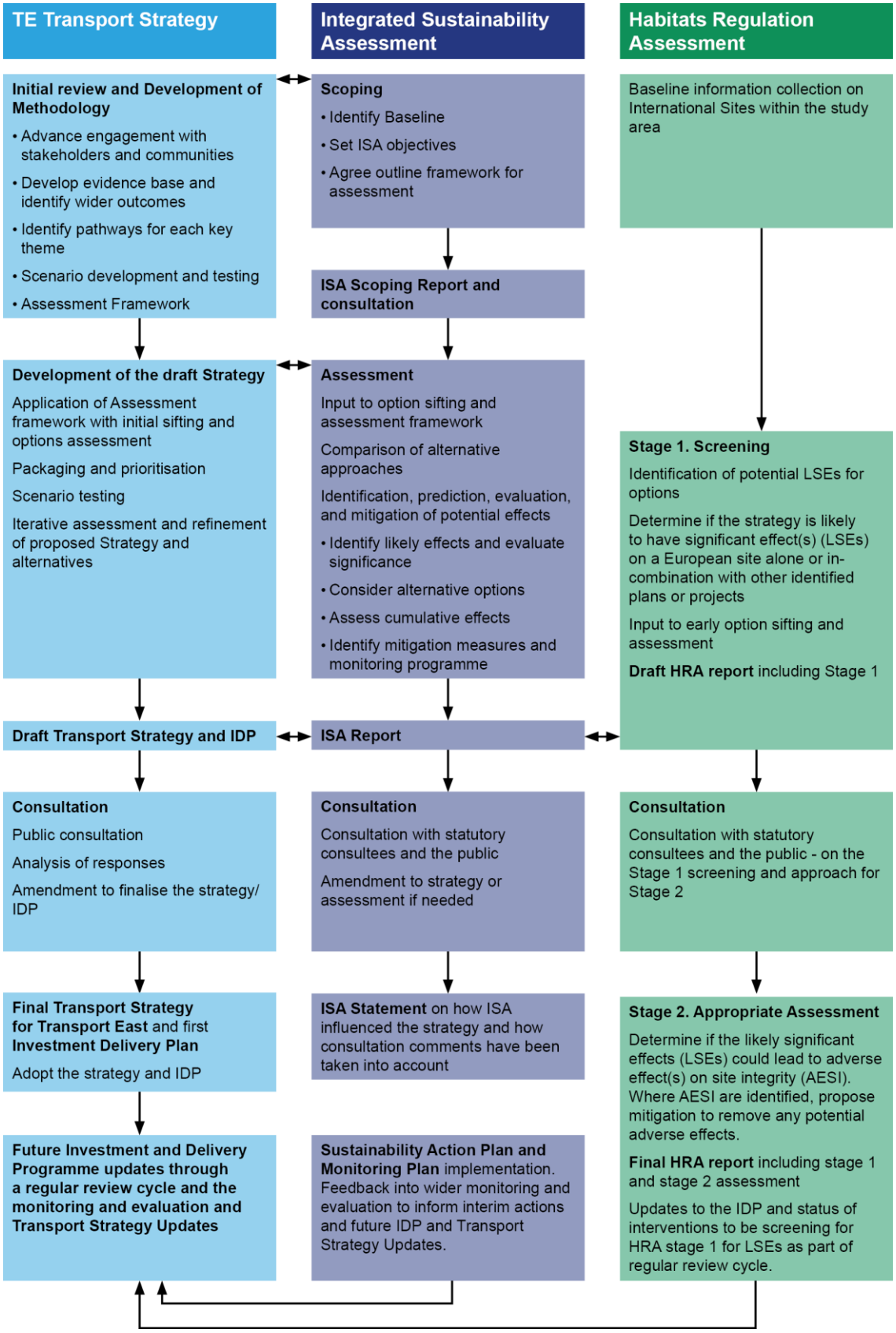

Figure 1.4 Summary of Strategy, ISA and HRA processes

2 Transport Strategy proposals

2.1 Development of the Transport Strategy

Transport East is developing a single regional Transport Strategy and Strategic Investment Programme (SIP), to embed priorities in the delivery plans of government, local authorities, Network Rail, National Highways, the private sector and other transport providers.

The strategy identifies strategic priorities for the region, and the SIP sets out the approach for identifying the individual projects and programmes which are key to implementing the Strategy. The SIP also sets out the investment necessary for the delivery of the strategy (see draft SIP section 2.4).

2.2 Wider Vision and Priorities

The Transport East draft Transport Strategy has identified wider outcomes that the Strategy should contribute to delivery. These include outcomes such as reducing carbon emissions to Net Zero; promoting active, healthy and safe lives; promoting and supporting a productive and diverse economy; supporting skills attainment, retention and social inclusion with access to education, training and employment opportunities.

Regional wider outcomes the Transport Strategy will help deliver:

- reducing carbon emissions to net zero by 2040
- promoting active, healthy and safe lives for all
- promoting and supporting a productive, sustainable and diverse economy
- supporting access to education, training and employment opportunities for all;
- facilitating the sustainable energy sector;
- helping our growing areas to develop sustainably to create high quality, inclusive, distinctive and resilient places to live, work and visit;
- protecting and enhancing the built and natural environment.

These wider outcomes have been combined to inform the overarching vision for the Transport East Region:

Draft Transport Strategy Vision

A thriving economy for the East, with fast, safe, reliable and resilient transport infrastructure driving forward a future of inclusive and sustainable growth for decades to come.

The draft Strategy sets out a series of pathways to follow to deliver this vision, focused on the following four strategic priorities for transport, unique to the Transport East region:

- **Decarbonisation to net-zero**– Working to achieve net zero carbon emissions from transport by 2040, building on our status as the UK's premier renewable energy region.
- **Connecting growing towns and cities** – Enhanced links between our fastest growing places and business clusters. Improving access for people to jobs, supplies, services, and learning; enabling the area to function as a coherent economy and improving productivity
- **Energising coastal and rural communities** – A reinvented, sustainable coast for the 21st century which powers the UK through energy generation. Supporting our productive rural communities and attracting visitors all year round.
- **Unlocking international gateways** – Better connected ports and airports to help UK businesses thrive, boosting the nation's economy and helping to level up communities through better access to international markets and facilitating foreign direct investment.

2.3 Regional Challenges

The “deep dive” studies, along with the production of the road and rail focused regional evidence base and decarbonisation review, identified challenges which are summarised against each theme in the **Error! Reference source not found.** below.

Table 2.1 Summary of challenges per key theme

Key Theme	Challenges
Decarbonisation to net-zero	Brexit impact on UK trade, imposing heightened barriers for accessing a range of decarbonisation capabilities and selling products & services to European Union member states. Public funding is currently skewed in favour of electrification compared to other alternative fuels. There is also currently significant public funding invested in fossil fuel related transport. There are concerns about the sustainability of battery manufacturing and whether an effective recycling method can be developed to minimise the environmental impact of lithium/rare metals earth mining but there are also potential replacements for lithium under development such as silicon or sodium-ion batteries. Recycling technologies for lithium batteries are not keeping pace with the rapid rise in EVs. Safety concerns over the reactivity, storage and transportation of hydrogen to be overcome to make it an acceptable and credible fuel source. Technological gap in electric vehicles (EVs) to enable longer distance ranges, and broader applications. Rollout of EV charging infrastructure. Hydrogen fuel cells are currently more expensive to manufacture than their EV counterparts but there are potential areas for future development such as large scale storage of hydrogen produced using renewables such as offshore wind energy. There is potential to consider use of recycled biofuels There are limited initiatives advancing ways to mass-produce biomethane.
Connecting Growing Towns and Cities	The region has poor east-west connectivity as well as some pockets of poor north-south connectivity, a lack of first mile-last mile (beginning and ending of a journey, for example travelling to a bus stop or railway station) options in some areas, and high levels of car dependency. Growth constraints include skill levels in the region being below the UK average and relatively low levels of innovation and entrepreneurialism. High-quality transport infrastructure has a role to play in tackling constraints by attracting skilled workers to the region, and better connecting residents to employment and education opportunities.
Energising Rural and Coastal Communities	Coastal areas are significantly more likely to be below the average for England for many of the Index of Multiple Deprivation indicators, with rural areas tending to perform better in relation to these indicators, with the exception of education. Rural areas’ main issues are around retaining skilled workers, particularly with a lack of real and perceived transport options to gain access to education, training and employment. Strategies to level up coastal and rural communities need to reflect their different challenges and opportunities.
Unlocking International Gateways	Ports and airports are reliant upon the resilience and reliability of the road and rail networks. More resilience and better recovery from disruption is required to support

Key Theme	Challenges
	gateway expansion, encourage sustainability and encourage intra-regional connection. Specific issues include: Rail network operations are close to or at operational capacity for freight and passenger movement. Rail connectivity is London centric, with a lack of east-west connections, some initiatives are underway to help address this. The Strategic Road Network is essential for major ports, and the local road network is essential for regional ports. Many of the key routes have varying levels of infrastructure provision with unreliable journey times and are lacking resilience. There is a need for integrated logistics and manufacturing in the region to be support by growth at ports and airports, attracting inward investment within the region, and boosting jobs and regional exports. COVID-19 has posed one of the most significant challenges to freight and passenger movements in recent history with long-term consequences potentially for patterns of travel. Support is needed to lower operational, surface access and supply chain emissions in line with the national decarbonisation towards NetZero. Passenger movements are the primary function of airports but a minor function for some ports in the region. Much of passenger movement is London centric, with a need to boost accessibility catchments within the region, and tourism.

Section 4 of the Transport Strategy identifies twelve goals within each of the four strategic priorities along with the actions proposed to achieve these.

The strategy covers a large region and a wide range of areas with differing land uses and characteristics and this is recognised through the place-based approach for the strategy which has tailored proposals to the needs of each area.

In addition to the strategic priorities, Transport East has identified six core strategic corridors (**Error! R eference source not found.**), linking key destinations within and beyond the Region which require particular focus. These corridors include growing urban areas, ports, airports and the road and rail connections between them and the rest of the UK. These corridors are described in section 5 of the Transport Strategy. Further investment will be needed along these if the region is to reach its potential as a thriving, connected, multi-centred economy, whilst reducing carbon emissions.

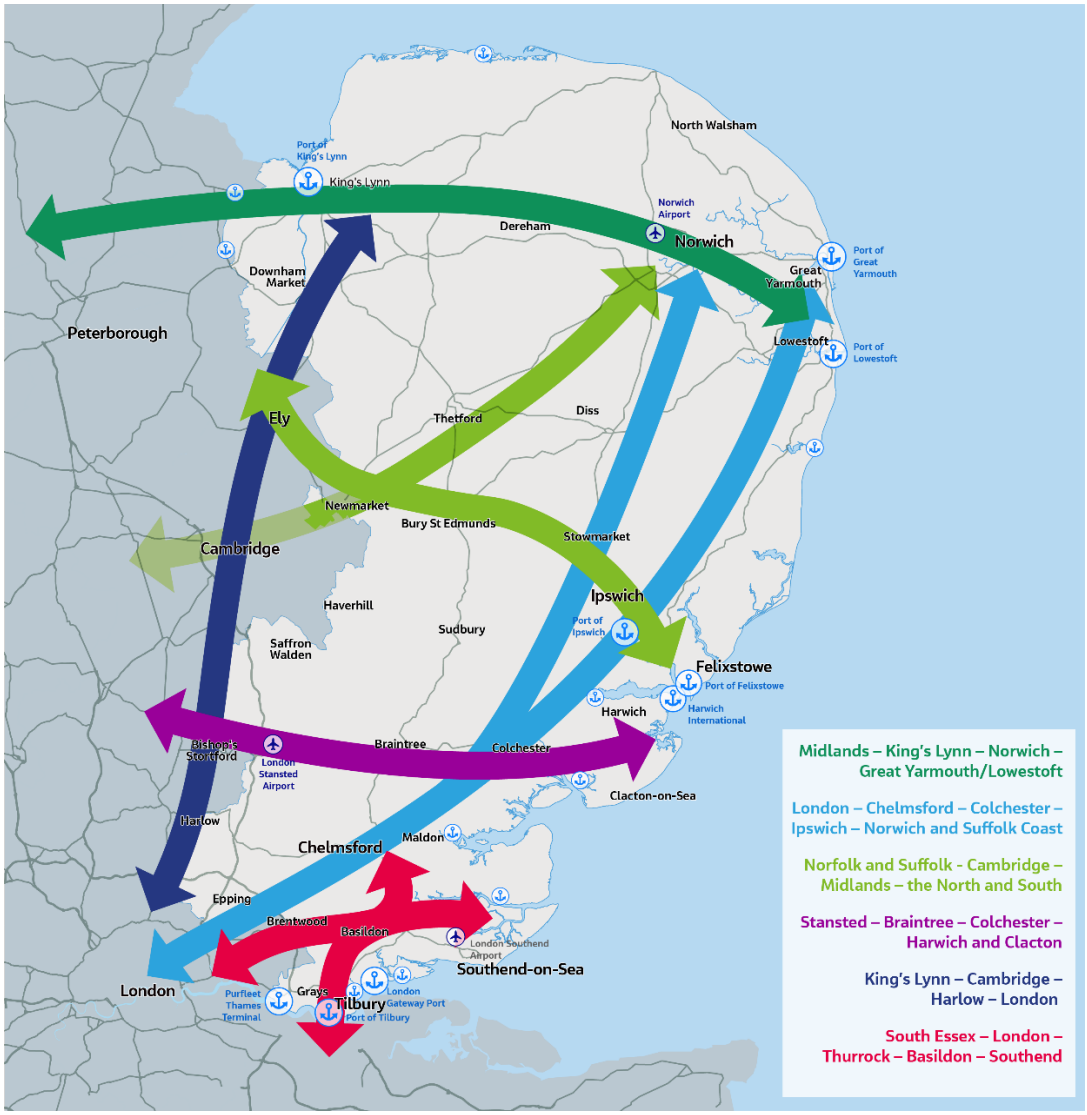

Figure 2.1 Strategic Corridors

Section 6 of the Transport Strategy outlines how the delivery of the strategy will be addressed through the 'Approach to Strategic Investment Programme' (draft SIP). This includes the following key stages:

- Development of an investment pipeline for the east
- Adoption of a strategic assessment framework to consider how the pipeline schemes align with the four strategic priorities.
- How Transport East will work with the Local Transport Authorities, and national partners for the delivery of the strategy
- Technical work programme to support implementation of the strategy
- Development of a Monitoring and Evaluation Plan to monitor performance in implementing the strategy through the interventions
- Regular reporting and review - the strategy will be updated periodically to ensure it remains relevant. This approach allows flexibility and will position the region to continue to support the government in achieving wider national aspirations.

The strategy provides examples and case studies and summaries how the different areas are expected to experience the strategy implementation below.

Rural and coastal communities

- A comprehensive electric vehicle charging network.
- A flexible public transport network providing accessible, reliable connections to the nearest urban centres.
- An efficient, safe and well-maintained local road network providing good connections to important local destinations.
- High-quality, inclusive walking and cycling networks to local centres, public transport hubs and for leisure purposes.
- A high-quality public realm in and around villages, town centres and visitor attractions.
- Ultra-fast broadband and 4/5G mobile connections for all.

Larger urban areas

- High quality, accessible, fast and efficient urban public transport networks, e.g., buses, supported by dedicated infrastructure.
- Comprehensive, safe, high-quality, inclusive urban walking and cycling networks
- Seamless interchanges to sustainable modes for 'last mile' trips into and out of urban areas (e.g., Park and Ride/ Park and Pedal).
- Faster, more reliable, road and rail links between towns and cities within the region and with important external destinations.
- Places and streets in towns and cities focused on the needs of people rather than vehicles.
- Sustainable development concentrated around existing and new public transport hubs.

Ports and airports

- High speed, high-capacity strategic road and rail links providing reliable freight journeys between gateways and major distribution centres.
- Faster, accessible and more reliable road and public transport links for passengers between gateways, major urban centres within the region, and important external destinations.
- Efficient and well-maintained local transport networks connecting to nearby urban areas and local tourist attractions, providing access to local labour markets and encouraging visitors to stay in the region.
- Infrastructure to decarbonise the movement of goods.

2.4 Overview of the Strategic Investment Programme (SIP)

The Strategic Investment Programme (SIP) sets out the approach to developing a regional investment project pipeline and the supporting mechanisms that will be put in place to deliver the strategic priorities in the Transport Strategy.

The SIP has also been developed to align with the Government's national programmes to deliver major road and rail investment. It focusses on strategic scale projects and has not considered more localised schemes, as these will be included in the Local Transport Plans.

Role of Transport East

Transport East will not deliver the individual interventions identified in the SIP, but will manage the SIP, advise government on priorities and deliver a programme of technical work and business case development in partnership with local and national partners.

Transport East has engaged hundreds of partners across the region, throughout the entire process, from identification of strategic priorities to the prioritisation of individual schemes. The engagement throughout has maintained support within the region, including all local authorities.

Interventions and Assessment Approach

The approach for the developing the SIP included identifying a long list of potential schemes, programmes and actions. These interventions were categorised based on the stage of development, including idea, development and delivery levels and covered a wide range of types of measures. For the purposes of illustrating the range of schemes to be considered by the ISA, the main types of intervention included in the long list are identified in **Error! Reference source not found.**.

Table 2.2 Types of Interventions for the Transport Strategy

Types of interventions	
Active travel - infrastructure provision and behaviour change support	Roll out and expansion of local authorities' walking and cycling programmes Pedestrian and cycle crossings and on road links River crossings
Bus and passenger transport operations	Bus priority infrastructure supporting immediate operational challenges aligned to COVID-19 Rapid transit schemes
Port and airports	Measures supporting the connectivity, accessibility and operation of International Gateways
Rail related measures	Electrification schemes Line capacity improvement/journey time/enhancement Rail connection improvements Station improvements Freight capacity study Connectivity gap studies for rail timetables
Road related measures	Infrastructure to support electric vehicles and alternative fuels Demand management strategies New links or bypasses Road widening or dualling Junction/interchange new/ upgrades Road improvement strategic packages
Digital technology	Digital infrastructure to optimise transport, incentivising public transport & active modes and substituting trips
Studies and action plans	Supporting the implementation of schemes associated with the Transport Strategy

The pipeline projects were grouped into the following categories:

- Committed projects – these are projects that have been identified to be in the delivery stage. They are well developed and already have some delivery funding certainty and commitment from national government.
- Projects to be delivered in neighbouring authorities – the transport network extends beyond the Transport East region, this section identifies those projects that are important to and affect transport in the East but will be delivered by others.

- Regional strategic packages – This category contains a mix of projects to be progressed by Transport East, the Local Transport Authorities / Local Government or other delivery bodies. These packages highlight priority areas of work, where Transport East can;
  - support the case for investment, for example for the 5G roll out;
  - make the case for long-term funding certainty to enable ambitious programmes for active travel and urban sustainable programmes; and,
  - add to the technical programme to develop an evidence base to support future Local Government decisions, for example the road user demand management measures.
- Strategic corridors – This category identifies projects that sit along the core strategic corridors (**Error! Reference source not found.**), that will either individually or in combination deliver the s trategic priorities. These are a mix of road, rail and sustainable transport measures that are either at the idea or development stage. The progress of these projects to delivery will depend on the business case made for funding, recognising the government's changing emphasis for projects to demonstrate significant contributions to decarbonisation and sustainable transport.

The interventions identified as ideas, in development or delivery but not yet committed projects were assessed against a framework which comprised:

- Potential to deliver Transport East Strategic Priorities
- Performance against Department of Transport (DfT), Critical Success Factors, and.
- Performance against ISA objectives

The SIP Approach also covers how ideas for the delivery of the Transport Strategy can be supported and developed further. New ideas from Transport East, its partners and others will continue to be added to the long list and any additional ideas will be assessed as part of the annual SIP management and review.

Funding

Funding the identified projects is necessary for the implementation of the strategy and is often linked to external decisions for delivery. The local authorities in the region are fully committed to the SIP Approach and already make a substantial contribution, however significant additional support will be required from government.

In addition to government funding, Transport East will work with partners to identify appropriate funding streams and private sector investment to further support the funding and delivery of the SIP. Information on identified funding streams is set out in section 3.6 of the draft SIP Approach.

Delivery and Performance

The SIP sets out the technical work programme for supporting delivery of the strategy and SIP projects (SIP Appendix G) including:

- Developing strategic analytical capability such as developing a Decarbonisation Analysis Toolkit including work towards developing a carbon budget for the region, and data collection as part of a travel behaviour survey;
- Undertaking connectivity studies for the six strategic corridors;
- Developing detailed plans for future investment such as for rail, electric vehicle infrastructure demand, alternative fuel for freight, active travel and for rural and coastal investment; and
- New policy and innovation through a rural mobility centre of excellence and a Stratefy Hub.

The SIP proposals will be reviewed annually and updated with status of investment priorities in the programme published and regularly updates on the Transport East website. The SIP includes commitment to developing a monitoring schedule to assess performance against Key Performance Indicators.

3 Review of Plans, Policies and Strategies

3.1 Overview

The Transport East Transport Strategy will both affect and be affected by other plans, policies and strategies (PPS), at a national, regional and local level. It is therefore necessary to review these PPS to identify key themes and issues to be considered during the ISA. An initial review of PPS was undertaken as part of the ISA Scoping Report and has been updated to reflect consultation comments and recently published documents. This chapter provides a brief overview highlighting key PPS considered in the assessment of the strategy and where relevant considered for potential interactions and cumulative effects.

The review is primarily focussed on national and regional level (including county and unitary) PPS and has been used to develop SEA objectives and criteria for the assessment. A high-level review of all the PPS considered is documented in Appendix B, and the key themes identified from the PPS review are summarised against each ISA topic area in **Error! Reference source not found.**.

National Level

International treaties and commitments are covered in the PPS review but as these are implemented through national legislation and policy, they are not considered separately. Key national level PPS are listed below:

- Transport Investment Strategy[11]
- National Planning Policy Framework[12]
- The 25 Year Environment Plan[13]
- Environment Act[14]
- Clean Air Strategy[15]
- Biodiversity 2020: Strategy for England's wildlife and ecosystem services[16]
- Inclusive Transport Strategy[17]
- National Networks National Policy Statement[18]
- Airports National Policy Statement[19]
- Decarbonising Transport – Setting the Challenge[20]
- Decarbonising Transport – A Better, Greener Britain[21]
- Bus Back Better: National Bus Strategy for England[22]
- The Governments statement on the historic environment for England 2010[23]
- Gear Change[24]

Regional Level

Regional plans and policy include those policies or plans set by government at a sub-national level, but above Local Authority level (this would be local policy). For the Transport East region these include (but are not limited to):

- Integrated Transport Strategy for Norfolk and Suffolk (New Anglia Local Enterprise Partnership, 2017)
- Local Industrial Strategy (New Anglia Local Enterprise Partnership)
- Broadland Futures Initiative
- Economic Strategy for Norfolk and Suffolk (New Anglia Local Enterprise Partnership)
- South-East LEP Economic Recovery and Renewal Strategy
- East Inshore and East Offshore marine plans 2014
- Transport for South East Transport Strategy
- England's Economic Heartland Transport Strategy
- Mayors' London Transport Strategy
- Midlands Connect Strategy and Midlands Connect Transport Strategy Refresh

Local Level

Local Transport Plans

Local Transport Plans are developed and implemented by local transport authorities, which in the Transport East region are the three County Councils and two Unitary Authorities.

Local Transport Plans outline the Local Transport Authorities' long-term strategy and objectives for their transport networks. They can also include short-term Implementation Plans to indicate how the authority proposes to deliver the Local Transport Plan proposals, including their priority issues and schemes over the plan period. Strategic Environmental Assessments are undertaken for Local Transport Plans.

The Local Transport Plans in the TE region have been reviewed by both the PPS review (Appendix B), and the Task 1A initial review, listed below:

- The Essex Transport Strategy: The Local Transport Plan for Essex 2011 - 2025
- Norfolk County Council Local Transport Plan 2026
- Suffolk County Council Local Transport Plan 2011 - 2031
- Southend Local Transport Plan 3 2011 - 2026
- Thurrock Transport Strategy 2013 - 2026

Development Plans

The Planning and Compulsory Purchase Act 2004 requires Local Planning Authorities (LPAs) to determine applications for planning permission in accordance with the Development Plan for their area unless material considerations indicate otherwise. The Development Plan for an area will include:

- the relevant Local Plan prepared by the District or Borough Council (including Unitary Authorities);
- the relevant Minerals and Waste Plan/s prepared by the County Council (including Unitary Authority); and
- any adopted Neighbourhood Plans prepared by Parish Councils.

Local Plans set out a vision and strategic priorities for the development of their area, to address housing needs (including to identify a 5-year housing land supply in accordance with the National Planning Policy Framework) and other social, economic and environmental priorities. Local Plan allocations and policies for housing and other economic development will influence the need to travel and for transport infrastructure, and vice versa. All Development Plans are subject to SEA and are prepared in consultation with the community. The current Local Plans and Minerals and Waste Plans for the Transport East Region are listed in Appendix B.

Other local level plans

Other local level plans and strategies have been identified in the Transport East Region, related to the local economy, climate change, flood risk management, landscape, heritage, walking, cycling and rail travel, infrastructure, strategic planning, health, and rural communities. Those prepared by County and Unitary Authorities are listed in Appendix B.

3.2 Key Policy and Themes

From the review of international, national, regional and local PPS, relevant PPS and key themes were identified (See **Error! Reference source not found.**).

Table 3.1 Key PPS and relevant key themes

ISA Topic	Key PPS	Key Themes
Population and Socioeconomics	Road Investment Strategy 2 (RIS2) National Highways Digital Roads National Planning Policy Framework Clean Growth Strategy Economic Strategy for Norfolk and Suffolk Local Industrial Strategy Economic plan for Essex The organisational strategy (2017 – 2021) and plan (2021) The Essex Transport Strategy: The Local Transport Plan Norfolk Delivery Plan Together for Norfolk Suffolk County Council Local Transport Plan Suffolk Framework for Inclusive Growth Ipswich Strategic Planning Area Report Bus Back Better: National Bus Strategy for England Southend Local Transport Plan Thurrock Transport Strategy Gear Change (and Gear Change: one-year-on)	Housing requirements Improve transport networks and access to employment sites Support local business and economies Prosperity – Support Economic growth Schemes must achieve social benefits Aims to maximise social and economic benefits Sustainable recovery post-covid Connectivity of population to facilities and resources/international gateways
Equality and Diversity	Inclusive Transport Strategy The Future of Essex Essex Joint Health and Wellbeing Strategy Together for Norfolk Suffolk County Council Business Plan Suffolk County Council, Safety, Health and Wellbeing Strategy Suffolk Framework for Inclusive Growth Gear Change (and Gear Change: one-year-on) Vision Zero Strategy	Inclusive growth Promote equality Create inclusive communities Improving access to transport networks to ensure full inclusiveness Access to employment, services and amenities Affordability of transport Reduce road danger for all
Health	National Planning Policy Framework Road Investment Strategy 2 (RIS2) Clean Air Strategy The Future of Essex The organisational strategy (2017 – 2021) and plan (2021)	Planning policies should aim to achieve healthy, inclusive safe places Improving access to health services Reduce health inequalities

ISA Topic	Key PPS	Key Themes
	The Essex Transport Strategy: The Local Transport Plan Essex Joint Health and Wellbeing Strategy Norfolk County Council Public Health Strategy Suffolk County Council, Safety, Health and Wellbeing Strategy Suffolk Framework for Inclusive Growth Suffolk Road Safety Strategy Gear Change (and Gear Change: one-year-on)	Promote healthy lifestyles Promote active travel Promote safety for active travellers
Community Safety	Road Investment Strategy 2 (RIS2) National Highways Home Safe and Well The Future of Essex The organizational strategy (2017 – 2021) and plan (2021) Essex Flood Risk Management Strategy Norfolk Transport Asset Management Plan Suffolk Framework for Inclusive Growth Suffolk Flood Risk Management Strategy Bus Back Better: National Bus Strategy for England – all partner authorities Gear Change (and Gear Change: one-year-on) Vision Zero Strategy	Improve road safety Safe Technology Improve quality and reduce negative impacts of existing strategic networks Create safe communities
Biodiversity	National Planning Policy Framework Environmental Act 2021 25 Year Environmental Plan UK Post-2010 Biodiversity Framework Biodiversity 2020: Strategy for England's wildlife and ecosystem services Green Essex Strategy Suffolk Nature Strategy Green Infrastructure Essex Strategy Green Infrastructure Plan for Thurrock St Edmundsbury Green Infrastructure Strategy (West Suffolk) Essex Biodiversity Action Plan Suffolk Local Biodiversity Action Plan Southend-on-Sea Local Biodiversity Action Plan Thurrock Biodiversity Study 2006-2011	Conserve and enhance, particularly designated sites and priority habitats Protection of irreplaceable habitats Avoid species decline Restoration of natural habitats - Nature Recovery Networks Biodiversity Net Gain delivery Contribute to local biodiversity action plans
Water Environment	National Planning Policy Framework Road Investment Strategy 2 (RIS2)	Improve and maintain good water quality

ISA Topic	Key PPS	Key Themes
	National Flood and Coastal Erosion Risk Management Strategy (FCERM) Future Water: Water Strategy for England East Inshore and East Offshore marine plans Anglian Water Plan Essex Flood Risk Management Strategy Norfolk Local Flood Risk Management Strategy Suffolk Flood Risk Management Strategy Broadlands Futures Initiative	Minimise the risk and impacts of flooding Adapt plans to account for the impacts of climate change
Air Quality	National Planning Policy Framework (NPPF) The 25 Year Environment Plan Clean Air Strategy	Reduction of polluting emissions Improve Air Quality
Noise and Vibration	National Planning Policy Framework (NPPF) Noise Policy Statement for England Draft Road Investment Strategy	Avoid noise disturbance Promote good health and quality of life through effective management of noise
Climatic Factors	Clean Growth Strategy Net Zero Highways: Our 2030/2040/205 National Planning Policy Framework Decarbonising Transport - Setting the Challenge Transport Decarbonisation Plan 25 Year Environment Plan Norfolk Climate Change Strategy Suffolk County Council Business Plan Suffolk Climate Emergency Plan Suffolk Framework for Inclusive Growth	Reduction in GHG emissions Mitigating and adapting to climate change Utilise renewable energy Net Zero aims and urgency of action to meet targets Decarbonisation of transport Link carbon sequestration opportunities to natural capital and biodiversity enhancement
Landscape/Townscape and Visual	Norfolk Access Improvement Plan 25 Year Environmental Plan National Planning Policy Framework (NPPF) Seascape Character Assessment Local Plan for the Broads Landscape Character Assessment – the Broads Suffolk Coast & Heaths Area of Outstanding Natural Beauty (AONB) Management Plan 2018 -23 The Norfolk Coast Area of Outstanding Natural Beauty Five Year Strategy Dedham Vale Area of Outstanding Natural Beauty (AONB) and Stour Valley Management Plan 2016-2021	Conserve and enhance landscape and scenic beauty Protect landscape and townscape character Long term management and maintenance of Green Infrastructure elements (and ecological elements)

ISA Topic	Key PPS	Key Themes
Cultural Heritage and Archaeology	National Planning Policy Framework 25 Year Environmental Plan Government's statement on the Historic Environment	Conservation and enhancement of designated and non-designated heritage features Maintain local distinctiveness
Soils, Geology and Contaminated Land	National Planning Policy Framework (NPPF) The 25 Year Environment Plan Norfolk Geodiversity Action Plan Essex Minerals Local Plan (and review)	Protect sites of geological value and soils Sustainable use of minerals Support land remediation and reuse Maintain environmental standards
Material Assets and Resources	Transport Investment Strategy National Planning Policy Framework (NPPF) Airports National Policy Statement National Networks National Policy Statement Economic Strategy for Norfolk and Suffolk Local Industrial Strategy East of England Route Strategy The organisational strategy (2017 – 2021) and plan (2021) Green Essex Strategy Norfolk Transport Asset Management Plan Suffolk Rail Prospectus Decarbonising Transport - Setting the Challenge Decarbonising Transport – A Better, Greener Britain Essex and Southend-on-Sea Waste Local Plan Mineral and Waste local plans National Planning Policy for Waste and Waste Management Plan for England 2021	Sustainable development, Resource and energy efficiency, Waste hierarchy and minimising waste to landfill Decarbonisation and meeting carbon reduction targets
Natural Capital and Ecosystem Services	25 Year Environmental Plan Environment Act 2021 Biodiversity 2020: Strategy for England's wildlife and ecosystem services The Natural Capital Evidence Compendium for Norfolk and Suffolk Green Essex Strategy	Minimise resource footprint and apply hierarchy prioritising avoiding impacts over reducing effects and providing compensatory measures Avoid loss of irreplaceable habitats Work towards sustainable land management Support carbon sequestration initiatives

ISA Topic	Key PPS	Key Themes
		Work to increase species richness, abundance, and ecological resilience and support nature recovery Improve biosecurity Develop plans in preparation for increasing likelihood of extreme climate events Protect and enhance designated sites and priority habitats and improve habitat connectivity Increase use and inclusivity of natural assets across all user groups Provide environmental net gain as well the minimum 10% biodiversity net gain (based on recognised biodiversity metrics) for development projects

4 Consultation

4.1 Scoping Consultation

As part of the process for undertaking the ISA for the draft Transport Strategy, an ISA Scoping Report was provided for consultation setting out the context for the assessment including a plan, policy and strategy review and description of the baseline environment and key trends. The methodology for the assessment was also outlined.

The ISA Scoping Report was subject to a statutory 5-week consultation as required under the SEA regulations. Following this consultation, comments have been collated and taken into consideration during the development of both the ISA and the Transport Strategy.

Comments were received from the following statutory consultees:

- The Broads Authority (BA)
- Historic England (HE)
- Forestry Commission
- Essex County Council (ECC)
- West Suffolk District Council

In addition, comments were received from the following non-statutory bodies:

- Suffolk Friends of the Earth (SFOE)
- Norfolk CPRE
- Transport Action Network (TAN)

No comments were received from the Environment Agency and Natural England for the ISA Scoping Report.

The consultation feedback received has been considered and addressed. A summary of the key comments and responses is set out in **Error! Reference source not found.** below.

Table 4.1 Key consultation feedback and responses

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
1. Transport Strategy: Emerging strategic approach	The BA requested additional strategy actions and ideas on public transport and active travel, a modal shift from air to rail, and consideration of water-based transport.	The draft Transport Strategy includes a range of proposed actions supporting modal shift across each of the 4 Pathways. Recommendations from our Active Travel and Passenger Transport Reports have fed into the development of the Transport Strategy and work to explore water-based transport is included in Goal 9 – Improving coastal connections.
2. Transport Strategy: Workplace scenarios	BA and ECC noted that a third workplace scenario could be considered (a higher level of remote working than 2019, but not as much as mid 2020), and queried the baseline travel assumptions.	The purpose of the scenario development and testing procedure was to identify a set of possible futures for the region, to quantify these in a rigorous manner, and then to explore their implications for the ability of the Transport Strategy to deliver both the wider and transport outcomes. In order to do this, relative extremes of potential variables outside of Transport East's control were considered, including change in level of remote working. The results of this found that if high levels of remote working were achieved, there would be 26% fewer daily trips than in a "back to normal" scenario where people revert to pre COVID-19 commuting patterns. It is acknowledged that potentially neither the "back to normal" or high levels of remote working workplace

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
		scenarios may be realised and as such the strategy has been developed to ensure that it focusses on other areas, such as modal shift and alternative fuels, not just reducing the need to travel
3. Transport Strategy	Norfolk CPRE highlighted the importance of improving rural bus services, as explained in the CPRE report "Every village, every hour: a comprehensive bus network for rural England" (March 2021)	Improving accessibility for rural areas is promoted within the strategy through a variety of measure, including the promotion of demand responsive rural passenger transport services.
4. Transport Strategy: Regional challenges - Decarbonisation	SFOE requested decarbonisation be prioritised urgently and a timescale for net zero carbon emissions in the region be defined. SFoE welcomed the promotion of a shift to active travel and public transport, to reduce car travel and reduce carbon emissions, and queried how the strategy would support these. TAN requests greater definition of carbon emissions reduction ambition, pathways and intermediate targets, in light of IPCC report and Government's Transport Decarbonisation Plan.	Decarbonising transport emerged as a priority early in our technical and engagement work to develop the Transport Strategy. To strengthen our understanding Transport East commissioned Energy Systems Catapult to establish an initial baseline of CO2 emissions and modelled a series of net zero targets. See draft Transport Strategy section 2.2 - The decarbonisation challenge. Net zero carbon transport is a core priority within the Strategy and informs the other three Pathways. The draft Transport Strategy aim is to achieve net zero transport by 2040. See draft Transport Strategy section 4.2 - Decarbonisation to Net Zero.
5. Transport Strategy: Regional challenges - Connecting our Growing Towns and Cities	SFOE object to more road building due to impacts on wildlife, landscape, and traffic generation, and to investment in fossil fuels or biofuels. SFOE objects to new roads and encourages reinstatement of railway lines. Queried the sustainability of a 'high growth' trajectory.	The aims of the Transport Strategy are to balance a range of needs, challenges, constraints and opportunities including addressing current issues such as congestion and connectivity to support economic and social and working towards meeting future goals including as a priority decarbonisation to meet net zero carbon targets. As explained in comment 1 above, it is acknowledged that a range of scenarios have been considered and potentially neither the "back to normal" or high levels of remote working workplace scenarios may be realised and as such the strategy has been developed to ensure that it focusses on other areas, such as modal shift and alternative fuels, not just reducing the need to travel Account is taken of potential of impacts through the ISA and the mitigation and monitoring proposed.
6. Transport Strategy: Regional challenges -	SFOE queries sustainability of encouraging globalised	Although this is outside the scope of the Transport Strategy and Transport East's control, we are proposing to try and influence future placemaking to

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
Unlocking international gateways	trade at ports, requests encouragement of fewer 'food miles' and similar initiatives and agrees with increased use of rail for freight. Requests more emphasis on a circular economy, to reduce waste and resource use through the repair, re-use and recycling of materials.	ensure that people can live and work locally, enabling them to support local businesses and local suppliers reducing movement of both people and goods. The ISA includes recommendations to apply the waste hierarchy and how this also would be supportive towards reducing carbon
7. Transport Strategy: Regional challenges - Re-energising our Rural and Coastal Communities	BA and SFOE raise concern about an over-reliance on electric vehicles. BA requested that 'decarbonising of transport' theme on p9 includes a defined aim to reduce miles driven (referring to the balanced pathway in the 6th Carbon Budget) and reduce flights. BA requests clarity on definition of Net-Zero Emissions.	The Transport Strategy sets out a multi-faceted approach to decarbonising transport. The primary focus is on reducing the need to travel along with reducing the distance travelled. If there is still a need to travel, the next focus is on shifting as many trips as possible to sustainable transport. Finally, if this cannot be achieved, then the focus is on using alternative fuels. Due to the nature of the region and depending on the location of future growth within the region, providing the required sustainable transport in rural areas to achieve modal shift may not be viable and so there will be a need to include alternative fuels. Transport East commissioned Energy Systems Catapult to establish an initial baseline of CO2 emissions and modelled a series of net zero targets. See draft Transport Strategy section 2.2 - The decarbonisation challenge Net Zero emissions used in the Transport Strategy refers to net zero carbon emissions related to transport specifically.
8. Transport Strategy: Regional challenges - Re-energising our Rural and Coastal Communities	SFOE objects to the term 'energy coast' along the designated Suffolk Coast & Heaths AONB and Heritage Coast, queries how the strategy will support the coast's tourist economy, landscape and wildlife, and how it can make quiet recreation in countryside easier to access, to benefit physical and mental health.	The Transport Strategy recognises the different economic sectors within coastal areas including tourism and the natural heritage of our coast. Within Goal 8 – increasing access for rural and coastal communities, particularly the active travel section, we recognise the role improved active travel networks play in increasing sustainable access to blue and green spaces and the linked health benefits.
9. ISA Approach: ISA Assessments	TAN requests consideration of lifecycle costs of vehicles that use the transport infrastructure, when assessing new infrastructure proposals, inclusion of aviation emissions, and the	The lifecycles costs of vehicles using infrastructure is outside the scope of the Transport Strategy Aviation emissions are also not covered by this strategy but (refer to the NPS for Aviation) although the strategy does set out its strong support for the decarbonisation of the international aviation industry (see goal 14) through the national JetZero approach.

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
	efficiency of hydrogen production.	Hydrogen is one of the potential fuel sources and production efficiency in terms of carbon would need to be part of future considerations of the benefit for this fuel use going forward to achieve net zero carbon emissions.
10. ISA Approach: Natural Capital	TAN is critical of the discussion of how transport infrastructure can contribute to the restoration of biodiversity and ecosystem services, and refer to impacts of severance, pollution and loss of habitat from road building.	The impact of infrastructure on biodiversity through severance, habitat loss, pollutions and disturbance are part of the ISA assessment. While there is mention of potential opportunities that can be included in infrastructure design these cannot be considered without first taking account of potential losses - see ISA objective on biodiversity.
11. ISA Approach: Health Impact Assessment	TAN highlights the need to scrutinise health assessment for gaps and assertions, including on impacts on non-drivers, including the disabled, children, women and other disadvantaged groups, and impact of road building on public transport, severance and pollution.	These comments have been taken on board to strengthen specific consideration of these groups –in the in baseline and ISA objectives/criteria.
12. Review of Plans, Policies and Strategies	Consultees requested additional plans, policies and strategies be considered, including on the NPPF, NPPG, South East LEP, Broads Authority plans, AONB related plans, local Green Infrastructure strategies, Biodiversity Actions Plans, the Norfolk Geodiversity Audit	Additional PPS noted have been considered and included where available.
13. Review of Plans, Policies and Strategies – Climate change	BA requested the Committee on Climate Change Balanced Pathways be considered. ECC requested Net Zero: Making Essex Carbon Neutral be included. SFOE requested inclusion of the Paris Agreement, the Government's National Determined Contribution target of 68% reduction in greenhouse gas emissions by 2030 from 1990, the Transport Decarbonisation Plan, and Gear Change.	Additional PPS noted are considered and included. Transport East commissioned Energy Systems Catapult to establish an initial baseline of CO2 emissions and modelled a series of net zero targets. See draft Transport Strategy section 2.2 - The decarbonisation challenge Net zero carbon transport is a core priority within the Strategy and informs the other three Pathways. The draft Transport Strategy aim is to achieve net zero transport by 2040. See draft Transport Strategy section 4.2 - Decarbonisation to Net Zero. Carbon emissions analysis has been commissioned by Transport East to understand the baseline trajectory for the region to 2050, and the impact of different scenarios on that trajectory.

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
14. Health: Active travel	BA requested greater emphasis on the public health benefits of supporting active travel. Essex CC asked for greater acknowledgement on how school travel can contribute towards wider health outcomes and the environment around schools.	The draft Transport Strategy includes strategy goals that are supportive of active travel and the benefits of this. The engagement with schools that was part of the strategy development and actions arising from this.
15. Community Safety: Accidents	BA and TAN query use of the term 'accidents' as outdated, TAN state collisions should be used.	The accident term was used as referenced by the Department for Transport, and data provided in the report refers to information from the DfT and STATS19. Transport East recognises that this includes collisions and prevention has due importance within the strategy. The draft Transport Strategy terminology has been updated to reflect emerging practice.
16. Community Safety: Road danger	TAN request mention of the issue of road danger and perception of road danger, which reduces walking and cycling, particularly new and bigger roads which increase traffic levels.	Perceptions of road safety and impacts were noted as an issue and included in the assessment framework but have been strengthened in the baseline information. Community severance and active mode safety considerations are taken into consideration in the assessment. The draft Transport Strategy refers to the Safer Systems approach - see Goal 7- Eliminating road danger
17. Biodiversity: Local wildlife sites	BA requested consideration of county wildlife sites, and roadside nature reserves.	These are local datasets that Transport East does not have access to. However, the importance of these sites and others is recognised but note that these will need to be part of more detailed project level consideration and discussion with local partners.
18. Biodiversity: Nitrogen deposition	BA – refer to nitrogen deposition as a major biodiversity issue, and also poses a risk to developments impacting on protected areas.	Nitrogen deposition is highlighted as an issue and considered in the ISA and HRA but the assessment is qualitative at this high level and is not based on traffic or air quality modelling.
19. Biodiversity	SFOE opposes biodiversity offsetting due to impacts on site habitats and lack of success for habitat creation, but suggests planting wildflowers on verges which can reduce maintenance.	The hierarchy for avoiding, mitigating and only compensating through off setting following application of the hierarchy is set out in the ISA - recommendations on opportunities such as habitat creation and appropriate maintenance regimes are identified
20. Water Environment: Road runoff	BA requested greater consideration of watercourse pollutants in surface water runoff from roads, including microplastics. TAN	Pollution from road runoff will be is a considered in terms of risk and also a requirement for addressing in design. The types of pollution involved are identified – we note that there are also many other important sources of microplastic pollution.

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
	highlight impact of microplastic pollution from vehicles in road runoff.	
21. Air Quality	Broads Authority requested consideration of localised air pollution from the brakes and tyres of electric vehicles.	These are noted in the baseline information
22. Landscape/Townscape and visual: Designated areas	BA requested greater emphasis on protected designated landscapes, including the Broads (with a status equivalent to a National Park) and AONBs, and reference to the special qualities and tourism benefit of the Broads.	Greater emphasis and the relevant references have been added. A map of designated landscapes was included in Appendix A to the Scoping Report.
23. Landscape/Townscape and visual: Local landscape character	BA and ECC - consider regional and local landscape character areas and assessments, including for the Broads, to inform the value, quality, and sensitivity of landscapes. Essex CC requested reference to 'valued' landscapes as well as designations in ISA objectives.	Regional and Broads-related assessments will be considered, but the regional scale of the ISA precludes detailed assessment of local character areas at this stage. Reference to valued landscapes is included in the ISA.
24. Landscape/Townscape and visual: Dark skies and light pollution	BA - consider potential for light pollution impacts on dark skies (CPRE's Night Blight assessment) and landscape character, including in the Broads and other protected landscapes.	The potential for light pollution on dark skies has been included in the ISA.
25. Cultural heritage and Archaeology: Heritage at risk	Historic England requested that assets on the Heritage at Risk register are considered.	Potential impacts on Heritage at Risk assets is considered in the ISA although in terms of general risk as location information on proposals at this strategy level is limited.
26. Cultural heritage and Archaeology: Significance and setting of heritage assets	Historic England requested that impacts on the significance of heritage assets, including in relation to their setting, are considered in ISA objectives and criteria, and refers to their good practice advice.	Reference to significance and setting of heritage assets has been strengthened in the ISA criteria.

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
27. Cultural heritage and Archaeology: Non-designated heritage assets	Historic England and Essex CC requested consideration of data on non-designated heritage assets recorded on the county and unitary councils' Historic Environment Record, and the potential for unknown archaeology, and that the local authorities' conservation and archaeological advisers are closely involved throughout the preparation of the ISA.	Transport East does not have access to the HER records, and the regional scale of the TS and ISA with limited information on individual schemes precludes consideration of these local sites. The ISA will consider the risk to these interests and also highlight that potential impacts of schemes need to be assessed through EIAs for individual schemes in consultation with local authorities.
28. Material Assets and Resources: Minerals	Essex County Council requested the protection of mineral bearing land be included in Key Themes and ISA objectives, and the inclusion of Essex Waste Local Plan and Minerals Plans to PPS review.	Minerals bearing land has been included in ISA objectives. The additional plans are now included in the PPS review.
29. Natural Capital and Ecosystem Services: Mitigation and monitoring plans	ECC requested that recommendations for Mitigation and Monitoring Plan ensure measurable biodiversity net gains and ecosystem services will be achieved from transport scheme proposals, in line with emerging Environment Bill	The expected future requirements on biodiversity net gain natural capital and ecosystems services are included in the ISA recommendations in line with the Environment Bill
30. General	Suffolk Friends of the Earth (SFoE) requested a stronger definition of sustainability.	A definition of sustainable transport has been included (see section 1) and is also reflected in the strategy vision.
31. Proposed ISA Methodology: Draft ISA Objectives	BA queried the wording of the assessment methodology categories of impact, including to address negative impacts and maximise the positives.	The assessment methodology allows the identification of both potential negative impacts and positive impacts and the assessment is against the ISA objectives which are aiming to avoid or minimise impacts and provide enhancements and positive effects.
32. Proposed ISA Methodology: Draft ISA Objectives	*Population and Socioeconomics:* TAN requests consideration of access to jobs via active travel and public transport for those without access to a car.	Amendments have been added to ISA to incorporate comments provided to objectives, criteria or monitoring plan as appropriate.

Theme	Consultee Comments on the Scoping Report	Responses for the Transport Strategy and the ISA
	Equality: TAN requests specific rewording to consider affordability of public transport (and access to e-bikes), and specific reference to women. *Health:* TAN requests rewording to 'significantly increase' levels of active travel. *Community Safety:* TAN requests rewording to reduce road danger for active travel. *Climatic factors:* TAN requests schemes be assessed on ability to reduce traffic and meet climate targets in short-medium term.	

4.2 Wider stakeholder engagement to develop the Transport Strategy

The development of Transport Strategy has involved significant wider engagement with the aim of ensuring that the strategy aligns with both regional ambition and local priorities, whilst contributing to national goals.

The approach to wider engagement has included the use of presentations, workshops, one-to-one meetings and an online questionnaire. Each method of engagement has proved useful in developing the strategy and has presented significant relevant feedback.

Initial engagement involved the introduction of Transport East and the developing Transport Strategy to 36 district representatives directing the relative importance of the key themes emerged (**Error! R eference source not found.**[25]). One recommendation was to involve younger generations throughout the process, which was consequently actioned through a school engagement campaign.

Table 4.2 Summary of key themes identified in the Engagement Report Summary.

Stage	Key Themes and Messages
Stage 1 A- Developing Non-Transport Objectives	Importance of decarbonisation and focus on electric vehicles New infrastructure must have minimal environmental impact Importance of ports and energy coast to the region's development
Stage 1B – Evidence Building	The role of the Transport Strategy in boosting and supporting the region's economy. Future transport options should be sustainable long term A shift to active travel Importance of reliable, improved public transport services Digital connectivity could compliment the transport sector, maximising assets and services. Opportunity to improve rail, while contributing to wider decarbonisation goals

Stage	Key Themes and Messages
	Importance of working with other Sub-national transport bodies and Transport for London to improve key corridors.
Stage 1C – Exploring Future Scenarios	A baseline is crucial Identifying rural and urban areas and the key 13 urban areas within the Region
Online Public Engagement	Changes of transport use and behaviour due to COVID including preference for transport type. Reduction in people using private cars and traditional commuting transport post COVID. General consensus included long term predictions of fewer journeys, reduction in public transport and increase in active travel. Importance of reliability, convenience and frequency for public transport.
Stage 2B – Ensuring Effective Delivery	Importance of decarbonisation Engagement of young people in the consultation of the strategy

4.3 ISA Report and Draft Transport Strategy /SIP consultation

The draft Transport Strategy and ISA report were subject to a full public consultation and stakeholder engagement process over an 8-week period. A wide range of environmental and community organisations, local government and statutory consultees were invited to comment on the ISA Report, draft HRA, draft Transport Strategy and draft Strategic Investment Programme (SIP) Approach and supporting documents as part of the consultation.

The ISA Report was also made available to the public to comment on through access to the following https://www.transporteast.org.uk.

A total of 590 comments were received in response to the consultation covering the Strategy, SIP and ISA (514 responses to the questionnaire and a further 76 responses received by email). More specifically a total of 129 responses were received in response to the questionnaire question *'Do you have any comments about the Integrated Sustainability Appraisal'.*

No comments were received from Environment Agency or Natural England.

The consultation feedback received has been considered and addressed. A summary of the key comments and responses is set out in **Error! Reference source not found.** below.

A separate Consultation Report has been prepared including a full analysis of the consultation responses.

Table 4.3 ISA Consultation feedback and responses

Theme	Consultee Comments	Response
ISA Chapter 3. Plans, Policies and Strategies	East Suffolk Council recommended reviewing their Cycling and Walking Strategy	East Suffolk Cycling and Walking Strategy (Draft) added to Appendix B.
	National Highways have a number of schemes not included in the plans, policies and strategies review, including Net Zero Highways: Our 2030/2040/2050 Plan, National Highways Digital Roads and National Highways Home Safe and Well.	All schemes have been added to Chapter 5 and Appendix B.

Theme	Consultee Comments	Response
	Basildon Borough Council referred to a new Essex Bus Service Improvement Plan (BSIP)	New Essex Bus Service Improvement Plan (BSIP) has now been reviewed in Appendix B.
ISA Chapter 5. Baseline	Historic England suggest identifying non-designated heritage assets.	Historic England previously commented on including non-designated assets but as included in the response table, Transport East do not have access to County HER records. Historic Environment baseline acknowledges non designated assets.
	Heritage England advised that appropriate priority should be given during the pre-application period to the identification, assessment and evaluation of non-designated assets	Text has been added to acknowledge this in the issues and opportunities section of the Heritage baseline (section 5.13)
	Light Rail Transit Association raised concerns that health problems are not considered, particularly relating to non-exhaust emissions and air quality.	The Air Quality baseline already stated 'increasing the use of electric and other low emission vehicles (as electric vehicles have zero exhaust emissions at street level; however even electric vehicles emit particulate matter from road, tyre and break wear' however text has been strengthened as an issue/opportunity in the same section.
	National Highways noted that the ISA has identified staycations to increase during COVID and will likely return to normal following this, however medium- and long-term trends should be considered.	Tourism is covered in socio-economics baseline section 5.3 Text has been added to this section to acknowledge other factors which may influence staycation trends affecting region.
	Transport Action Network suggested referring to more stringent WHO guidelines for the Air Quality baseline	Reference to the WHO guidelines has been added to the Air Quality Baseline
	Transport Action Network suggested referring to the issues of road kill and habitat severance.	References have been added to road kill to the biodiversity baseline. Habitat fragmentation is already included but further reference has been added.
	Norfolk Wildlife Trust identified existing impacts of the transport networks on wildlife and highlighted the need for the Strategy to actively contribute to goals of the Environmental Act 2021.	References relating to the existing impacts of the transport networks on wildlife are added to the biodiversity baseline section. The ISA includes specific recommendations in the Sustainability Action Plan for developing a coordinated approach to support nature recovery and Environment Act 2021 goals. The strategy includes as a regional wider outcome the aim to protect and enhance the built and natural environment. Also, proposals for contributing to the Environment Act 2021 biodiversity goals have been added as Transport Strategy section 6.6 and opportunities to link biodiversity and environmental net gain and carbon sequestration are highlighted and to take this approach forward in the proposed Corridor studies.

Theme	Consultee Comments	Response
ISA Chapter 6. Assessment Methodology	The Broads Authority raised there is no mention of net gain in the biodiversity ISA objectives.	Reference to biodiversity net gain opportunities were already included under the Natural Capital objective but opportunity for biodiversity has also been added to the biodiversity objective together with signposting to the Natural Capital and Ecosystem services row.
	Transport Action Network suggested amendments to the ISA objectives for population and socio-economics, equality and diversity, health, community safety and carbon	Objective wording has been amended to clarify and address comments.
	Transport Action Network stated there is no consideration as to whether proposals (such as new roads) might undermine the economic viability of public transport, existing or planned.	For the ISA, proposals are assessed independently of funding availability. Economic viability of proposals will be addressed as part of the scheme business cases and may also be dependent on different funding streams.
ISA Chapter 7. Assessment of the Transport Strategy	The Broads Authority stated that the ISA includes and assesses lots of specific schemes, but these specific schemes are not in the Transport Strategy.	The Transport Strategy provides overarching approach and the SIP includes potential schemes to deliver the strategy. We have now separated the ISA into two documents to assess the strategy and SIP separately, to ensure this is clearer.
	Norwich, Broadland and Norfolk Green Party Groups stated the ISA fails to consider a fourth approach that involves combining alternative fuels and modal shift to sustainable modes, with managing demand for road travel, with the overall aim of reducing absolute levels of vehicle miles.	In response to the comments, five approaches and a no plan scenario have been further defined and assessed as part of the ISA update for the finalised transport strategy. This includes an additional approach taking account of the need to manage demand from connectivity improvement and prevent induced traffic increases.
	The Transport Action Network made numerous suggestions relating to the scoring and assessments within Chapter 7.	All scoring and assessments have been reviewed and amended where necessary
ISA Chapter 8. Assessment of the SIP	The Broads Authority and Transport Action Network queried what 'pre' and 'post' refer to.	Pre and Post refers to pre and post mitigation or enhancement, as stated in the column heading of each table. Text has been added to the start of the section to clarify this further.
	Chelmsford City Council corrected the Beaulieu Station name in the SIP	Scheme name has been corrected.
	The Thames Crossing Action Group raised concerns relating to the cumulative effects identified for the Lower Thames Crossing SIP scheme (CP4)	The cumulative effects related to the Lower Thames Crossing, a scheme identified in the SIP as a committed scheme, have been further reviewed and a standalone table (ISA Volume 2 Table 7.14) summarising the review has been included. Cumulative effects are assessed where two or more SIP schemes are likely to interact or have combined effects on the same receptors or where SIP schemes potentially interact with committed schemes or

Theme	Consultee Comments	Response
		other planned schemes, as stipulated in the text.
	Transport Action Network stated it is unclear why only the A47 North Tuddenham to Easton is considered to have an interaction identified and A47-A11 Thickthorn Junction and A47 Blofield to North Burlingham are not.	Cumulative effects relating to the Norwich Western Link (SIP scheme B2) and NSIP projects have been reviewed. Section 7.3 has been updated to include potential interactions through traffic flow, however as the A47-A11 Thickthorn Junction and A47 Blofield to North Burlingham projects are not in close proximity, no interactions with the Norwich Western Link have been identified for construction related impacts.
ISA Chapter 9. Monitoring and Evaluation	South East LEP raised concerns over the limited information around the format of the monitoring process.	Chapter 9 Sustainability Action Plan refers to working with partners to set up templates/proformas for collecting data and information on scheme proposals on a consistent basis so this can support regional analysis, reporting and monitoring in the future. There will be dependency on information provided for individual schemes and detailed monitoring plans would be expected to be developed as part of the consenting process for each scheme but would be the responsibility of the relevant scheme promoter.
	Transport Action Network commented on the monitoring plan and suggested changes to indicators for inclusivity, safety, air quality and climate.	The monitoring plan indicators have been reviewed and updated to incorporate suggestions where these are considered feasible to measure.
	Transport Action Network commented on the need for consideration of lifecycle analysis to cover resources and carbon from vehicle manufacture.	We recognise that currently electric vehicle manufacture has a higher carbon footprint than equivalent Internal combustion engine (ICE) vehicles and this is primarily due to the carbon emissions associated with battery production. Given plans for future carbon analysis including developing a carbon budget for the region. We therefore suggest TE review consideration of lifecycle analysis as part of the scope of future carbon analysis work and comments from the consultees are responded to through this review.
	The Transport Action Network believe that 3 - 5 year monitoring is not often enough and suggest annual reporting to keep the region within its carbon budget.	The SIP is intended to be a rolling plan, updated on a regular basis – commitment to developing a carbon budget is included in the strategy and the programme for updating and reporting will be reviewed and a monitoring schedule will be developed. There is recognition through the initial ESC Phase 1 carbon baseline and scenario analysis that the sooner actions are taken towards decarbonisation the more these will contribute to meeting 2040 net zero targets.

Theme	Consultee Comments	Response
Other	Collaborative Mobility UK (CoMoUK) highlighted there is currently limited reference to shared transport in any form, either collectively or individually.	The strategy has been strengthened to specifically to include support for shared transport
	Climate Emergency Policy and Planning and Transport Action Network have raised there is currently no carbon budget and that the road building proposed has not been quantified and assessed for carbon impact.	The Transport Strategy included commitment to developing a carbon budget. Currently quantification of construction and operation related carbon emissions is not available for assessment – this information would be expected to be part of the carbon cost analysis undertaken for the business case and for consenting, following relevant guidelines and standards. For the ISA, all short term schemes proposed within the SIP been assessed qualitatively for construction and operational impacts reported separately rather than combined. By presenting both construction and operational impacts the ISA more clearly identifies where there may be significant negative impacts relating to construction phase carbon and other topics.
	The Transport Action Network also raised concerns relating to the wider impacts of road building, particularly relating to carbon and emissions.	As above. By presenting both potential construction and operational impacts, the ISA more clearly identifies where there may be significant negative impacts relating to carbon and other topics.
	Norwich, Broadland and Norfolk Green Party Groups suggested the Transport Strategy must adopt a Regional Transport Carbon Cap for 2040 and set five yearly regional carbon budgets and annual regional targets for cutting carbon emissions and an action plan for meeting this framework.	The Transport Strategy and SIP include commitment to developing a carbon budget and this also referred to in the ISA Sustainability Action Plan and Monitoring Plan.

5 ISA baseline, issues and trends

5.1 Introduction

This chapter sets out the study area baseline against which changes due to the Transport Strategy proposals can be assessed. An extensive baseline review has been conducted as part of the ISA Scoping stage and updated for the ISA. It considers current conditions, existing pressures and future trends and how the baseline is likely to develop without the influence of the proposals in the Transport Strategy. Potential issues and opportunities relevant to the assessment of the Strategy are also identified.

The study area for the baseline includes the Transport East region and bordering and connected areas where there are potential pathways for impacts such as, for example, within river catchment areas and the key transport corridors between neighbouring regions.

Information used to establish the baseline is based on publicly available data sources.

The following topics have been addressed:

- Population – Section 5.2
- Socioeconomics – Section 5.3
- Equality and Diversity – Section 5.4
- Health – Section 5.5
- Community Safety – Section 5.6
- Biodiversity – Section 5.7
- Water Environment – Section 5.8
- Air Quality – Section 5.9
- Noise and Vibration – Section 5.10
- Climatic Factors – Section 5.11
- Landscape/Townscape and Visual – Section 5.12
- Cultural Heritage and Archaeology – Section 5.13
- Soil, Geology and Contaminated Land – Section 5.14
- Material Assets and Resources – Section 5.15
- Natural Capital and Ecosystem Services – Section 5.16

5.2 Population

Transport East's area covers a total area of 12,849 sq km, and comprises five Local Transport Authorities: Norfolk, Essex, Suffolk, Southend-on-Sea, and Thurrock. In 2019 the population of this area was approximately 3.5 million[26]. The population of each local authority area and the population density are presented in **Error! Reference source not found.**.

Table 5.1 Population of each constituent area in the Transport East Area

Constituent Areas	Population[27] (rounded)	Population Density (per sq km)[28]
Norfolk	907,800	169
Essex	1,489,200	431
Suffolk	761,400	200
Southend-on-Sea	183,100	4,294
Thurrock	174,300	1,064
Transport East Area Total	3,515,800	273
England	56,343,100	432

Essex has the largest population with just under 1.5 million and is approximately 43% of the Transport East population. Thurrock and Southend-on-Sea are much smaller in geographical size and therefore have a significantly smaller population compared to Norfolk, Essex, and Suffolk. Of the constituent

areas, the Unitary Authority of Southend-on-Sea has the highest population density of 4,294 people sq. km, this is significantly larger than the other counties. Norfolk and Suffolk have the lowest population density at 169 per sq km and 200 per sq km respectively. These are lower than the Transport East (273 per sq km) and England national average (432 per sq km).

5.3 Socio - economics

Multiple deprivation (intra-regional comparison)

When a cross reference to all the Index of Multiple Deprivation (IMD) Metrics is compared across the Transport East Region, there are some stark differences between Coastal areas and Rural areas (see **Error! Reference source not found.**) with shows the overall IMD score for the region. Coastal areas in t he region tend to have higher levels of deprivation compared to the national average across all metrics. The region's coastal resorts are reliant on seasonal tourism, with other job opportunities more limited. The general pattern shows that the least deprived areas are more clustered towards urban centres and most deprived areas are dispersed along the coast and clustered in parts of north west Norfolk and east Essex.

There is a difference between the levels of deprivation between the types of settlement across the deprivation domains, with coastal communities to be below England's average, and in the bottom 20% or 40% respectively. Within many coastal communities, there are relatively affluent neighbourhoods adjacent to some of the most deprived neighbourhoods despite similar access to key services by walking and public transport.

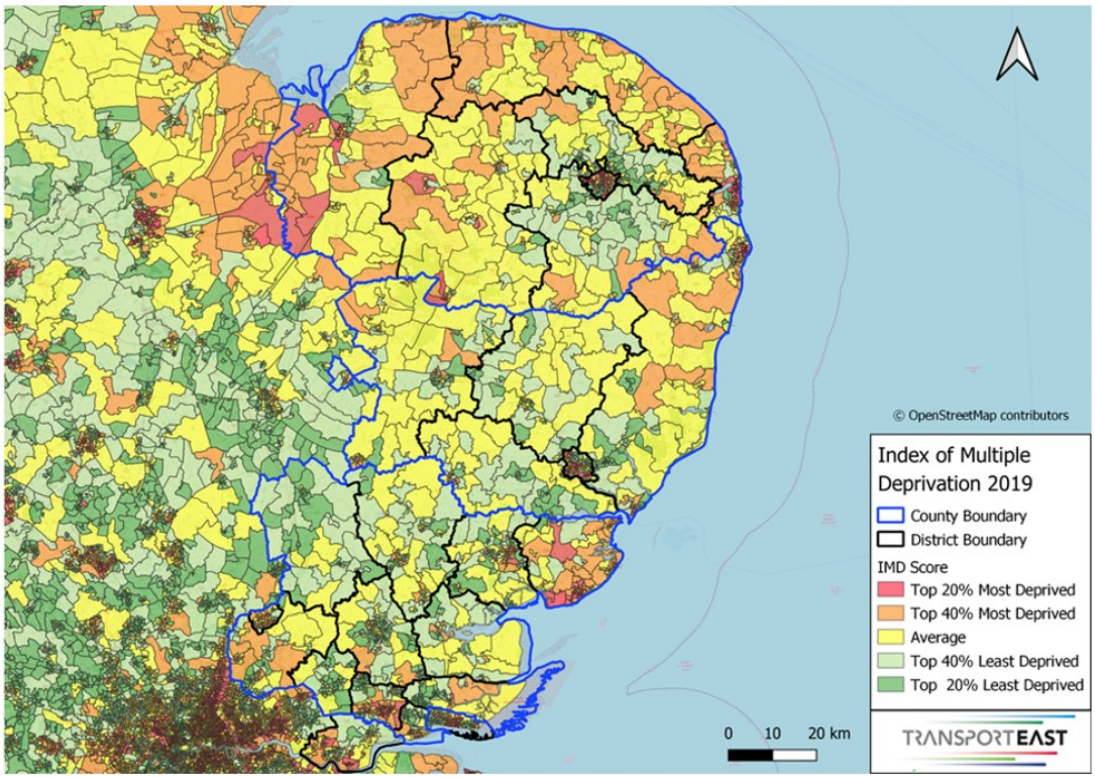

Figure 5.1 IMD scores for the Transport East Region (Source: MHCLG)

According to the 2011 census, approximately 700.000 people in the Transport East region live in coastal areas accounting for about 21% of the population. All Coastal Districts have over the UK average of 18% of over 65s with the exception of Southend-on-Sea and Thurrock with 17.8% and 12.7% respectively.

The Coastal Districts of North Norfolk and Tendring have the highest proportion of their population that are over 65 years old with 29% and 27% respectively. Coastal areas in the Region tend to have

higher levels of deprivation compared to the national average across all metrics. The region's coastal resorts are reliant on seasonal tourism, with other job opportunities more limited.

According to the 2011 census, 33% of the Transport East Region live in rural areas, which is considerably higher than the national average of 18.5%. This varies considerably within the Region with Norfolk and Suffolk more rural (50% and 40% of their populations living in rural areas respectively) than Essex (26%) and Thurrock (13%), with no rural population in Southend-on-Sea.

Within rural areas of the Transport East region, 22% of the population is over 65 years old, and 58% are between 18-65. Rural areas across the region tend to have higher levels of car ownership due to limited access to public transport and unwalkable journey times to key services. Many areas also suffer with retention issues for young graduates who are more attracted to more skilled, better paid jobs in urban areas.

In addition to coastal and rural areas, the Transport East region also comprises of a number large urban areas and settlements. A number of these urban areas experience urban deprivation to an extent, in particular Norwich with an estimated 35%[29] of children living in poverty, compared to the Norfolk average of 15%[30]. Ipswich also has a number of deprivation determinants lower than the national average[31].

Education

Qualification data from the Census 2011 is presented in **Error! Reference source not found.**. The c onstituent area with the largest percent of no qualifications was Thurrock, closely followed by Norfolk. The proportion of people with level 1 to level 4 qualifications is broadly the same across the constituent areas. Norfolk and Suffolk had the largest proportion of apprenticeships (both 4.2%).

Table 5.2 Qualification levels across the Transport East population, 2011 (%)

Constituent Areas	No qualifications	Level 1 1-4 GCSEs	Level 2 5 or more GCSEs	Level 3 2 or more A levels	Level 4 degree, professional qualification	Apprenticeships	Other qualifications
Norfolk	26.3%	14.3%	16.2%	11.8%	21.9%	4.2%	5.3%
Essex	23.9%	16.1%	17.2%	11.6%	23.0%	3.8%	4.5%
Suffolk	24.3%	14.4%	16.5%	11.6%	23.5%	4.2%	5.5%
Southend-on-Sea	24.6%	16.4%	17.5%	11.4%	21.8%	3.0%	5.3%
Thurrock	26.5%	18.1%	17.5%	10.9%	17.4%	3.4%	6.1%

Employment and the Local Economy

In 2019, the employment rate across the Transport East area was 77.6%, similar across all authorities and is higher than the average for England (76%)[32]. Thurrock has the greatest proportion of unemployment across the counties with 5.5%, followed by Norfolk with 4.1%. The unemployment rate across the Transport East Area is 3.8%, higher than the average for the region (3.3%) but slightly less than the national average (4%). Employment is highest in the motor trades, wholesale and retail industry sectors for Norfolk (16.2%, Essex (16.4%), Suffolk (15.2%) and Thurrock (25.7%). The health sector provides the largest proportion of employment in Southend-on-Sea with 17.2%[33]. **Error! R eference source not found.**[34] shows the industry breakdown of employment across the Transport East area.

Table 5.3 Industry Breakdown of employment across the constituent areas, 2019

Industry Sector	Norfolk	Essex	Suffolk	Southend-on-Sea	Thurrock
Agriculture, forestry and fishing	2.2%	0.8%	1.5%	0.2%	0.2%

Industry Sector	Norfolk	Essex	Suffolk	Southend-on-Sea	Thurrock
Mining, quarrying & utilities	1.2%	1.0%	1.4%	0.3%	1.5%
Manufacturing	9.2%	6.8%	9.5%	6.2%	4.5%
Construction	5.4%	7.8%	5.5%	4.7%	7.6%
Motor trades, wholesale, retail	16.2%	16.4%	15.2%	14.1%	25.7%
Transport and storage	3.2%	5.1%	6.1%	2.3%	16.7%
Accommodation and food	8.4%	6.9%	7.3%	9.4%	6.8%
Information & communication	1.9%	3.4%	3.0%	2.3%	1.5%
Financial & insurance	3.5%	2.9%	2.7%	2.7%	0.9%
Property	1.6%	1.9%	1.4%	2.0%	1.2%
Professional, scientific & technical	6.2%	8.8%	6.1%	9.4%	3.8%
Business admin & support services	6.8%	8.1%	11.3%	7.8%	7.6%
Public admin & defense	4.9%	3.1%	4.0%	5.5%	3.4%
Education	9.2%	9.2%	8.2%	10.9%	9.1%
Health	15.4%	13.2%	11.9%	17.2%	7.6%
Arts. Entertainment, recreation & other services	4.6%	4.6%	4.9%	5.5%	3.0%

Gross value added (GVA) is the value generated from the production of goods and services. GVA per head on average across the Transport East area is £23,431. GVA per head is greatest in Suffolk (£25397) followed by Essex (£25318) and Norfolk (£20907). GVA per head for Southend-on-Sea and Thurrock were £17266 and £25262 respectively[35]. The GVA for the Transport East Region is much less than the national for England which was £27,949 in 2017[36].

The industry sector which contributes the most to GVA across Suffolk and Thurrock is distribution, transport, accommodation, and food contributing 20% and 39% of GVA, respectively. In Norwich and Southend-on-Sea, the greatest contribution to GVA is from the public administration, education and health sectors, contributing 21% and 24% to GVA, respectively. In Essex, real estate activity contributes the largest proportion to GVA, approximately 15%[37].

Between October-December 2013 and October-December 2020, the number of disabled people in employment across the UK increased by 1.41 million, an increase of 47%[38]. There were 3.5 million disabled people in work in 2017, with the Government aiming to increase this to 4.5 million by 2027.

Business Health

The business health indicator was obtained using data from the ONS on 2019 Business Demography startups and closures. All areas had a growth in business health with more business startups than closures in 2019[39]. In 2019, Essex had the largest growth with 1,495 businesses, compared to Southend-on-Sea which had the smallest growth with only 60 businesses. Thurrock saw a growth of 430 businesses, while Norfolk and Suffolk saw a growth of 255 and 370, respectively[40].

Tourism

Within the Transport East Region in 2019 Norfolk had five of the most visited top 20 paid attractions in the East of England (Blickling Hall, Gardens and Park, Felbrigg Hall Garden and Park, Dinosaur Adventure, Pensthorpe Nature Reserve and Gardens and Holkham Hall). Essex had four attractions; RHS Garden Hyde Hall, Audley End Miniature railway, Audley End House and Gardens and Purfleet Heritage and Military Centre. Suffolk had three of the most visited paid attractions in the East of

England; Ickworth House, Park and Gardens, Sutton Hoo Anglo Saxon Burial Mounds and West Stow Anglo Saxon Village[41].

In addition to tourism attractions, large recreational areas have become tourism hotspots. For example, there are nearly 200 nature reserves across the Transport East Region, including the Suffolk Wildlife Trust, North Cove Nature Reserve and Suffolk Coast and Heaths AONB. In addition, the Broads also attracts vast numbers of visitors each year, visiting for the unique landscape and wildlife. It is estimated to attract approximately eight million visitors per year, bringing with it, significant economic benefits for the region[42].

Previously, due to the peak of the COVID-19 pandemic, staycations increased, however the medium and long term trends of staycations within the UK is currently unknown. It is likely that other factors such as costs of travelling abroad, Brexit and rising environmental consciousness may also impact tourism in the Region. The Region. particularly coastal areas, experience increased volumes of visitors during weekends, bank holidays and summer periods. This increased pressure may result in increased congestion and pressure on public transport services. The seasonal pressure on the transport network may also impact landscape and biodiversity.

5.4 Equality and Diversity

A baseline has been compiled using public Census data from 2011 and supplemented with more recent information where available.

Data from the Office for National Statistics (ONS) has also been gathered on the following protected characteristics from Section 4 of the Equality Act 2010:

- Age
- Sex and Gender
- Race
- Disability
- Marriage and Civil Partnership
- Pregnancy and maternity
- Religion or belief; and
- Sexual Orientation

Equality and diversity element strongly tie in with the concept of 'levelling up' introduced by the UK government in 2020. From previous assessments on the Index of Multiple Deprivation, it was observed that multiple disparities existed amongst the intra-regional areas within Transport East's area of influence. Of these, the biggest difference groups were observed to be the communities living in the rural areas and the coastal areas which are further described in the subsequent sections. Levelling up will contribute to addressing the needs of individual rural or coastal communities as each have different issues and challenges.

Age

Error! Reference source not found.[43] presents the split of the population across the different age r anges: Under 19s, 19 to 44 years old, 45 to 69 years old and the Over 70s. In 2019, Thurrock had a much younger population in comparison to the other areas, with the greatest proportion of under 19s (27%) and 19 to 44 year old's (35%). Thurrock also has a much smaller proportion of over 70s with 10%, compared with Norfolk and Suffolk who have 18% and 17% respectively. Accessibility to health care facilities is especially important for the older population[44].

Table 5.4 Age structure of the Transport East population, 2019 (%)

Constituent Areas	Under 19	19-44	45-69	Over 70s
Norfolk	20%	29%	33%	18%
Essex	22%	31%	32%	15%
Suffolk	21%	28%	33%	17%

Constituent Areas	Under 19	19-44	45-69	Over 70s
Southend-on-Sea	23%	31%	31%	14%
Thurrock	27%	35%	28%	10%

Gender

Within the Transport East Region, approximately 49.1% of population are male and 50.9% female, which is comparable with the national male and female percentage of 49.2% and 50.8% respectively[45]. Despite the near even split of gender of the population, the gross weekly pay (full time workers) difference between men and women are seen to be highest in Suffolk (£100.8) whilst the lowest difference is seen in Southend-on-Sea which has a difference (£45.7) lower than the national average (£78.6).

Similarly, the overall hourly pay (excluding overtime) is seen to be higher among men across the Region, with the exception of Southend-on-Sea. The hourly pay difference between gender is seen to be the highest in Suffolk (£1.42) and higher than the average national difference (£1.22)[46].

Ethnicity

Error! Reference source not found.[47] shows the split of the population across different ethnic groups. T he largest proportion of the Transport East population stated they were white British (89.9%), this proportion was largest in Norfolk (90.8%). This proportion was much higher than the national average (78.7%). The second highest ethnicity across the Transport East area was all other white (4.4%), followed by Asian/ Asian British (2.5%).

Table 5.5 Ethnicity across the Transport East constituent Areas, 2016

Constituent Areas	White British	All Other White	Mixed / Multiple ethnic groups	Asian / Asian British	Black/ African / Caribbean / Black British	Other ethnic group
Norfolk	90.1%	5.6%	0.6%	2.1%	0.8%	0.8%
Essex	89.8%	3.4%	1.4%	2.6%	1.8%	1.0%
Suffolk	88.9%	5.6%	1.5%	1.9%	1.3%	0.8%
Southend-on-Sea	86.7%	5.0%	1.7%	2.8%	2.2%	1.7%
Thurrock	77.2%	6.6%	1.8%	3.0%	9.0%	2.4%
Transport East	89.9%	4.4%	1.5%	2.5%	1.9%	1.1%
England	78.7%	6.2%	1.8%	8.0%	3.5%	1.9%

Data from the latest Annual Population Survey (Jan –Dec 2019) shows that BAME women currently make up 16% of the female working age population of England and Wales. White women make up the remaining 84%. BAME men currently make up 15% of the male working age population[48].

Disability

Error! Reference source not found.[49] shows the proportion of the population whose day to day activities a re limited by a long-term health problem or disability. The proportion of people with significant disabilities that affect their day to day across the Transport East Region (8.1%) is in line with the England average (8.3%) while Norfolk has the highest proportion of people with long term health problems or disabilities at 20.1% compared to the 17.6% England average.

Table 5.6 Proportion of the population whose day to day activities are limited by a long-term health problem or disability across the Transport East constituent Areas, 2011

Constituent Areas	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
Norfolk	9.1%	11%	79.9%
Essex	7.7%	9.4%	82.9%
Suffolk	7.9%	10.1%	82.1%
Southend-on-Sea	8.8%	9.7%	81.5%
Thurrock	7.2%	8.3%	84.4%
Transport East	8.1%	9.7%	82.2%
England	8.3%	9.3%	82.4%

Religion

Error! Reference source not found.[50] below shows the breakdown of religious groups across the T ransport East area.

Table 5.7 Religion across the Transport East constituent Areas, 2016

Constituent Areas	Christian	Buddhist	Hindu	Jewish	Muslim	Sikh	Other	None/ not stated
Norfolk	60.0%	0.5%	0.3%	0.3%	0.9%	*	1.6%	36.4%
Essex	58.3%	0.3%	0.8%	0.3%	1.3%	0.1%	1.4%	37.5%
Suffolk	62.8%	0.5%	0.3%	0.1%	0.9%	0.0%	1.65	33.7%
Southend-on-Sea	56.7%	0.6%	1.1%	1.7%	0.6%	0.0%	2.2%	37.2%
Thurrock	61.4%	0.6%	1.2%	*	2.4%	0.6%	1.8%	31.9%
England	56.6%	0.5%	1.7%	0.5%	5.6%	0.7%	1.5%	32.8%

* Data not available

Sexual orientation

Recent data on sexual orientation is limited, data from 2015, presented in **Error! Reference source not f ound.** shows that the majority of the population across the constituent areas in Transport East identified as heterosexual/straight[51].

Some 48.9% of residents in the Transport East region are married or in same-sex civil partnerships, with 51.4% residents in Norfolk having the highest percentage of married couples. This overall percentage of marriages across Transport East region are seen to be slightly higher than the national at 46.8%[52].

Table 5.8 Sexual Orientation for the constituent areas, 2013 to 2015 (%)

Constituent Areas	Heterosexual or straight	Gay or lesbian	Bisexual	Other	Don't know or refuse to say
Norfolk	94.8%	0.5%	0.6%	0.3%	0.8%
Essex	96.7%	0.4%	0.2%	0.2%	0.6%
Suffolk	n/a	n/a	n/a	n/a	n/a

Constituent Areas	Heterosexual or straight	Gay or lesbian	Bisexual	Other	Don't know or refuse to say
Southend-on-Sea	95.2%	0.6%	0.4%	0.45	1.1%
Thurrock	96.4%	0.6%	0.4%	0.3%	0.9%

Pregnancy and maternity

Error! Reference source not found.[53] shows that the conception rate varied across the constituent a rea for women aged 15 to 44. Thurrock had the highest rate with 91% while Norfolk had over 20% fewer with 69.2% in 2018. Essex, Suffolk and Southend-on-Sea were all broadly in line with the conception rate for England as a whole. Southend-on-Sea had a larger percent of Under 16 pregnancies with 5.2%, Thurrock had the least with 1.9%.

Table 5.9 Conceptions across the constituent areas, 2018

Constituent Areas	All conceptions (rounded)	Conception rate per 1,000 women aged 15 to 44	Conceptions Under 16	Conception rate per 1,000 women aged 13 to 15
Norfolk	10,400	69.2%	38	2.9%
Essex	20,300	78.2%	47	2.0%
Suffolk	8,900	72.6%	26	2.1%
Southend-on-Sea	2,600	78.9%	12	5.2%
Thurrock	3,200	91.0%	6	1.9%
England	800,200	75.7%	2,266	2.5%

Accessibility

Error! Reference source not found. shows the dominance of dispersed rural villages and rural t owns with the 'urban city and town' close to, Norwich, Ipswich and Colchester. Thurrock, and Southend-on-Sea are closer to London and there is therefore a greater concentration of areas classed as 'urban city and towns' compared to the rest of the Region.

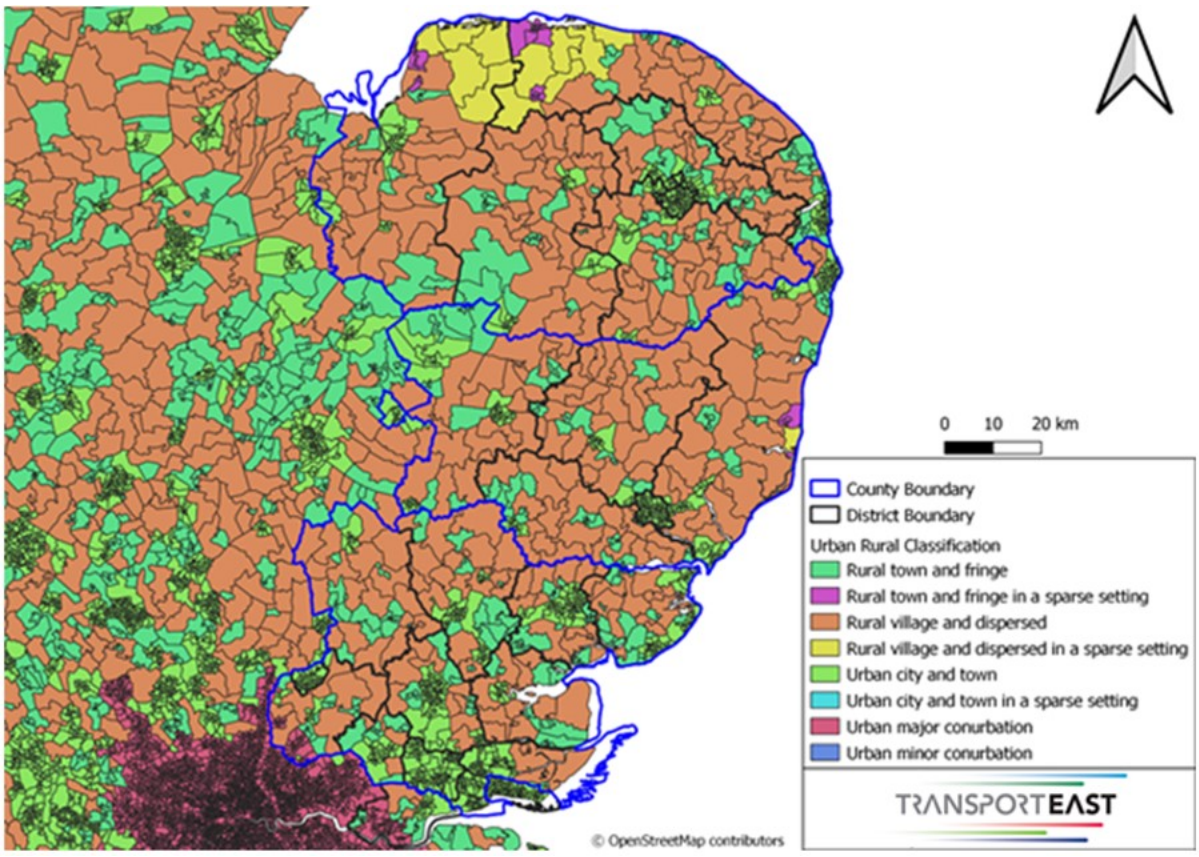

Figure 5.2 Urban / Rural area classification across the Transport East area

The characteristics of urban/rural geography of the Transport East region is shown in the Figure 5.2[54]. The focus of journey time calculations analysis has been on public transport / walking across these different urban/rural areas, to provide an understanding of accessibility that is available for the vast majority of potential users. There may be pockets of relative inaccessibility by walk/public transport, where cycling provides good access to services or transport hubs, but as often is the case, in these locations there is likely to be high car dependency. There are also groups in both rural and urban areas including those disabled or on low-income levels who are not car drivers or may not have access to a car for their daily access needs. These users are also often restricted to access by local services such as Door to Door services or Community cars which are limited to certain time periods and may need pre-booking.

Error! Reference source not found.[55] shows the time taken to reach a town centre by walking and p ublic transport, from 0 to 120 minutes. It shows that only a minority of coastal and rural communities have good access to town centres by walking and public transport. Across the Transport East Region, only 48% of the rural population can access a town centre in 30 minutes. This compares with 36% of rural Norfolk and 71% for rural Suffolk. Compared to an England average of 53%, accessibility to town centres from rural areas are low. Only 48% of residents over 65 are within 30 minutes of a town centre while only 50% of those aged between 14 and 19. There is also a need to consider journey time reliability of the transport network. In addition to reducing congestion to improve journey times, reducing demand on the road network will improve journey time reliability for users, while also benefiting pedestrians, cyclists and residents through lower volumes of vehicles and fewer air, noise and segregation issues.

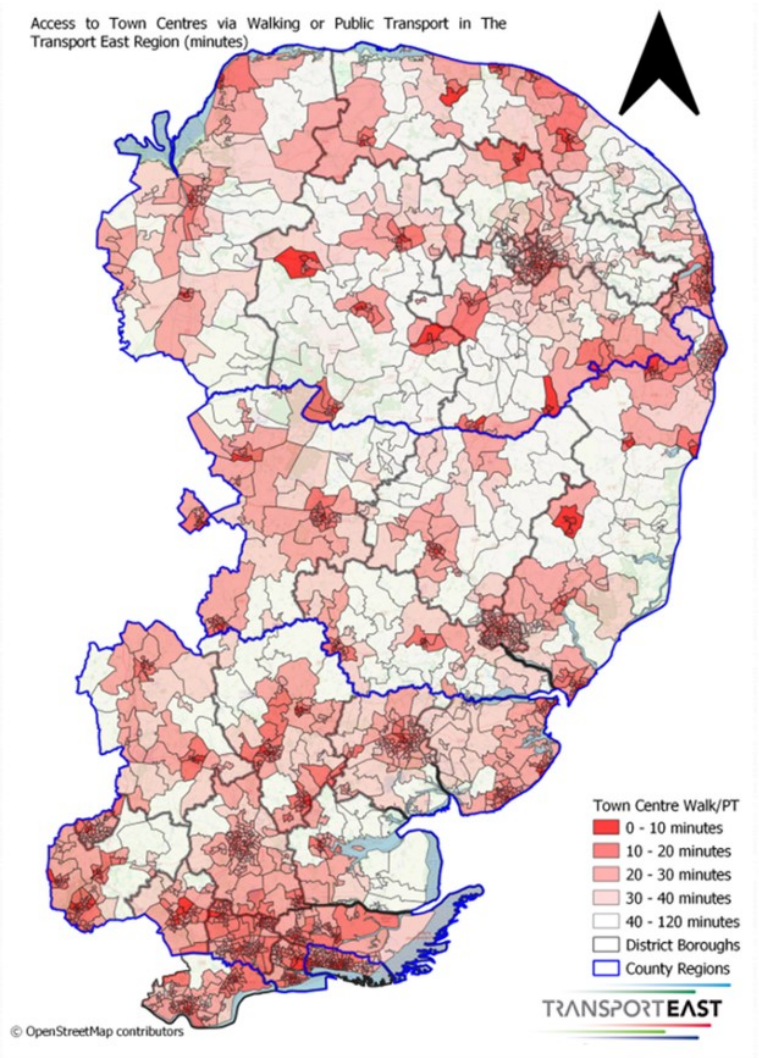

Figure 5.3 Access to Town Centres via walking or public transport

Rural areas and those who live in urban areas are more likely to not have a car in their household (see **Error! Reference source not found.**). Just over 43% of the households have access to one car or v an, in line with the national average (42.2%).

Table 5.10 Car / van availability for households across the Transport East Area

Constituent Areas	No car / van	1 car / van	2 car / van	3 car / van	4 or more car / van
Norfolk	18.8%	44.8%	27.4%	6.4%	2.5%
Essex	18.0%	42.1%	29.6%	7.4%	3.0%
Suffolk	17.9%	43.5%	29.2%	6.8%	2.6%
Southend-on-Sea	27.3%	44.5%	22.2%	4.6%	1.4%
Thurrock	20.1%	43.9%	27.3%	6.45	2.3%
Transport East	18.8%	43.3%	28.4%	6.8%	2.6%
England	25.8%	42.2%	24.7%	5.5%	1.9%

Coastal areas are generally seen to have a higher rate of households with no car or van even if the coastal community is also rural.

Inaccessibility and loneliness, especially those residents living in households aged over 65 and those aged 16-24 years is a health consideration, however this challenge does not appear to exist beyond pockets in Norfolk's rural towns and some coastal communities according to the ONS dataset[56]. Loneliness appears to be more prevalent in more urban areas often with a correlation with the Index of Multiple Deprivation, especially in Tendring, Kings Lynn and West Norfolk, and Castle Point.

ONS data published in 2020 looked at coronavirus and loneliness and described a phenomenon of "lockdown loneliness". Collecting more than 5,000 individual responses during the UK's initial lockdown period (April 3–May 3, 2020), the survey found that the lockdown affected everyone asked, with 31% reported that their well-being had been impacted by loneliness. There was no link between lockdown loneliness and objective indicators such as having a health condition or disability.

Although the ONS survey included adults only, similar findings have been reported in young people. Place2Be, a UK-based organisation that provides mental health services in primary and secondary schools, found in a recent survey of over 200 frontline mental health professionals that loneliness and isolation was the most common topic discussed by young people, parents and carers during the lockdown.

Accessibility to recreational areas can encourage physical activity and provide access to nature having a beneficial effect on wellbeing, through increased opportunity for physical activity, social interaction and relaxation[57]. Socially deprived communities are likely to benefit the most from the health benefits of natural environments, through reductions in stress, mortality and morbidity. Moreover, access to green space promotes community cohesion, reducing social isolation for minority groups and the elderly[58]. Across the 2019/2020 period 65% of the Transport East adult population were physically active, slightly less than the 66.4% for England[59]. Of adults aged 18 and above, over 62% were classified as overweight or obese, this was greatest in Thurrock (69.4%) and lowest in Norfolk (62.7%). The Transport East Region has a greater proportion of overweight or obese adults than the national average (62.8%)[60].

Key Trends

Population growth 2030 and 2040 (see **Error! Reference source not found.**) will see the Counties p opulations increasing by over 10%. Thurrock has the largest expected growth of 11% in 2030 and 21% in 2040. This increase in population will place greater demand on the transport infrastructure and network.

Table 5.11 Population Projections 2030 and 2040

Constituent Areas	2019 (rounded)	2030[61]	% Increase from 2019	2040[62]	% Increase from 2019
Norfolk	907,800	974,300	7%	1,017,668	12%
Essex	1,489,200	1,580,618	6%	1,647,398	11%
Suffolk	761,400	794,838	4%	819,172	7%
Southend-on-Sea	183,100	195,024	6%	203,587	11%
Thurrock	174,300	191,662	10%	202,327	16%
England	56,343,100	59,181,798	5%	61,157,868	9%

Data has also shown that ethnic diversity in the population make up across the Transport East Region is projected to increase between 20 to 40% and some areas increasing by 50 to 60%[63].

Parts of the coastal communities such as North Norfolk and the former Suffolk Coastal District are projected to have over 37% of their residents over 65 by 2043[6465], potentially contributing to an increase in loneliness[6465].

Table 5.12 Population Projections by state pension age and working 2030 and 2040

Indicator	Norfolk	Essex	Suffolk	Southend-on-Sea	Thurrock	TE area total	England total
State Pension 2019	218,553	301,301	175,905	34,840	23,530	754,129	10,127,000
Working age 2019	538,206	905,212	448,855	112,849	110,524	2,115,646	35,393,000
State Pension Age 2030	240,920	324,374	196,600	37,618	24,950	824,462	11,211,000
% Increase from 2019	11%	9%	13%	10%	8%	9%	11%
Working Age 2030	582,383	972,378	468,940	122,399	125,073	2,271,173	37,529,000
% Increase from 2019	7%	6%	3%	7%	11%	7%	6%
State Pension Age 2040	282,504	376,518	230,975	44,933	30,339	965,269	13,209,000
% Increase from 2019	31%	27%	33%	31%	32%	28%	30%
Working Age 2040	581,414	983,716	459,634	123,528	130,121	2,278,413	37,481,000
% Increase from 2019	6%	7%	1%	8%	16%	8%	6%

Error! Reference source not found. shows population projection by state pension age and working age a cross the Transport East constituent areas for 2030 and 2040. Thurrock is the area with the highest increase from 2019 of working age population by 2030 and 2040, 11% and 16% respectively. In comparison, Suffolk is the area with the lowest increase from 2019 of working age population with only 3% for 2030 and 1% for 2040. Similarly, Suffolk is the area that is estimated to experience the highest increase of state age pension population by 2040 (33%). This is in line with the other areas within Transport East, whose state age population is predicted to increase an average of 30%.

Issues and Opportunities

Key issues and opportunities for population, equalities, and socioeconomics are:

- Population growth across all age groups will place pressure on the transport network, housing availability, amenities, education and health facilities.
- The transport network should aim to support and improve access to services and facilities for vulnerable groups including the elderly population, disabled, women, families with young children, and single parent families.
- There are opportunities to improve access to rural areas through transport services, digital services and bring services to people.
- COVID-19 has changed work habits increasing the number of people seeking to live outside the city centre, as the need to access workplaces is reduced. This may reduce daily commutes but will place different demand on transport services as more people travel into urban centres for leisure and social interaction
- COVID-19 is expected to increase staycations in the short term therefore transport infrastructure needs to be able to accommodate increased demand to coastal hotspots – an influx of tourists can create parking issues, congestion, environmental impacts e.g., litter, disturbance and erosion.
- Transport is a facilitator that allows efficient business and is essential for modern living. Sustainable transport interventions can support inclusive growth for communities which further helps social cohesion, access to employment and access to vital services.
- By helping disabled people into work, enables people to reach their potential and economic independence. Employers will also enjoy the advantages of a diverse workplace, the talents of disabled people and the potential for greater productivity[66].

5.5 Health

The World Health Organization (WHO) constitution defines health as '*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'[67]. Health is determined by a complex interaction between individual characteristics, lifestyle and the physical, social and economic environment. Most public health experts agree that these 'wider determinants of health' have a greater influence than formal healthcare for ensuring a healthy population. **Error! R eference source not found.**[68] provides a conceptual illustration of wider determinants of health in our natural and built environment.

A related issue, of key importance to public health, is the issue of health inequalities. The Marmot Review into health inequalities[69] looked at differences in health and wellbeing between social groups and described how the social gradient on health inequalities is reflected in the social gradient on educational attainment, employment, income, quality of neighbourhood and other issues. Understanding the wider determinants of health is seen as an important means of tackling health inequalities and improving population health.

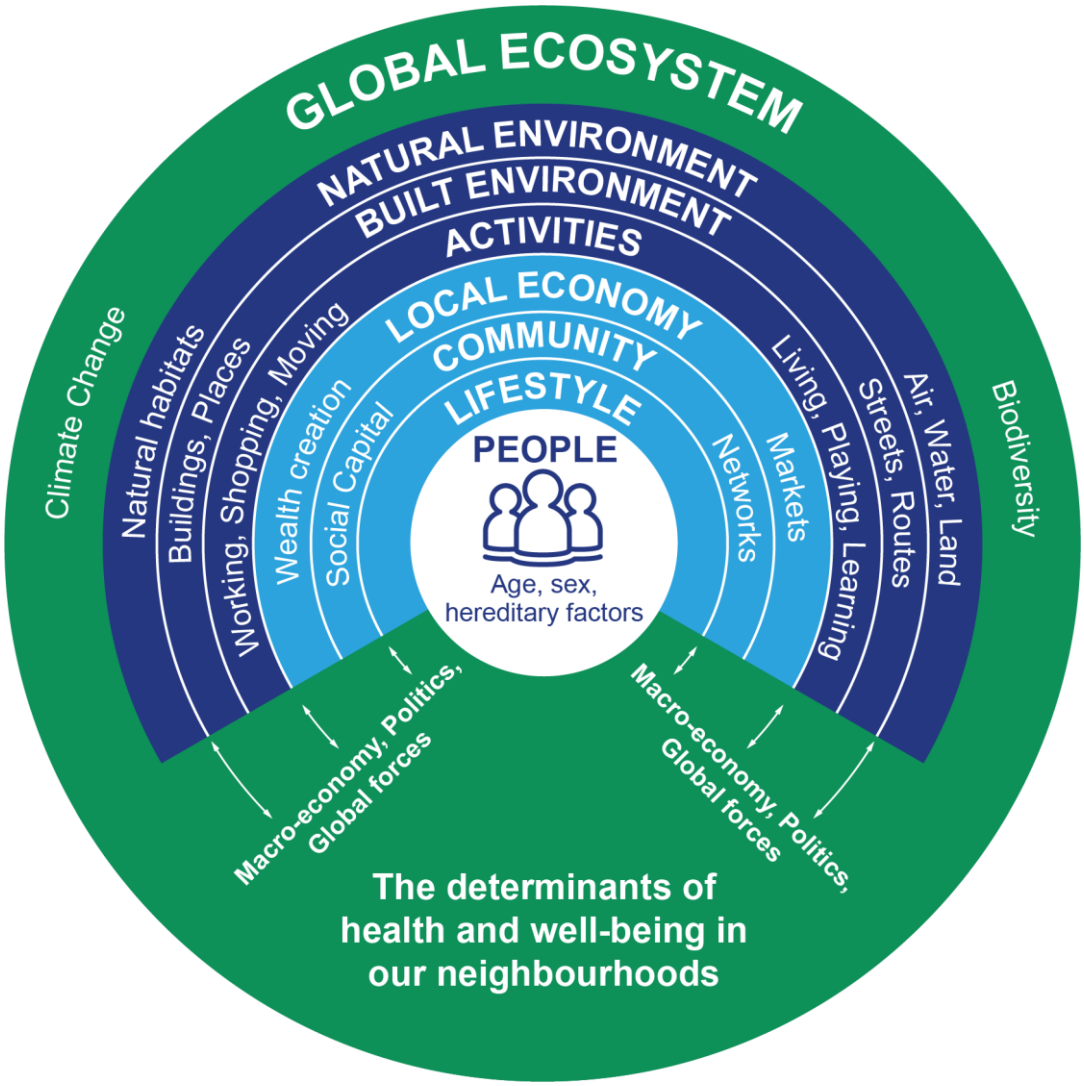

Figure 5.4 Determinants of health and wellbeing in our neighbourhoods

Transport can have both positive and negative effects on health, and these effects can be distributed unequally across populations. **Error! Reference source not found.** illustrates potential pathways b etween transport policy and physical and mental health (including health inequalities). Physical and mental health are strongly interconnected, with physical health problems significantly increasing the risk of poor mental health and vice versa.

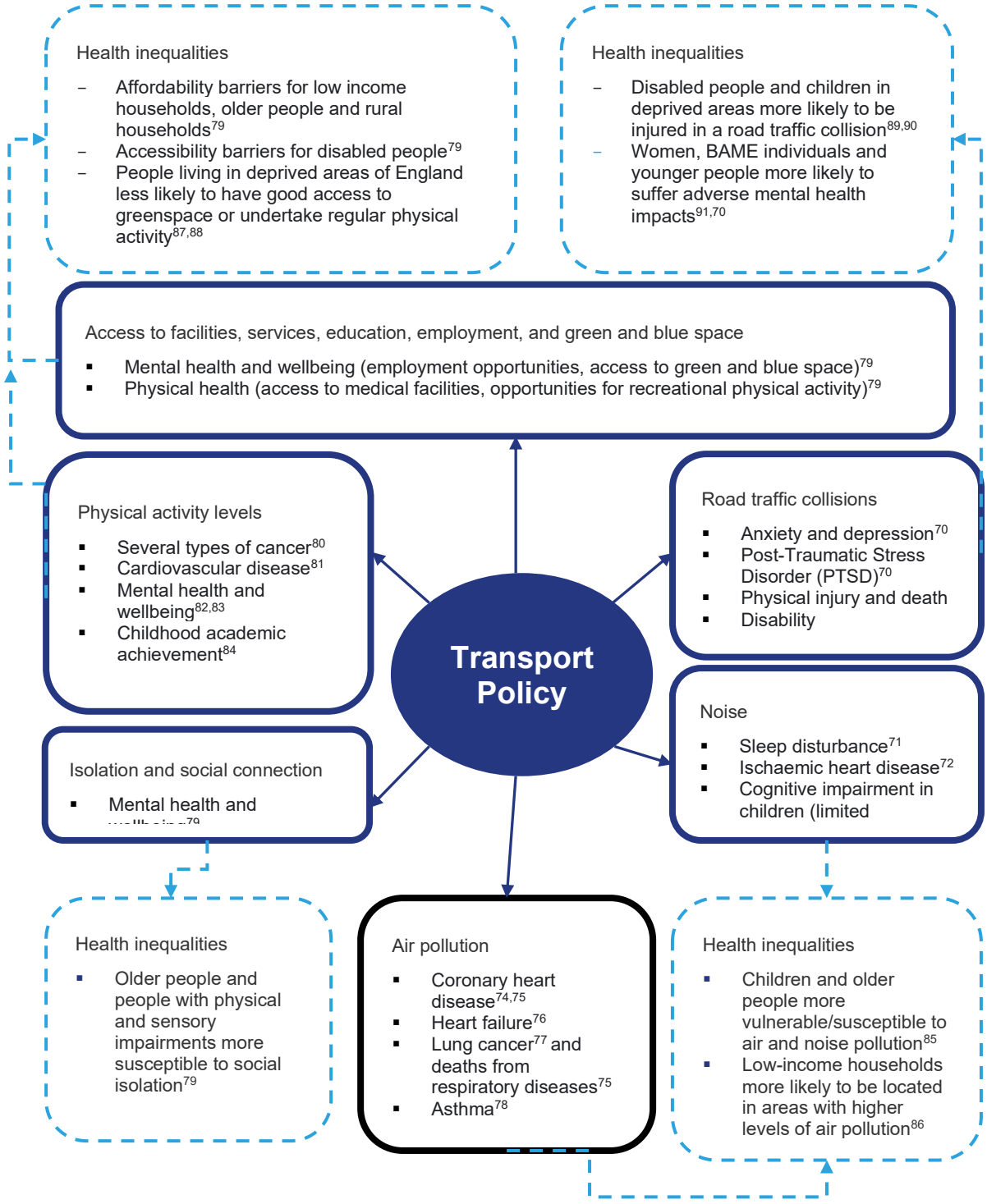

Figure 5.5 Links between transport policy and health outcomes

Whilst the Strategy has potential to alter transport patterns outside the Region, the primary health effects would happen within, rather than beyond the Region, consequently, baseline information for the Region has been derived from the following sources:

- Public Health England's (PHE) Local Authority Health Profiles webtool (https://fingertips.phe.org.uk/profile/health-profiles)

- PHE's Health Inequalities Segment Tool (https://analytics.phe.gov.uk/apps/segment-tool/)
- Suffolk County Council[92], Thurrock County Council[9394], Norfolk County Council[95], Essex County Council[96] and Southend-on-Sea Borough Council[9798] Joint Strategic Needs Assessments (JSNA)
- Transport East Regional Evidence Base[99]
- Levelling up Rural and Coastal Communities evidence base[101]

Error! Reference source not found. presents key socio-demographic and health indicator data i dentified in **Error! Reference source not found.** as being particularly relevant to transport interventions. Data is presented at local authority level for the purposes of this scoping assessment. It is acknowledged that this will mask variation at the local level. For example, an initial review of local level data (Lower Layer Super Output Areas, or LSOA, is a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales) using PHE's Local Health webtool shows that rates of premature mortality all causes are higher in coastal towns in Norfolk, Suffolk and Essex than in other parts of the study area. At the assessment stage local level (LSOA where available) data will be obtained and reviewed in relation to specific transport interventions.

Table 5.13 Population health indicator data

Indicator	Local Authority					England average
	Essex	Norfolk	Southend-on-Sea	Suffolk	Thurrock	
Indicator data for populations particularly vulnerable to health impacts associated with transport						
Life expectancy at birth (male) (2017-2019)	80.4	80.1	79.1	80.9	79.4	79.8
Life expectancy at birth (female) (2017-2019)	83.5	84.1	82.5	84.3	82.7	83.4
Population aged under 19 (2019) (%)	See Table 5.4					18.9
Population aged over 65 (2019) (%)	See Table 5.4					18.8
Long term health problem or disability (2011) (%)	17.1	20.1	18.5	17.9	15.6	17.6
Deprivation score (IMD 2019)	See 'Multiple deprivation (intra-regional comparison)					
People aged 16-64 in employment (%) (2019/2020)	76.9	78.0	77.6	78.4	76.6	76.2
Health indicators relevant to transport						
Physically active adults (%) (2019/2020)	67.6	66.2	63.2	69.5	58.3	66.4
Adults aged 18+ classified as overweight or obese (%) (2019/2020)	63.8	62.3	65.1	62.7	69.4	62.8
Prevalence of obesity (including severe obesity) at Year 6 (%)	19.5	19.7	19.5	18.7	25.2	21.0
Physically active children and young people (%)	45.5 (East of England region)					44.9
Premature mortality rate (aged under 75) from all causes (2017-2019) (standardised rate per 1000)	300	304	353	281	329	326

Indicator	Local Authority					England average
	Essex	Norfolk	Southend-on-Sea	Suffolk	Thurrock	
Under 75 mortality rate from all cardiovascular diseases (2017-2019) (standardised rate per 1000)	60.7	64.7	75.5	60.3	74.5	70.4
Under 75 mortality rate from cancer (2017-2019) (standardised rate per 1000)	126.1	121.5	141.6	117.9	137.0	129.2
Emergency hospital admissions from COPD (2019/2020) (rate per 1,000)	351	341	535	327	582	416
Estimated prevalence of common mental health disorders (2017) (% of population aged over 16)	14.9	15.8	17.5	14.8	17.3	16.9
Estimated prevalence of common mental health disorders (2017) (% of population aged over 65)	9.5	10.1	10.6	9.4	10.4	10.2
Killed and seriously injured (KSI) casualties on England's roads (2016-2018) (crude rate per 1000)	54.3	47.6	43.5	39.2	49.5	42.6
Note: shaded cells indicate values that are either statistically significantly worse than the England average or are within the worst quintile for England (IMD data only)						

Error! Reference source not found. describes the baseline for each of the six main pathways b etween transport policy and health identified in **Error! Reference source not found.**, including evidence of health inequalities where available.

Table 5.14 Health outcomes and inequalities within the study area

Potential pathway to health impacts	Health outcomes in the study area	Health inequalities in the study area
Access to facilities, services, employment, education and green and blue space	Male and female life expectancies in Southend-on-Sea are significantly lower than the England average, and rates of premature mortality (all causes) are significantly higher. Female life expectancy is Thurrock is also significantly lower than the England average. Other leading and lagging health indicators linked to access to facilities, services and greenspace are generally similar or better than the England average.	Norfolk and Suffolk have a relatively high proportion of residents aged over 65 and with a long term health problem or disability, both to experience accessibility difficulties. King's Lynn and coastal areas in Norfolk, Suffolk and Essex in particular have a high proportion of residents with long term health problem or disability. As described in detail in 'Accessibility' (Refer to Section 5.3) only a minority of coastal and rural areas have good access to town centres and hospitals by walking and public transport, and for rural communities' access to GPs is worse than the England average[100].
Road traffic collisions	Three of the five local authorities (Essex, Norfolk and Suffolk) within the study have rates of KSI	Small area analysis of relationships between areas with high proportions of older people, people with a disability or

Potential pathway to health impacts	Health outcomes in the study area	Health inequalities in the study area
	casualties which is significantly higher than the England average.	high levels of deprivation and KSI casualty rates will be undertaken to support the health assessment in the ISA should relevant options taken forward to assessment
Air and noise pollution	Air Quality Management Areas have been declared (where Air Quality Objectives are not likely to be achieved, due to road vehicle emissions) by 16 of the 26 local authorities in the region, and of the 46 AQMAs, 42 were for exceedances of annual mean NO_2, with four in Thurrock declared for exceedances of particulate matter (PM_{10}). The 46 NIAs are located mainly at major road junctions within urban areas (see 'Noise'). Rates of emergency hospital admissions for COPD are significantly higher than the England average in Southend-on-Sea and Thurrock. Respiratory diseases are the main contributor to the life expectancy gap between Southend-on-Sea and England in men and one of the main contributors for women.	Southend-on-Sea Joint Strategic Need Assessment (JSNA)[104] [105]recognises that there are higher levels of transport related pollution within the more deprived areas. Whilst coastal areas in Norfolk, Suffolk and Essex have high proportions of older residents, elevated air and noise pollution levels occur within urban conurbations.
Physical activity levels	Rates of physically active adults, overweight or obese adults and obese children are statistically significantly higher than the national average in Thurrock. However, data for health outcomes linked to physical activity levels (cardiovascular disease, cancer, anxiety and depression) are similar to the England average in Thurrock and across the Region	Data on rate of physical activity in adults and children is not currently publicly available at small area level. Small area analysis of relationships between leading health indicators and health outcomes linked to physical activity levels and levels of deprivation will be undertaken to support the health assessment within the ISA. An initial review suggests there is some correlation between deprivation and rates of premature mortality from cancer and circulatory diseases in coastal towns in Norfolk, Suffolk and Essex, and in Thurrock.
Social connection and isolation	The prevalence of common mental disorders (anxiety and depression) in people aged over 16 is similar to the England average across all local authorities.	Older people are more susceptible to social isolation, and Norfolk and Suffolk have a high proportion of residents aged over 65, particularly within coastal areas. However, health indicator data shows rates of common mental health disorders in over 65s is similar to the England average. However, levels of loneliness are generally higher in urban areas with a few exceptions such as a few rural towns in Norfolk and some coastal communities[101] (see 'Accessibility' for further detail).

Key Trends

- All local authorities but particularly Norfolk and Suffolk, anticipate increases in the proportion of residents aged over 65 in the coming decades.
- Physical activity levels in some areas of Essex are declining, in contrast to the national trend.
- Rates of KSI casualties on roads in Essex and Norfolk have increased over the last decade, a trend common across the UK.
- Levels of deprivation are rising in coastal Suffolk.

Issues and Opportunities

Key issues and opportunities include:

Health protection

- Interventions which seek to reduce road traffic collisions would focus on encouraging modal shift towards public transport and active travel (see 'Health promotion' opportunities identified below), but where necessary would also include traffic calming measures such as speed limits and addressing new challenges such as from e scooters.
- Interventions reducing air and noise pollution also address inequalities in exposure to poor air quality such as within the existing AQMAs in Essex, Thurrock and Southend-on-Sea and NIAs within urban areas.

Health promotion

- Consideration of age friendly design, including design for dementia, and potential for increasing access to health services in development of transport proposals to better an older population.
- Interventions to encourage a shift towards public transport, walking and cycling which will provide benefits including air pollution and physical activity levels. These would include measures to improve the public realm within urban areas and increase public transport connectivity within rural and coastal areas, as well as provision of good pedestrian and cycling infrastructure.
- Continued support for access to recreational facilities and green and blue space, with opportunities to improve access.

5.6 Community Safety

Safety and community severance are important considerations for users accessing the transport network. In addition, safety is also an indicator of crime and the fear of crime on the network.

The statistics and terminology used in the following baseline has been derived from the Department for Transport's annual road traffic statistics. There was a total of 5,923 reported road accidents in the Transport East Region in 2020, of which 2,727 were on urban roads whilst 3,196 were on rural roads[102]. The highest number of these road accidents was in Essex (2,385) whilst the lowest was in Thurrock (272).

Taking an average across the Transport East Region, 46.8 people (per 100,000 resident population) are killed or seriously injured (KSI) on the roads.[103] Suffolk has the lowest KSI at 39.2 per 100,000 population, lower than the England average of 46.7. Thurrock has the highest number of KSI at 49.5. The highest number of fatal accidents across the Transport East Region in 2020 were recorded in Essex with 38[104] while there were 98 fatal, 1513 serious, and 4,312 slight accidents across the Region in 2020.

Across England, car occupants accounted for 42% of road deaths, pedestrians 27%, motorcyclists 19% and pedal cyclists 6% in 2019[105]. Whilst 2019 saw an increase in pedestrians and pedal cyclists' accidents, 2020's change in travel patterns have contributed to a larger percentage reduction for pedestrians and a smaller reduction for pedal cyclists compared to other road users[106]. An impact of these collisions would be on the increased severance and perceptions of safety that active mode users have when accessing the network. Prior experience of an incident on the network is a significant factor influencing users' perceptions of safety. In the Bike Life cities survey (June 2018), both women and men believe safety for cycling needs to be improved in comparison to other transport modes. Safety is likely to include both road safety and personal safety[107] Road safety and perception of safety has a bigger impact on women, the Sustrans survey show that less than half of women

(46%) think their city is a good place to cycle overall with adequate infrastructure, including the amount, directness, condition and signposting. Severance, perception of safety and road safety will be considered in the assessment of the strategy interventions with the aim that everyone should be able to access the network safely across the Transport East region.

A public transport survey (2020) for the Transport East Region shows that safety is among the top three categories considered 'Important' or 'Very important' when people use public transport. Further data showed that safety tends to be more of a factor for specific groups such as women and those retired and over 65 years of age. Women are also more likely to see safety as a 'very important' issue compared to men. When comparing personal security, especially on public transport services women tend to rate personal security as more important compared to men who tend to rate it of 'neutral' importance.

Transport interventions may affect the level of security for transport users. This includes vulnerability to crime both at stations and on the transport network. Different social groups have different perceptions and vulnerability to crime.

Evidence suggests that, younger people are likely to be more susceptible to crime as they have less ability to protect themselves or recognise the danger of a situation [108]. Older individuals are also likely to have a greater fear of crime due to their insecurity or inability to protect themselves or withstand the effects of a crime. Moreover, the physical and mental weaknesses caused by old age make the elderly easy targets to those with criminal intent. Similarly, women's susceptibility to sexual assault and frequent experiences of various forms of harassment make them feel more vulnerable and perceive higher security risks[109]

Ethnic minority groups tend to live in low-income urban areas where the risk of assault is higher. Furthermore, individuals living in deprived areas have less choice about where they live making them more exposed to crime[110].

In 2017/2018, the number of reported sexual offences committed on public transport in the UK, increased by 7.6% (over 60% of these assaults were against females). The number of violent offences increased by 16% to 13,591 in 2018/19. These trends have changed in 2019/2020 which saw recording of sexual offences decrease by 7.53% whilst violent offences still increased by 1.11%. In 2019/2020 for the Transport Police B division area North (which includes the Transport East Region in addition to Cambridgeshire) reported 248 sexual offences against females compared to 19 against men.[111]

Between 2014 and 2016, the numbers of disability related hate crime incidents in England reported to the British Transport Police decreased by 37% while since 2016, the number of incidents has seen an increase of 24%.[112]

Key Trends

Except for Suffolk, the number of people seriously hurt or killed on the roads is higher than the national average. As the population increases, this could lead to a greater number of vehicles on the roads with potential for increased accident risk but the demographic changes also indicate this population increase will be mainly in older age group so the number of two car households could decline and the average distance travelled could decline in some areas. There is also the general trend for declining accident rates despite increased vehicle numbers on the roads. Safer roads have contributed to this trend in the past and in the future road safety improvements and better technology in vehicle automation might be beneficial to help reduce accident rates further. New challenges include concerns over safety associated with e-scooter use.

National Highways has set a clear long-term goal to bring the number of people killed or injured on the network as close as possible to zero by 2040. It has committed that, by the end of 2020, 90% of travel on the roads for which it has responsibility will be on roads with a 3-star safety rating or better[113]. In addition to this national agenda, Safer Essex roads partnership has recently launched Vision Zero as their ambition to have zero road deaths and serious injuries on roads in the Essex, Southend-on-Sea and Thurrock council areas by 2040[114]. Alongside this Norfolk and Suffolk councils have teamed up with Think! and Road safety strategies to support safer travel. This could help contribute to a reduction in serious road accidents.

Issues and Opportunities

Key issues and opportunities around community safety include:

- With traffic levels reaching levels seen pre-pandemic, there in an increase number of accidents and causalities.
- Protection of children, particularly in deprived areas, and young people, who are greatly over-represented in the casualty statistics[115].
- Fatalities on rural roads are more likely than on other road types.
- Crime on public transport in the UK particularly with regards to sexual assault, violent crimes, and disruption is increasing particularly affecting women, disabled and those from ethnic minority groups.
- Encourage the reporting of crimes as well as ensuring better safety provisions for all transport users.

5.7 Biodiversity

The biodiversity study area extends to include 2km from the Transport East Region boundary and areas with impact pathways such as where there are hydrological connections including river catchments that cross the Transport East boundary or changes to air pollution and nitrogen deposition along connecting transport corridors.

Information to inform this baseline has been gathered from multiple online sources:

- Magic Interactive Map[116]
- Joint Nature Conservation Committee (JNCC)[117]
- Natural England Website[118]
- Norfolk Biodiversity Information Service[119]
- Suffolk Biodiversity Information Service [120]
- Essex Wildlife Trust Biological Records Centre[121]

The distribution of statutory designated sites of international, national and local importance are presented in Appendix A: Figure 1 and are outlined below:

International/European

Sites protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) include:

- Special Areas of Conservation (SACs), designated under the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive)
- Special Protection Areas (SPAs) designated under the Directive 2009/147/EC of the European Parliament and of the council of 30 November 2009 on the conservation of wild birds (the Birds Directive)
- Ramsar sites, designated to meet the commitments of the Convention on Wetlands of International Importance,
- These areas all contribute to an international network of protected sites.

There are 24 Special Protection Areas (SPAs) (Appendix C) within the biodiversity study area, predominantly associated with coastal habitats and designated for the protection of waterbirds. These SPAs cover a total area of approximately 520065 ha, of which 85.3% is marine habitat. The Outer Thames Estuary SPA, on offshore SPA covering 392,451.66 ha of marine habitat, is also within the biodiversity study area.

Additionally, there are 23 Ramsar sites (Appendix C) within the biodiversity study area, designated to protect wetland habitats, covering an area of approximately 123,141 ha.

National/Local

There are 401 Sites of Special Scientific Interest (SSSIs), 38 National Nature Reserves (NNRs) and 119 Local Nature Reserves (LNRs) (Appendix A: Figure 1). In addition to these statutory designated

sites, there are more than 2300 county or local wildlife sites, including roadside nature reserves within the Transport East study area.

Within the Transport East Region boundary approximately 90% of SSSIs have been assessed as being in 'favourable' or 'favourable recovering' condition with the majority of the remaining 10% being in 'unfavourable-no change' or 'unfavourable – declining' condition

A variety of priority habitats and species (as defined in the Natural Environment and Rural Communities (NERC) Act 2006) are identified in the Region, including coastal and lowland habitats, such as coastal and floodplain grazing marsh, lowland dry acid grassland, deciduous woodland and traditional orchards. Priority species include bats, terrestrial mammals, reptiles, amphibians, insects and freshwater and marine species. (Note: Priority habitats and nature recovery sites are covered in the section on Natural Capital).

Key Trends

The 2019 State of Nature Report (State of Nature Partnership, 2019) highlighted the current trends in UK biodiversity since 1970. For England it was reported that 35% of species have experienced reductions in population, and 31% have reduced range. In comparison, 31% of species have seen increased populations and 24% have increased ranges.

Eight key drivers were identified for the changes in England's biodiversity: climate change, urbanisation, pollution, woodland management, fisheries, invasive non-native species, freshwater management and agricultural management, all relevant for the Transport East Region but particularly the latter two. The majority of sites within the Transport East Region. biodiversity study area that are designated for coastal habitat and birds report public access and disturbance as threats to qualifying features[122].

A 2020 review of UK biodiversity indicators found long-term deterioration for a number of indicators including pressure from invasive non-native species, status of threatened habitats and species, status of UK Priority species, birds in the countryside and at sea, and biodiversity and ecosystem. However, positive long-term trends including integration of biodiversity considerations into business activity, area of land in agri-environment schemes, pressure from pollution, protected areas, wintering water birds, mammals of the wider countryside (bats) and greenhouse gas removals by UK forests[123]. The impacts of the development of the existing transport network on habitats and wildlife through fragmentation, severance, pollution and disturbance as well as road kill effects for some species.

Recently, a focus on environmental commitments and schemes, such as the Water Framework Directive, Environmental Land Management Schemes (ELMS) and biodiversity net gain for development is seeking to halt and reverse the negative biodiversity trends. Agri-environment schemes have recently demonstrated positive associations with winter bird populations in England[124]. Particularly significant is the pending inclusion of biodiversity net gain as a planning requirement for all developments in England as will be required through the Environment Act 2021. The Environment Act also sets out a requirement for Local Nature Recovery Strategies and goals for species abundance.

As discussed, the coastal and rural areas of the region are visited by a large volume of tourists each year, resulting in increased seasonal pressures on the transport network. This seasonality may also affect local flora and fauna due to a higher volume of visitors interacting with and potentially damaging habitats and the local environment.

Issues and Opportunities

The Transport East Transport Strategy has the potential to affect biodiversity in both positive and negative ways. New infrastructure required to meet the aims of the strategy may result in direct loss of habitats and associated species as well as indirect effects due to pollution and disturbance, including nitrogen deposition. There is also the potential for a negative impact on wildlife due to severance and fragmentation, as a result of an expanding transport network. Evidence suggests these negative impacts are already affecting wildlife[125][126]. Designated sites already under pressure from recreational access and disturbance may be negatively affected by increased accessibility as a result of the strategy. The new infrastructure and Transport Strategy may also impact biodiversity and wildlife

through increasing the rate of roadkill and collisions with local fauna. However, the Transport Strategy may have positive effects through habitat enhancement measures as well as reduced pollution due to the decarbonisation theme.

5.8 Water Environment

The water environment baseline has been derived from the following sources:

- Water Framework Directive – River Basin Districts (Cycle 2)[127]
- Environment Agency - Flood Risk Maps[128]
- Environment Agency – Catchment Data[129]
- MagicMap[130]

The study area has an extensive water environment consisting of river networks throughout the areas, estuaries on the coastline, and surface water bodies found throughout the region, and ground water aquifers. Water from groundwater and surface water sources is essential for the environment, public water supply, agriculture and industry. The different Water Framework Directive water body categories are provided in **Error! Reference source not found.**[131].

Table 5.15 Number of water bodies in the Anglian River Basin District

Water Body categories	Natural	Artificial	Heavily modified	Total
Rivers, canals, and surface water transfers	189	44	293	526
Lake	10	19	17	46
Coastal	4	1	8	13
Estuarine	3	0	15	18
Groundwater	31	0	0	31
Total	237	64	333	634

The water environment has the potential to be both directly and indirectly affected by the Transport Strategy, while the functionality and the service of the infrastructure can be affected by flooding. The construction of land-based transport can potentially contribute to pollution of nearby watercourses and groundwater.

To protect the water environment, there are nationally significant legislation and corresponding standards, established within the EU Water Framework Directive (2000/60/EC), which seeks to protect and maintain water quality standards. The Water Framework Directive (WFD) sets an objective to achieve at least 'good ecological status' for all waterbodies by 2021. Very few water bodies meet 'good ecological status' particularly in Norfolk and Suffolk (see **Error! Reference source not found.**[132]).

Table 5.16 Ecological and chemical classification for surface waters* (2019)

	Ecological status or potential					Chemical Status	
Number of Water bodies	Bad	Poor	Moderate	Good	High	Fail	Good
603	22	105	428	47	0	603	0

*Anglian River Basin District data used

Table 5.17 Chemical and quantitative classification for groundwater* (2019)

	Quantitative status		Chemical status	
Number of Water bodies	Poor	Good	Poor	Good
31	14	17	15	16

*Anglian River Basin District data used

The region falls within the Anglian River Basin District, which is made up of 338 management catchments. The Anglian River Basin Management Plan[133] (2015), states priority issues they aim to tackle include diffuse pollution from rural areas (see landscape Section 5.11) and pollution from wastewater. It is worth noting that the current river basin management plans are due to be revised in 2021. The Region also has groundwater Source Protection Zones (SPZs), which are areas to protect drinking water sources from pollution. SPZs in the Region include Zone III (total catchment), Zone II areas (outer Protection Zone) and Zone I (Inner Protection Zone) areas.

Due to the extensive coastline and land-based water bodies, the region is susceptible to flooding and coastal erosion with consequential impacts on transport infrastructure. Road and rail infrastructure may become in-operatable due to flooding. Large areas within Norfolk and Thurrock are categorised as Flood Zone 3 (high risk) and Flood Zone 2 (medium risk) see (Appendix A: Figure 3) and **Error! R eference source not found.**[134].

Table 5.18 Flood Risk areas for Groundwater and Surface water

Flood Risk	
Ground and Sea Flood Risk	**Surface Water Flood Risk**
London and Thames Estuary	Canvey Island
Saffron Walden	Thurrock
Lowestoft	Chelmsford
Great Yarmouth	Colchester
Hunstanton	Ipswich
Kings Lynn	Norwich
	Harlow

The study area coastline excluding Thurrock is within Shoreline Management Plan Areas (SMPAs) and these are important for coastal management and flood protection.

Also within the Transport East area is the Broadland Catchment, covering the Broads, and also further into Norfolk and Suffolk. The Broadland Catchment includes four main rivers; the Bure, Waveney, Wensum and Yare, with the water ultimately flowing through or under the Broads and out to sea at Great Yarmouth or Lowestoft. The Broadland Catchment Partnership comprises of a range of organisations, groups and individuals, with the aim of improving the catchment utilising a Catchment Based Approach (CaBA)[135].

Key Trends

The Water Framework Directive seeks to protect and maintain water quality standards, and where necessary highlights conditions to be improved. These standards are statutory requirements, and therefore water quality should continue to improve. This is reflected in the objectives for surface water bodies for the Anglian River Basin District, which aims to have 176 water bodies achieving good ecological status by 2027 (compared to the 47 in 2019). However, with pressure for urban development rising, the impact on poorly managed construction may result in increased pollutants within water bodies.

The Environment Agency reports[136] that urban and transport pollution sources are among the main activities that prevent water bodies reaching good status - agriculture and rural land management (31% of reasons for water bodies not achieving good status), the water industry (28%), and urban and transport (13%). Runoff from roads can pollute watercourses when pollutants from oil spills and vehicle tyre and brake wear build up and are washed into nearby rivers when it rains. Vehicle tyre wear is the largest source of plastic entering UK waters and is also estimated to account for approximately 30% of all microplastic pollution in the world's oceans[137]. Road runoff can carry over

300 different pollutants including trace metals, hydrocarbons and other organic pollutants which also pose a threat to river health in the short and longer term, and in extreme cases can cause 'fish kills'.

A recent study of major roads in outer London[138] found that all the roads assessed had a high potential for damaging river health, and recommended the use of sustainable drainage systems (SuDS) at the roadside (close to the sources of pollution), and wetlands downstream, to use natural vegetation to capture and treat road runoff pollutants before they enter rivers or surface water sewers. The Broadland Catchment Partnership have identified that at times, some groundwater and river sources exceed drinking water standards for nitrate and pesticides. This increases the need for treatment and can therefore be costly.

Due to climate change and isostatic change the sea level continues to rise affecting the region. Sea level rise can also result in saline intrusion into groundwater which, combined with over abstraction, may result in reductions in groundwater quality. Other notable trends are that of increasing extreme weather events, and consequently flood risk and droughts.

Issues and Opportunities

Transport East Transport Strategy has the potential to negatively affect the water environment as new infrastructure may increase water pollution and affect flood risk while also offering an opportunity to potentially increase the resilience to flooding. There is also the opportunity to incorporate SuDS and wetlands in scheme design to reduce river pollution from road runoff.

5.9 Air Quality

The Air Quality baseline has been derived from the following sources:

- Clean Air Strategy (2019)[139]
- Road to Zero strategy (2018)[140]
- Clean Growth Strategy (2017) [141]
- UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations (2017/18)[142]
- DEFRA/DfT, 2017. Air Quality Plan for tackling roadside nitrogen dioxide concentrations in Eastern[143]
- DEFRA, UK Air Information Resource, AQMA[144]

Poor air quality contributes directly to ill health, with elderly people and those with health conditions such as asthma and heart disease being more at risk. Deposition of nitrogen oxides can change soil chemistry and affect biodiversity in sensitive habitats. In addition, ozone, formed when volatile organic compounds react with other air pollutants in the presence of sunlight, can travel long distances from its source and trigger asthma attacks and other respiratory problems as well as damage to crops.

The UK Government's Clean Air Strategy (DEFRA, 2019) reports that road transport, domestic shipping, aviation and rail are responsible for a significant proportion of air pollutant emissions - 50% of nitrogen oxides (NOx), 16% of fine particulate matter ($PM_{2.5}$) and 5% of non-methane volatile organic compounds (NMVOCs). Road transport is the largest source of nitrogen oxides in the UK and is the main source of exposure at the roadside, as well as producing particulate matter and VOCs. Airports also have an adverse effect on air quality from surface access via road transport and also on stratospheric ozone. The region is host to one major international airport at London Stansted and two small international airports at Norwich International and London Southend. The region is host to several major ports on the Suffolk and Essex coastline, including Felixstowe, the UK's busiest container port where shipping is a contributor to SO_2 and NOx emissions.

Legally binding air quality objectives (AQOs) have been established in the UK based on European law, to limit outdoor exposure to a range of air pollutants, as set out in the UK's Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007). The UK Clean Air Strategy (2019) outlines further actions the Government is taking to tackle emissions. The UK plan for tackling roadside nitrogen dioxide (2017) produced regional Zone Plans, including for the Eastern zone, which examined air quality in the Transport East area and adjacent counties to the west and parts of London. The Plan required local authorities to prepare feasibility studies to deliver NO_2 concentration compliance in the shortest possible time, including Southend-on-Sea Borough Council in 2018.

Local authorities are responsible for monitoring and assessing air quality in their areas, and where AQOs are not likely to be achieved, they must declare Air Quality Management Area (AQMA) and prepare an Action Plan to tackle the issue. AQMAs are mainly declared where nitrogen dioxide (NO_2) levels from road vehicles exceed the AQO.

Across the region, 16 of 26 of authorities have declared AQMAs. Of the 46 AQMAs, 42 were for exceedances of annual mean NO_2, with four in Thurrock declared for exceedances of particulate matter (PM_{10}). AQMAs have been declared in the following council areas: Thurrock (18 AQMAs); Southend-on-Sea Borough (1); 12 in Essex districts: Colchester (3), Brentwood (3), Chelmsford (2), Uttlesford, Maldon, Epping Forest, and Rochford; 11 in Suffolk: Ipswich (5), West Suffolk (3), East Suffolk (2) and Babergh; and 4 in Norfolk: King's Lynn and West Norfolk Borough (2), Norwich City, and Breckland (see Appendix A: Figure 2).

It is important to note that projects near and/or on the strategic road network must comply with the Design Manual for Roads and Bridges (DMRB) Sustainability and Environmental Appraisal LA 111 (Noise and Vibration from Construction, Operation and Maintenance Projects), to reduce the risk of significant effects occurring.

Key Trends

Air quality has improved across the UK in recent years. Emissions of nitrogen oxides fell by 27% between 2010 and 2016 and are also at their lowest level since records began (DEFRA, 2019). The first UK lockdown for the Covid-19 pandemic in early 2020 led to a substantial improvement in air quality in major cities due to sudden reductions in road and air traffic. Ozone levels however are expected to require longer term changes before reduced levels are measured. The question remains whether this will be sustained when lockdown restrictions are fully eased. Nevertheless, poor air quality remains a significant issue for public health.

The UK Government has adopted more stringent legally binding ceilings for national emissions of air pollutants for 2020 and 2030 and has published proposals to tackle emissions in the Clean Air Strategy (2019), the Road to Zero strategy (2018), a plan for tackling roadside nitrogen dioxide concentrations (2017/18), and the Clean Growth Strategy (2017) which sets out measures to reduce air pollutant emissions from the transport sector. These policies include:

- increasing the use of electric and other low emission vehicles (as electric vehicles have zero exhaust emissions at street level; however even electric vehicles emit particulate matter from road, tyre and break wear)
- ending the sale of new petrol and diesel cars and vans by 2030
- encouraging and facilitating more active forms of travel (walking and cycling)
- encouraging a shift to public transport (including through the National Bus Strategy for England (March 2021) and
- introducing low emission buses and electric trains
- shifting passenger and freight traffic from road to rail
- adoption of Clean Air / Low Emission or Ultra Low Emission Zones

However, these improvements could be countered by general increases in road, shipping and air traffic. Transport projects can affect air quality through increased vehicle traffic on new or dualled roads, or increased train capacity on rail lines. Vehicle and train engines are a contributor to air pollution through the emission of nitrogen oxides (NOx), which has potential to result in significant effects on biodiversity as well as posing an economic risk as previous developments have been halted due to nitrogen levels in protected areas.

Further to the more stringent legally binding ceilings for national emissions, the World Health Organisation have published new guidelines for PM2.5 and NO2 which are tighter than the legal limits[145].

Issues and Opportunities

The Transport Strategy can support national and local policies to reduce air pollutant emissions from road, rail, and ports, in conjunction with similar policies and interventions supporting those above.

Although there is an opportunity to improve air quality through reducing exhaust emissions through the policies above, it should be noted that this will not reduce non-exhaust emissions (NEEs).

5.10 Noise and Vibration

The noise and vibration baseline has been derived from the following web sources:

- Environmental Noise Directive (2002/49/EC)[146]
- Extrium – Noise and Air Quality Viewer[147]

Noise is considered as any additional unwanted sound, which has the potential to cause harm to human and ecosystem health. Transport is the largest contributor to noise pollution in the UK[148], and therefore should be considered when developing the strategy, to minimise the potential for harm to human and ecosystem health (see Section 5.4). Due to these effects the EU Environmental Noise Directive (2002/49/EC) introduced strategic noise mapping and noise Actions Plans. The Transport East region has a number of major infrastructure routes including road and rail, in close proximity to urban areas (See Appendix A: Figure 2). To reduce this impact, Noise Important Areas (NIAs) have been introduced in areas where transport noise is considered to be a problem.

Within the Transport East Region, there are more than 100 NIAs, all located around major road infrastructure, particularly the A12, A13 and A127. In addition to this, there is significant noise around transport connection hubs such as ports and airports. Both noise and vibration can also occur as a result of rail transport, including freight.

Beyond high noise areas, tranquil areas are where there is peace, quiet and calm[149], which is often referred to within planning and policy documents as something to be protected or achieved. Tranquil areas are likely to be far from major transport infrastructure, in rural areas.

Key Trends

Due to both an increasing population and the preference of road use as a primary form of transport, car usage may increase and with increased road usage, urban areas and holiday destinations may experience increased congestion. However, improved vehicle technologies such as hybrid and electric cars, are quieter than conventional vehicles, so may also contribute to a reduction in general transport noise although at higher speeds when tyre noise dominates benefits may be more limited. Travel pattern changes due to the COVID-19 pandemic and related restrictions, showed an initial decline in road, rail and air transport. However, the long-term travel behaviour changes are difficult to predict. Over the last 20 years, tranquillity mapping produced by CPRE[150], demonstrated a long-term trend of a reduction of tranquil areas, which therefore should be considered by the Strategy as something to protect.

Issues and Opportunities

With an increasing and more elderly population and road usage previously discussed, there is the potential for the Transport Strategy to increase noise pollution. Equally, it could look to decentralise and reduce congestion in urban areas, as well as promote active lifestyles. Under the multi-centred growth key theme, the promotion of walking and cycling, which with the vehicle technology changes could contribute to reducing noise and vibration particularly in close proximity to the identified NIAs, although within limits as tyre noise is a more dominant source of noise than engine noise at higher speeds. Also identified within the baseline, is the exposure to noise and vibration as a result of rail transport. This provides an opportunity to consider measure which may help to mitigate this such as choice of train, technology, stations and noise barriers. This will require further consideration during the assessment.

5.11 Climatic Factors

The climatic factors baseline is derived from the following sources:

- Met Office[151]
- Reports from the UK Department for Business, Energy and Industrial Strategy, UK Committee on Climate Change, IPCC[152]

The climate of the Transport East Region is generally mild and dry. It is one of the driest regions of the UK, with many areas receiving less than 700mm of rainfall a year. Hours of sunshine are higher towards the coast. This is also one of the more sheltered parts of the UK, although sea breezes are an important feature of the weather in late spring and summer. Mean annual temperature over the region varies from around 9.5 °C to just over 10.5 °C (compared to a UK average of between 7 and over 11 °C, and some of the UK maximum temperature records are held by stations in the region.[153]

Managing climate change has been defined as one of the two key challenges of this century[154]. The UN Intergovernmental Panel on Climate Change has found that anthropogenic greenhouse gas emissions (principally carbon dioxide and methane, but also nitrous oxide and fluorinated gases) and other human activities are estimated to have caused approximately 1°C of global warming above pre-industrial levels, and that global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate[155].

More recently, the IPCC has finalised the first part of the Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis*[156] which address the most up-to-date physical understanding of the climate system and climate change.

In 2019, total UK greenhouse gas emissions were 45% lower than in 1990 and 3.6% lower than 2018. Transport is now the largest sector source of UK domestic greenhouse gas emissions, almost entirely through carbon dioxide emissions, with 122 $MtCO_2e$, 27% of the total, in 2019 (BEIS, 2021)[157]. Emissions from transport fell (by 1.8%) in 2019 for the second year in a row, despite an increase in road traffic. Road transport is the most significant source of emissions in this sector, dominated by passenger cars (67.7 $MtCO_2e$), followed by HGVs (19.5 $MtCO_2e$) and light duty vehicles (19.2 $MtCO_2e$), with national shipping (5.5 $MtCO_2e$), buses (3.1 $MtCO_2e$) and railways (1.7 $MtCO_2e$) much smaller sources. Domestic transport emissions are only 4.6% lower than in 1990, with increased road traffic largely offsetting the improvements in vehicle fuel efficiency. In 2019 based on fuel supplied from UK bunkers, emissions from international aviation fuel use were estimated at 37.0 MtCO2e, a rise of 1% from 2018, and emissions from international shipping were 7.5 MtCO2e, a fall of 4.8%.

In the Transport East Region, transport was the highest emitting sector in 2018, responsible for 41% of emissions (7,667 kt CO2e), 96% from road vehicles. Emissions have increased since 2010 contributing approximately 5% of UK transport emissions (see Transport East *Decarbonisation Evidence Base and Strategic Recommendations Report*[158]). The Region is however, one of the largest low-carbon energy producers in the UK, from nuclear power and offshore wind, and has potential to contribute to the decarbonisation of the UK electricity supply.

The Transport East Region is likely to become warmer and drier generally, with hotter, drier summers and heavier bursts of rainfall increasing localised flood risks, which transport infrastructure will need to accommodate. The risks comprise:

- Flooding and exposure to high temperatures and heatwaves
- Water shortages
- Damage to wildlife and natural ecosystems,
- Damage to soils
- Sea level rise and coastal erosion
- Loss of food production and trade
- Pests and diseases[159].

Global agreements and national commitments are attempting to limit greenhouse gas emissions. The Kyoto Protocol in 2005 first committed the UK to reduce emissions by 12.5% over the period 2008 to 2012, and the Climate Change Act 2008 set a legally binding target to reduce emissions to 80% of 1990 levels by 2050. The UK was subsequently one of 195 signatories to the historic 2015 United Nations Paris Agreement which seeks to achieve significant reductions in greenhouse gas emissions to avoid the worst effects of climate change by limiting global warming to well below 2°C and pursue efforts towards 1.5°C.

In June 2019 the Climate Change Act 2008 (2050 Target Amendment) Order 2019 required at least a 100% reduction of greenhouse gas emissions (compared to 1990 levels) by 2050 (the 'net zero' target). The Government's Sixth Carbon Budget (April 2021) commits the UK to reduce emissions by

78% by 2035 compared to 1990 levels, and incorporates the UK's share of international aviation and shipping emissions[160].

Measures to reduce greenhouse gases have been made by the Committee on Climate Change[161], the UK Climate Assembly[162] and the UK Government's *Decarbonising Transport: Setting the Challenge* report[163] and *Decarbonising Transport: A Better, Greener Britain* published July 2021.[164]

The recently published Decarbonising Transport: A Better, Greener Britain includes a number of commitments to decarbonise transport. The following commitments were included:

Part 2a:

- Increasing cycling and walking
- Zero emission buses and coaches
- Decarbonising our railways
- A zero emission fleet of cars, vans, motorcycles, and scooters
- Accelerating maritime decarbonisation
- Accelerating aviation decarbonisation
- Any additional guidance or commitments published following the recent COP26 in Glasgow will be considered where relevant to the Strategy.

Key Trends

There is increasing local political will to tackle climate change, as evident Babergh, Breckland, East Suffolk, Ipswich, Mid Suffolk, North Norfolk, Norwich, Suffolk, Thurrock and West Suffolk councils have declared climate emergencies[165], while some of which have made commitments to work towards net zero emissions by 2030. Others have aimed for carbon neutrality at a later date, a key aim of the Net Zero: Making Essex Carbon Neutral plan.

Public concern about climate change remains high. In the latest BEIS Public Attitudes Tracker (March 2021), 80% of the public said they were either very concerned (33%) or fairly concerned (47%) about climate change. Transport choices were also among the top three behaviours expected to have the largest impact on tackling climate change - everyone choosing to walk, cycle or use public transport more instead of using a car (49%) and everyone driving an electric or hybrid car (35%).

In 2020, greenhouse gas emissions fell due Covid-19 pandemic (7% globally and by 13% in the UK)[166]. A key challenge will be to sustain reductions in emissions after Covid restrictions are lifted.

The Transport East *Decarbonisation Evidence Base and Strategic Recommendations Report* (November 2020) examines trends including business opportunities for sustainable economic growth and the need for R&D, innovation and legal support to develop new and improved carbon reduction practices and technologies. It also notes:

- electric vehicle (EV) use is increasing assisted by an increasing number of public EV charging points (568 at the last count);
- plans for local low emission public transport projects including electric buses and light rail;
- new railway lines into deep-sea container ports to enable movement of freight by rail rather than road, and other ports are also investing in electrification and decarbonisation.

Issues and Opportunities

As the highest greenhouse gas emitting sector, transport in the region has the opportunity to play a significant role in reducing greenhouse gas emissions, in line with the UK's international commitments and national targets. Key recommendations and opportunities are set out in Transport East's *Decarbonisation Evidence Base and Strategic Recommendations Report* (November 2020), the Committee on Climate Change's Net Zero report[167], the UK Climate Assembly report[168] and the *DfT's Decarbonising Transport - Setting the Challenge report* (2020)[169]. Transport East has the opportunity to deliver change by:

- Reducing the need to travel by diesel and petrol vehicles;
- Accelerating a shift from the private car to active transport (walking and cycling) and to improved low-carbon public transport (electric buses and trains);
- Decarbonising road vehicles, including increasing the uptake of electric vehicles;

- Tackle emissions from ports and airports;
- Understanding what works where - place based solutions;
- Supporting research and development for green transport technology and innovation;
- Delivering resilience to climate change.

5.12 Landscape/Townscape and Visual

The landscape/townscape baseline has been derived using the following web sources:

- MagicMap[170]
- Natural England[171]
- Nationaltrails.com[172]
- Landscapes for Life[173]
- Landscape East[174]
- CPRE Night Blight[175]

The landscape and townscape of the Transport East region is diverse. As seen in Figure 4 (Appendix A), beyond Norwich, Ipswich and Colchester the region is largely rural with many smaller villages and three Areas of Outstanding Natural Beauty (AONB):

- Dedham Vale
- Suffolk Coast and Heaths
- Norfolk Coast

Extension of the Suffolk Coast and Heaths AONB by an 38km^2 into Essex was announced in July[176]. The Stour Valley is a prospective AONB.

In addition to the three AONBs, the Norfolk and Suffolk Broads can also be found within the TE Region. The Broads has status equivalent to a National Park, due to its unique landscape, wildlife and culture and is made up of over 60 open areas of water[177]. The Brecks is also considered particularly sensitive on the basis of its open and gently undulating character and is identified as a nationally distinctive landscape.

National trails include: The Peddars Way and Norfolk Coast Path run from Knettishall Heath Country Park in Suffolk, to Holme next the Sea in Norfolk[178]. The Region also has 124 long distance paths[179], for example, Nelsons Way, a 650km beginning in Burnham Thorpe, Norfolk.

Living landscapes is a vision shared by local wildlife trusts, with the aim of restoring, recreating and reconnecting habitat. Norfolk Wildlife Trust have identified 6 priority living landscapes within the county boundary, and Essex Wildlife Trust have identified 80 areas to improve over the next decade. Suffolk Wildlife Trust have also identified areas for living landscapes.

The Region comprises 14 National Character Areas[180] (NCAs) consisting of a variety of landscape types (see **Error! Reference source not found.** and **Error! Reference source not found.**[181]):

- North West Norfolk
- East Anglian Chalk
- North Norfolk Coast
- Mid Norfolk
- The Brecklands
- The Fens
- South Suffolk and North Essex Claylands
- South Norfolk and High Suffolk Claylands
- Central North Norfolk
- Suffolk Coast and Heaths
- Northern Thames Basin
- Greater Thames Estuary
- The Broads; and
- North East Norfolk and Flegg

Table 5.19 Landscape Character Types in the Transport East Region

Landscape Character Type	Description	Location
Broadland Marshes	Low lying wetland	East Norfolk
Chalk Hills and Scarps	Chalk hills incised by dry valleys	Predominately outside the TE region but is found in west Suffolk
Coastal Dunes	Sand dunes	North and east coastline
Coastal Levels	Marshland	East and north coast
Forested Estate Sandlands	Conifer plantations, arable land and remnant heaths	Found mainly in the Brecks of Norfolk and Suffolk
Lowland Settled Claylands	Coastal farmland	Southern Essex, Thurrock
Lowland Settled Farmlands	Settled agricultural landscape	North east Norfolk, Southern Essex, Thurrock
Lowland Village Chalklands	Low lying arable landscape	Central/west Norfolk
Lowland Village Farmlands	Low lying landscape	West Norfolk
Planned Peat Fen	Low lying, dark peaty soils	South west Norfolk and north-west Suffolk
Planned Silt Fen	Engineered open landscape	West Norfolk
Plateau Estate Farmlands	Arable landscape	Norfolk and north-east Essex
Saltmarsh and Intertidal Flats	Natural habitats of saltmarsh and intertidal mudflats	North Norfolk coast and east tidal creeks
Settled Chalk Valleys	Chalk valley landscape, often soft rounded topography	North-west Essex
Settled Marsh	Flat, intensively farmed arable landscape	West Norfolk
Settled Plateau Claylands	Extensive, elevated plateau landscape	North Suffolk and South Norfolk
Valley Meadowlands	Low lying valley floors	North Norfolk
Valley Settled Farmlands	Settled, busy landscapes	Extending from Chelmsford to Fakenham
Wooded Hills and Ridges	Varied and textured landscape	Essex
Woodland Peat Fen	Poorly drained wetland	Norfolk and Suffolk
Wooded Plateau Claylands	Ancient wooded landscape of arable farms	Norfolk, Suffolk, Essex
Wooded Plateau Farmlands	Enclosed landscape	North Essex and south-west Suffolk
Note: Shaded cells indicate dominant Landscape Character Types within the Transport East region		

Coastal landscapes are particularly important in the region and are recognised in the local coastal heritage designations (see cultural heritage section 5.13 also).

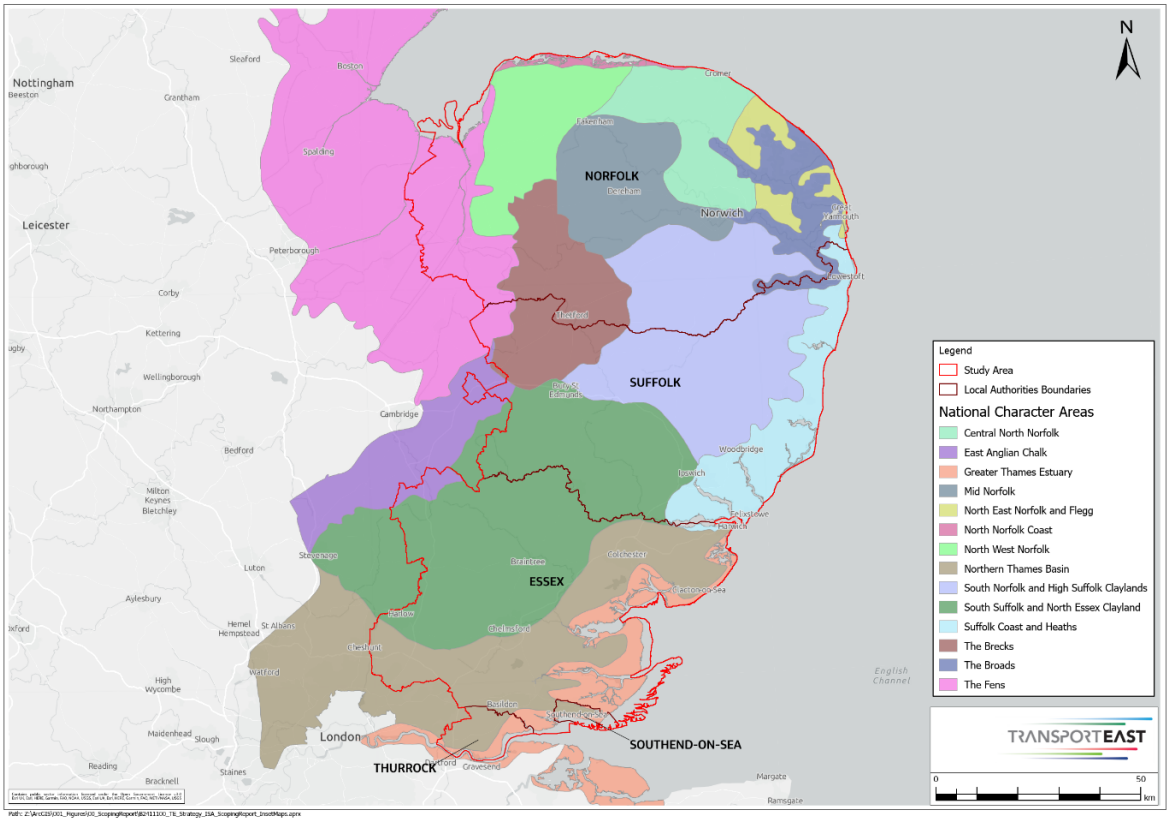

Figure 5.6 National Character Areas

In addition to landscape character, the landscape baseline also considers the presence of light pollution and dark skies. The CPRE's Night Blight report182 finds the East of England (which includes the Transport East region) to be the second darkest region at night in England. Online mapping shows considerable darker sky areas in the rural and coastal parts of Norfolk, Suffolk, north west and coastal Essex away from major settlements, including in the Broads and AONBs, and the highest levels of light pollution in the urban areas of southern Essex, Southend-on-Sea, Thurrock, Felixstowe, Ipswich, Lowestoft, Great Yarmouth, Norwich and along the A12 corridor in Essex, largely due to street lighting.

Local landscape designations and local landscape character assessments are also recognised as important sources of baseline information along with sustainability appraisals for local plans. This information is not available for mapping regionally. Registered Parks and Gardens have important landscape as well as heritage value and are included with the cultural heritage baseline.

Key Trends

The current landscape is subject to pressure from climate change, urbanisation and intensive agricultural practices. There are noted to be a number of proposed Nationally Significant Infrastructure Projects (NSIPs) in the region which potential landscape impacts. Designated area policies will provide protection against some pressures, but they are vulnerable to recreational and agricultural pressures. In the future there could be landscape benefits from the implementation of the new agricultural and environmental support through Environmental Land Management Schemes (ELMS).

In July 2020 it was announced that the Suffolk Coast and Heaths AONB is due to be expanded by an additional 38km^2, extending the designated area to across county borders and into Essex[183].

Issues and Opportunities

A key theme of the draft Transport Strategy is improving rural and urban connectivity, and therefore improved access to rural assets could result in negative impacts on landscape features the absence of effective management. This is likely to be particularly evident during the summer months and bank holidays when the region experiences large volumes of visitors to coastal and rural areas. The draft Transport Strategy also refers to promoting healthy lifestyles and improved access to trails which may also require active management. New infrastructure may adversely affect landscape quality, and light pollution levels, including the character and visual amenity of areas beyond designations. There are also opportunities to control and reduce the upward light spill from street and road lighting in new infrastructure schemes in accordance with good practice guidance[184].

5.13 Cultural Heritage and Archaeology

The cultural heritage and archaeology baseline mapping has been derived using the following:

- MagicMap[185]
- Historic England[186]

While there are not any UNESCO World Heritage Sites in the Region, other designated cultural assets exist. For example, the Region has 1093 scheduled monuments protected under the Ancient Monuments and Archaeological Areas Act 1979. There are 1,218 Grade 1 and 37,422 Grade 2 listed buildings designated due to their special architectural and historic features and protected under the Planning (Listed Buildings and Conservation Areas) Act 1990. **Error! Reference source not found.**, REF _Ref89169577 \h * MERGEFORMAT **Error! Reference source not found.** and **Error! Reference source not found.** show the distribution of heritage assets in Essex, Thurrock and Southend-on-Sea, Norfolk and Suffolk respectively.

There is one registered battlefield (Battle of Maldon, 991) protected under the Historic Buildings and Ancient Monuments Act 1983 (as amended) and 116 Registered Parks and Gardens, for which the NPPF requires consideration of their conservation value.

Finally, the Region exhibits two non-statutory Heritage Coast designations in North Norfolk and Suffolk that are protected under the NPPF.

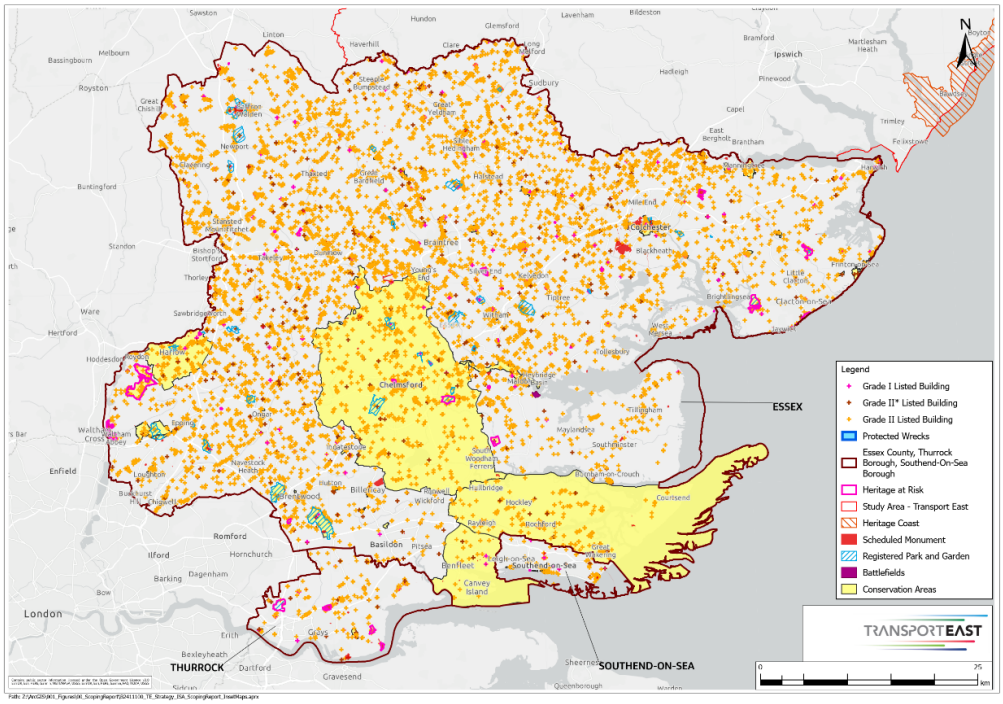

Figure 5.7 Heritage assets in Essex, Thurrock and Southend-on-Sea

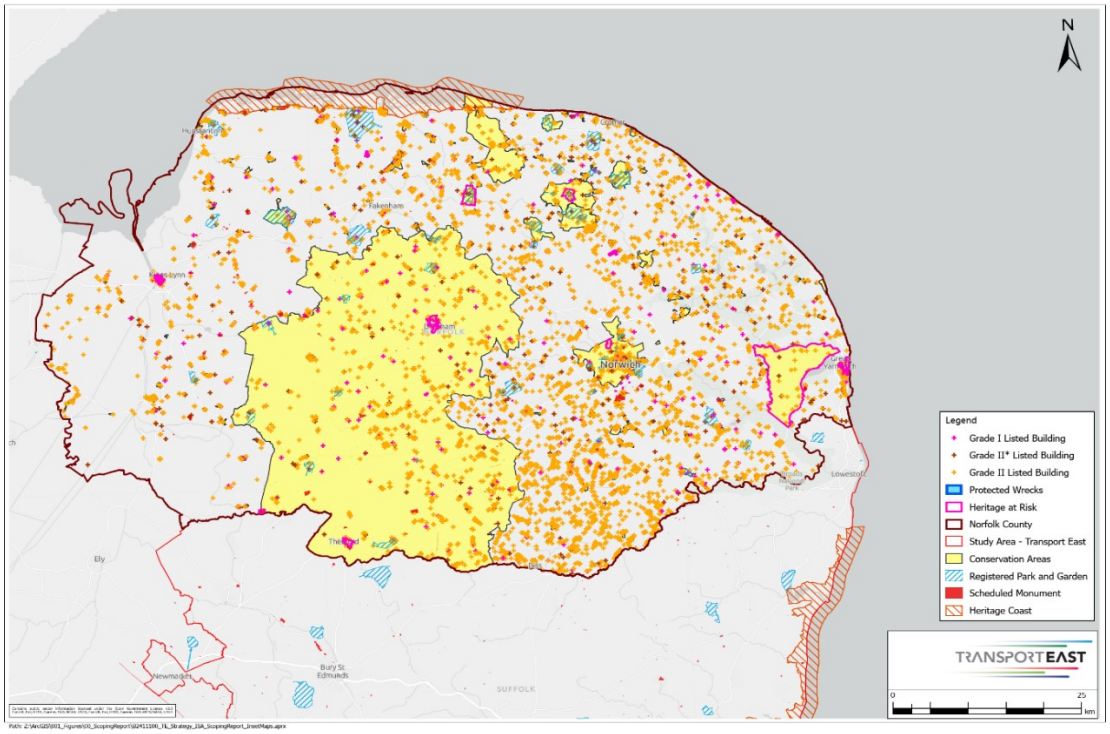

Figure 5.8 Heritage assets in Norfolk

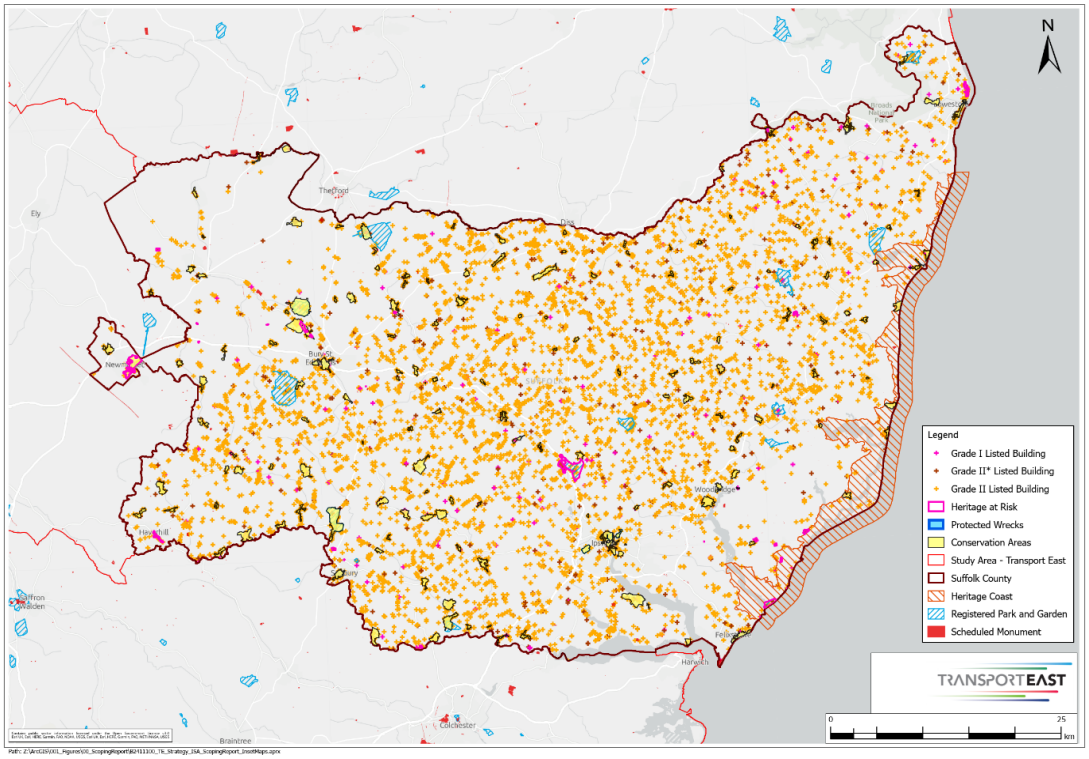

Figure 5.9 Heritage assets in Suffolk

There are 618 Conservation Areas, defined as 'areas of special architectural or heritage interest, the character or appearance of which it is desirable to preserve or enhance' within the Region (see **Error! Reference source not found.**).

Table 5.20 Conservation Areas within the TE region*

Constituent Areas	Conservation Areas
Norfolk	234
Suffolk	173
Essex	190
Southend-on-Sea	14
Thurrock	7
Total	618

*Data on numbers of Conservation Areas unavailable for the districts of Colchester (Essex) and Breckland (Norfolk)

There are also significant archaeological and paleo-archaeological interests, including potential and unknown interests in the region which can be affected by infrastructure development disturbing soils or changing drainage.

Historic landscapes are another aspect of cultural heritage, including settlements and land boundary patterns and the layers of evidence of past land use both spatially and through time. These are closely linked to a sense of place and the value and knowledge communities have for an area.

Historic England maintain a 'Heritage at Risk' register for designated assets such as listed buildings, Conservation Areas, Registered Parks and Gardens or scheduled monuments that are at risk of being lost as a result of neglect, decay or inappropriate development, or are vulnerable to becoming so. The latest Heritage at Risk register for the East of England [187] includes 249 designated heritage assets in the Transport East region, including 162 listed buildings and structures (including places of worship, not including grade II listed buildings), 51 scheduled monuments, 6 registered parks and gardens, and 30 Conservation Areas, that are considered at risk of being lost, and these should therefore be considered.

In addition to designated heritage assets, it should be noted that there are a large number of non-designated heritage assets, including archaeological remains, in the region. These are buildings, monuments, sites or landscapes identified by local authorities as having a degree of heritage significance that merit consideration in planning decisions, but which do not meet the criteria for designated heritage assets. The majority of non-designated assets are recorded on the Historic Environment Records held by County and unitary councils, who are consulted on the scope and results of the ISA.

Key Trends

There is potential for adverse direct effects from development on the setting of designated heritage features from lighting, noise and vibration and visually intrusive activity as well as effects from climate change and air pollution. The adverse effects associated with climate change include an increase in extreme weather, which may deteriorate heritage features, particularly those already in a vulnerable and poor condition or affect soils and drainage with potential effects on both built heritage but also buried archaeological interest. Air pollution can also contribute to the degradation of heritage assets[188].

Issues and Opportunities

The Transport Strategy may negatively affect heritage assets due to loss or damage or setting impacts. By improving connectivity of rural areas, the public may have better access to heritage assets. The Transport Strategy could bring long term benefits from reducing air pollution. Archaeological and paleo-archaeological interests could however be at risk from infrastructure development. There is an opportunity to consider heritage at risk assets, including their setting. Further potential issues include potential adverse effects on the significance of assets due to loss of or severance of an asset from its setting, therefore it is necessary that appropriate priority is given during the early stages to ensure sites, particularly nationally important sites are identified.

5.14 Soils, Geology and Contaminated Land

The baseline for soils, geology and contaminated land has been derived using the following web sources:

- Landis Soilscapes[189]
- BGS Geology of Britain viewer[190]
- MagicMap[191]
- Natural England[192]

The Regions' bedrock comprise three dominant sedimentary rock types - White Chalk; Neogene And Quaternary Rocks (Gravel, Sand, Silt and Clay) and Thames Group (Clay, Silt, Sand and Gravel). There are also smaller outcrops of Mudstone, Sandstone and Limestone. Superficially, the geology primarily includes Till (Diamicton) and Glacial Sand and Gravel[193].

There are 99 SSSIs recognised for their geological significance, nearly half of which are found in Norfolk (40 in Norfolk, 33 in Suffolk, 22 in Essex and 4 in Thurrock). There are also Regionally Important Geological Sites (RIGS) and Local Geological Sites (LoGS).

Throughout the study area, the following soils are prevalent:

- Stagnosols
- Gleysols
- Cambisols
- Luvisols
- Leptosols

Deep peaty soils can be found in the East Anglia Fens, which includes areas within Norfolk and parts of Suffolk. Natural peatland is an important habitat for a number of species and is also identified as a significant carbon sink and considered vital to climate regulation[194] Due to the ongoing national commitments of decarbonisation, this habitat should remain untouched.

The regions agricultural land has been identified using MagicMaps, which shows the regions agricultural land classification (ALC) is predominantly Grade 2 and Grade 3, with some minor Grade 1 and Grade 4. Grade 1 land is excellent quality land with no or minor limitations for cultivation, Grade 2 is very good quality land and Grade 3 refers to land which is 'good to moderate' quality, meaning there are minor limitations to the choice of crop and Grade 4 is 'poor quality'. Grade 3 can be subdivided as 3a and 3b although this subdivision is not available for the regional mapping. A large proportion of the region is considered 'best and most versatile land' (Grade 1, 2 or 3a) (see **Error! Reference source not found.**).

Key Trends

The main area for change is the potential pressure for development may cause an increase in pressure for land and result in the loss of valuable soils. Changes to agricultural practices can also influence erosion rate and loss of soil nutrients and climate change will also affect soils and drainage and their vulnerability to erosion. Climate change and more frequent extreme weather may result in peat drying out, which will release stored carbon[195]. Increased areas requited for waste disposal may cause land contamination.

Issues and Opportunities

The 99 SSSIs designated for their geological significance, local geological sites and areas of natural peatland should be avoided to ensure there is no detriment. There may be opportunities to link decarbonisation aims to initiatives to improve soil carbon storage and peatland restoration.

5.15 Material Assets and Resources

The baseline for material assets and resources has been derived using the following sources:

- Regional Evidence Based (Transport East) [196]
- CORINE Land Cover [197]

Material assets and resources are broad terms, taken in this context to mean physical materials that are valued and/or used by people This can include buildings and infrastructure, including urban areas, transport routes, minerals and land. Assets and resources relating to cultural heritage, the natural environment / biodiversity and water resources are examined under other headings in this report.

The material assets and resources that could be considered in the Transport East region[198] include:

Population and housing:

- Approximately 3.5 million people live in the region, 33% in rural locations (a highly rural area, as compared to the 19% average for England), in around 1.54 million homes. The number of dwellings in the region has increased by 5% between 2009 and 2017 with an average increase of 8,784 homes a year.
- The region has two cities (Norwich and Chelmsford) and these and the largest towns (Southend-on-Sea, Ipswich, Colchester, Grays, Harlow and Thurrock) are the main population and economic centres, supported by a large number of smaller towns including King's Lynn, Great Yarmouth, Bury St Edmunds, Lowestoft, Basildon, Braintree, Clacton-on-Sea, Epping, Brentwood, Canvey Island and Harwich.

Transport infrastructure:

- There are 15 strategic road and rail corridors in the region, which has approximately 82 km of motorways (the M11 and M25 in Essex and Thurrock) and 589 km of dual carriageway A roads. The major road network provides important north-south connectivity within Norfolk and Suffolk (A140, A12, A146, A131, A134, A1307) and east-west connectivity in Essex, Southend-on-Sea and Thurrock (A127, A13, A130, A133 and A1159).
- Three main radial railway routes (Great Eastern Main Line, West Anglia Main Line and Essex Thameside) connect the main urban settlements with London and limited east-west connections (Felixstowe to Ipswich, Ipswich to Cambridge, Norwich to Cambridge and Norwich to Peterborough via Ely), with branch lines connecting smaller settlements (See **Error! Reference source not found.**).
- Walking and cycling is supported by the region's National Trails (including the Peddar's Way and Norfolk Coast Path), public rights of ways and National Cycle Network routes.
- There are 13 ports, including the UK's busiest container port at Felixstowe, Harwich Port, Port of Tilbury and DP World London Gateway, and three international airports (London Stansted Airport, London Southend Airport and Norwich Airport). Heavy goods vehicle traffic in the region is dominated by routes accessing the main ports (**Error! Reference source not found.**). There are also operational military airfields within the region, at RAF Marham in Norfolk, and RAF Lakenheath and RAF Mildenhall in Suffolk (both hosting US Air Force and other US Visiting Forces units).

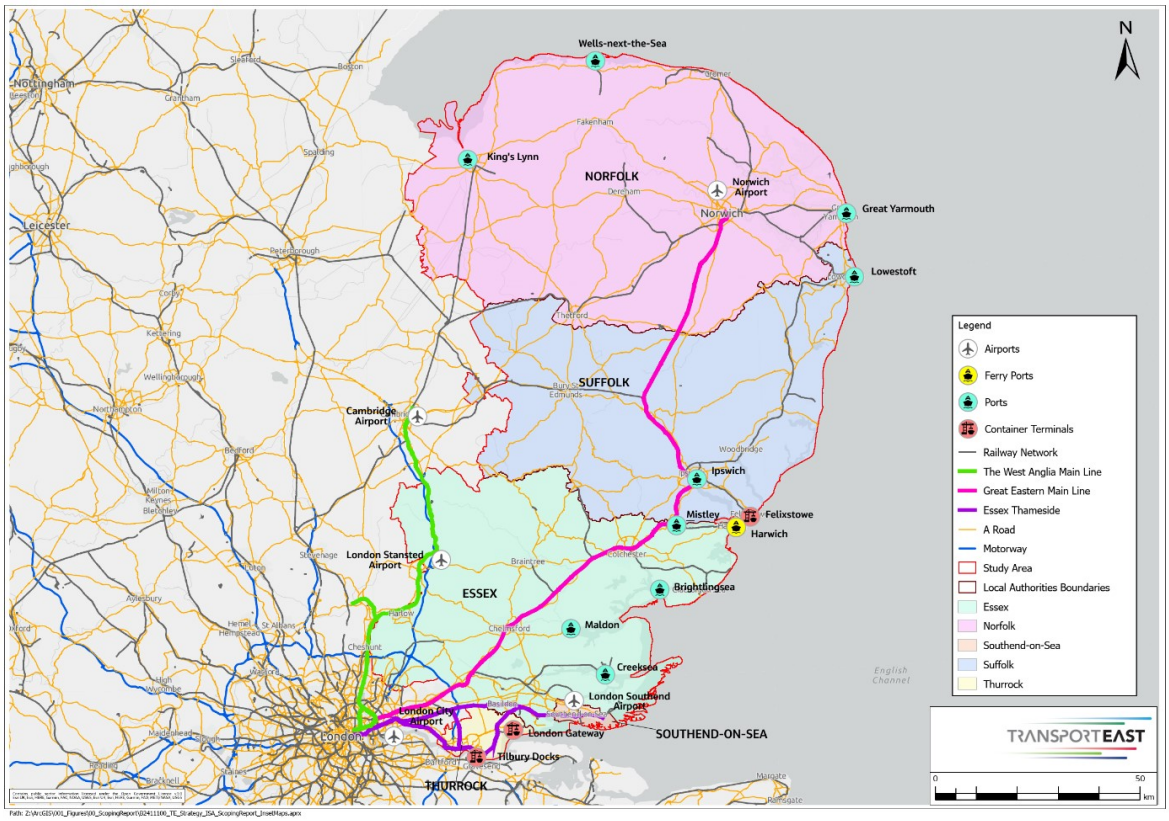

Figure 5.10 Transport Infrastructure in the Transport East region

Economic:

- The Transport East Region has a diverse economy, the main sectors being distribution, public administration, real estate and manufacturing, and there are also key strengths in ICT, agri-tech, biosciences, green energy production, financial industries and the visitor economy.
- Construction, transport and logistics have particular importance, with the UK's busiest container port at Felixstowe and the international shipping ports of DP World London Gateway and Tilbury, which require good rail and road links.

Energy:

- The Region's coastline hosts the nuclear power (Bradwell and Sizewell) industry and the offshore renewables industry with major offshore windfarms including Scroby Sands, Sheringham Shoal, Greater Gabbard, London Array, Gunfleet Sands and Galloper.

Agriculture:

- Around three quarters of the Region's land is used as productive farmland, half being arable. Farms are on average (118 hectares) larger than England as a whole (86 hectares; data from 2018) and are major producers of wheat, barley and oil seed rape, sugar beet, potatoes, pigs, chickens and eggs.
- Half of the farmland in Essex, and large parts of Norfolk and Suffolk, are classed as 'best and most versatile land', of Grade 1, 2 or 3a under the Agricultural Land Classification (**Error! R eference source not found.**).

Minerals:

- The Region has working and allocated sites for sand and extraction, and a smaller number of sites that make an important contribution to the national production of silica sand. Minerals are transported long distances by both road and rail, including through strategic rail depots and marine wharves.

- The Norfolk Minerals and Waste Local Plan Review 2019[199] proposes to plan for the extraction of 10.5 million tonnes of silica sand in West Norfolk, 340,000 tonnes of carstone and 20.3 million tonnes of sand and gravel during the Plan period to 2036.
- The Suffolk Minerals and Waste Local Plan 2020[200] allocated nine sites for the extraction of sand and gravel sufficient to supply 9.3 million tonnes over the Plan period to the end of 2036.
- Essex Minerals Local Plan 2014[201] sets out additional provision for 40.67 million tonnes of sand and gravel and 0.39 million tonnes for silica sand within the Plan period to 2029.

Forestry:

- The CORINE inventory[202] estimates that 5% of the region has woodland cover. The largest forested areas are Thetford Forest in Norfolk/Suffolk (the largest lowland pine forest, and largest man-made lowland forest in the UK), and Epping Forest in Essex/ London.

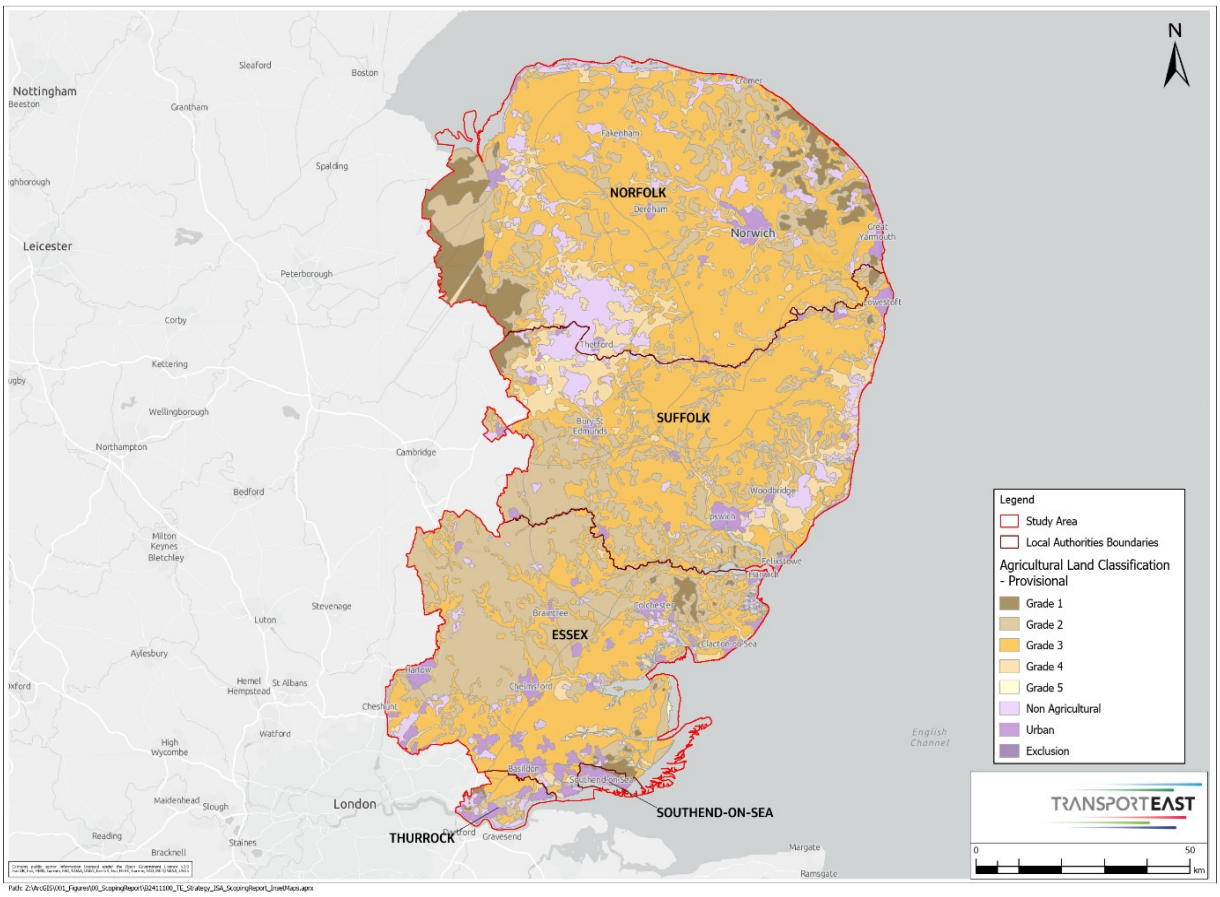

Figure 5.11 ALC for Transport East region

Key Trends

Land use changes including development and planning pressures for the expansion of housing and urban land uses, transport investment decisions including a range of existing planned road and rail schemes, demand for minerals, and agricultural change.

Issues and Opportunities

Potential issues include loss of sterilisation of material assets from infrastructure development or conflict with other land uses. There are opportunities to improve access along congested or poorly connected routes

5.16 Natural Capital and Ecosystem Services

Natural capital can be defined as: 'the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large. They do this in many ways but chiefly by providing us with food, clean air and water, wildlife, energy, wood, recreation and protection from hazards'[203]. The direct and indirect benefits provided by natural capital assets are known as **ecosystem services.**

To develop a natural capital baseline, a proportionate two-staged approach has been taken including spatial analysis and review of strategic documents.

Spatial Analysis

Several approaches to developing natural capital approaches are available, as detailed in resources such as Defra's Enabling a Natural Capital Approach[204] and Natural England's Natural Capital Indicator work[205]. For the purposes of this Scoping Report, it has been considered important to:

- Identify a method to indicate the coverage of natural capital assets, allowing for interpretation as to potential ecosystem services; and
- Identify high-value habitats and opportunities for future enhancement.

The following datasets have been utilised for the purposes of developing a natural capital baseline:

- CORINE Land Cover 2018 – Provides a continuous coverage of land cover across the study area, allowing the quantity and spatial coverage of natural capital assets to be identified. Subsequently, assumptions can be made in regards ecosystem service provision.
- Natural England's Habitat Networks (Combined Habitats) (England)[206] – Provides the geographic extent and location of 18 priority habitats nationally which may support biodiversity net gain and potential environmental net gains.

In addition, the following have been reviewed:

- Natural Capital Compendium for Norfolk and Suffolk[207] - Presents information on natural assets across Norfolk and Suffolk and considers potential risks to these assets.
- Essex Green Infrastructure Strategy[208] (includes Thurrock and Southend-on-Sea) – Describes the need for green infrastructure in Greater Essex and sets out a vision and objectives for its delivery.
- OpenNESS case study: Mapping Cultural Ecosystem Services in Essex[209] - Investigates how cultural ecosystem services can be used in decision-making in Essex.
- Whilst it is acknowledged that a 'Natural Capital Check' has been produced for Essex, this document it not publicly available and therefore has not been incorporated into the natural capital baseline for the purposes of the Transport East Transport Strategy – Integrated Sustainability Assessment.

The CORINE inventory consists of 44 classes of land cover using a different classification system to the UK Broad Habitat Types identified in the UK National Ecosystem Assessment (NEA)[210] typically used for natural capital assessments. Nonetheless, a translation of CORINE 2018 Land Cover data classifications to UK Broad Habitat Types has been completed as presented below in **Error! Reference source not found.** and **Error! Reference source not found.**.

Table 5.21 UK Broad Habitat Type area and percentage cover across the study area

Broad Habitat Type	Area (ha)	Percentage (%)
Coastal margins	52,814	4%
Enclosed farmland	906,882	68%
Freshwater	13,832	1%
Marine	1,554	0.1%

Broad Habitat Type	Area (ha)	Percentage (%)
Mountain, moor, and heathland	5,060	0.4%
Semi-natural grassland	162,931	12%
Urban	122,919	9%
Woodland	64,608	5%

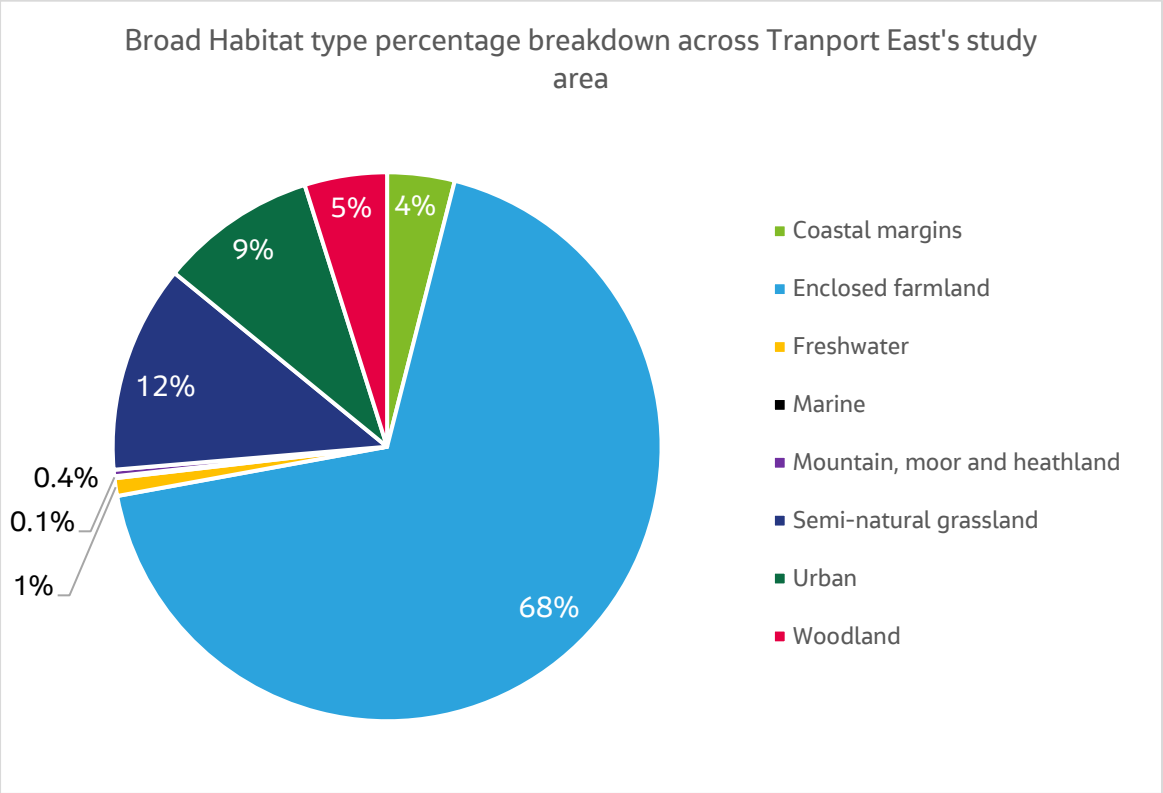

Figure 5.12 Broad Habitat Type percentage across study area

Each of the UK Broad Habitat types present can provide a variety of ecosystem services as listed in Appendix D.

When assessing the benefits and values associated with natural capital and ecosystem services, a logic chain approach (as developed by Natural England[211]) can be used, as presented below in **Error! R eference source not found.**. This looks at data on natural capital asset quantity, quality and location, the ecosystem services likely to be provided, the benefits and the value and benefits to society. For this baseline, an assessment of ecosystem asset **quantity** has been provided.

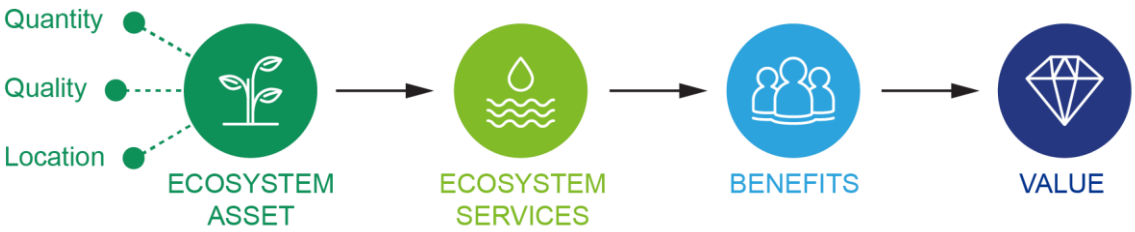

Figure 5.13 Natural England logic chain for assessing natural capital assets

Habitat Networks

Priority habitats, those that are most threatened and in need of conservation, across the Region (see Figure 6 – Appendix 6) comprise offering opportunities for biodiversity net gain:

- Ancient woodland
- Coastal
- Lowland dry acid grassland
- Lakes
- Lowland calcareous grassland
- Lowland fens
- Lowland heathland
- Lowland meadows
- Purple moorgrass and rush pasture
- Reedbeds
- Rivers
- Traditional orchards
- Wood-pasture and parkland

Natural England's Habitat Networks (Individual Habitats) (England) data also presents information on habitat restoration and creation opportunities with **Error! Reference source not found.** providing an o verview of the restoration and creation opportunities, which include:

- **Restorable habitats:** Sites where data suggests small fragments of the primary habitat or degraded habitat exists and where restoration may be possible.
- **Network Enhancement Zone 1:** Land within close proximity to the existing habitat components that are more likely to be suitable for habitat re-creation for the particular habitat.
- **Network Enhancement Zone 2:** Land within close proximity to the existing habitat components that are unlikely to be suitable for habitat re-creation but where other types of habitat may be created, or land management may be enhanced including delivery of suitable Green Infrastructure.
- **Fragmentation Action Zone:** Land immediately adjoining existing habitat patches that are small or have excessive edge to area ratio where habitat creation is likely to help reduce the effects of habitat fragmentation.
- **Network Expansion Zone:** Land within relatively close proximity to the Network Enhancement Zones 1 & 2 that are more likely to be suitable for habitat creation for the particular habitat and identifying possible locations for connecting and linking up networks across a landscape and identifying possible locations for connecting and linking up networks across a landscape

Table 5.22 Restoration and creation opportunity area by habitat type within the Transport East study area

Habitat	Restorable Habitat (ha)	Network Enhancement Zone 1 (ha)	Network Enhancement Zone 2 (ha)	Fragmentation Action Zone (ha)	Network Expansion Zone (ha)	Total
Ancient Woodland	2,148	-	50,932	527	-	53,607
Coastal	27,403	16,662	20,573	3,210	12,940	80,788
Lowland dry acid grassland	935	9,587	5,819	2,304	34,494	53,139
Lakes	2,370	-	43,868	80	-	46,318

Habitat	Restorable Habitat (ha)	Network Enhancement Zone 1 (ha)	Network Enhancement Zone 2 (ha)	Fragmentation Action Zone (ha)	Network Expansion Zone (ha)	Total
Lowland calcareous grassland	345	6,545	5,227	498	28,431	41,046
Lowland fens	15,564	21,271	36,133	5,271	50,994	129,233
Lowland heathland	600	12,793	7,272	3,799	44,699	69,163
Lowland meadows	7,601	22,540	6,616	1,274	77,276	115,307
Purple moorgrass and rush pasture	35	5,752	3,635	1,083	31,225	41,730
Reedbeds	17,144	32,173	5,190	3,771	40,650	98,928
Rivers	1,517	-	14,205	5	-	15,727
Traditional orchards	1,150	39,576	2,255	-	-	42,981
Wood-pasture & parkland	4,011	8,217	745	160	25,505	38,638
Total	78,675	175,116	151,538	21,455	346,214	-

Table 5.22 displays that the largest opportunities for creation and restoration include lowland meadow and lowland fens. For network expansion, d ancient woodland and lakes, where habitat re-creation is unlikely but where other types of habitat may be created, or land management may be enhanced.

Enhancing priority habitats can also provide carbon sequestration opportunities.

Key trends

Key trends are presented in **Error! Reference source not found.** below.

Table 5.23 Natural assets, features, key trends, and risks across the Transport East study area

Asset	Feature	Key trends	Risks
Land	Food producing land	More of the best food-producing land grades than English average in Norfolk and Suffolk (25.5% Grades 1&2 and 53.8% Grade 3). 61% of Essex graded agricultural land.	Growing risk: Reducing water availability impacting food production. Risk to productivity from climate change, poor management and pollution.

Asset	Feature	Key trends	Risks
	Productive woodland	The Brecks has 27.6% forest cover. Provides recreation, as well as timber and energy from waste wood. Woodland cover of Greater Essex is 5.3% of total land area, of which 3.5% is defined as ancient woodland	Growing risk: Risk from pests, pathogens, invasive species, and climate change induced extreme weather events.
	Land under conservation management	Sites designated for nature conservation cover 10% of Norfolk and Suffolk's land. Multiple designations across the counties. Broad scatter of smaller sites that form island sanctuaries in agricultural landscapes also important to enable species to migrate across the landscape.	Growing risk: Risk to species and habitats from climate change, urbanisation and salinisation.
	Carbon density in vegetation	Woodland, heaths, and freshwater margins have the highest rates of carbon storage in the counties. Due to the land area under agriculture, the total amount of carbon stored by farmland is greater than all other land uses combined in Norfolk and Suffolk.	Growing risk: Fire risk and drought impact on carbon stored.
Soil and Sub-Surface	Soil physical properties	High soil loss by water erosion (16t/ha/yr) in North Norfolk and other smaller areas across the counties.	Growing risk: Climate Change with drier summers increasing wind erosion, soil shrinkage etc.
	Soil biological health	Soil invertebrate abundance is highest in freshwater margins and less disturbed habitats[1]	Growing risk: Intensive agriculture caused arable soils to lose organic carbon, climate change could exacerbate organic matter decomposition.
	Aquifers	Around 90% of Norfolk and Suffolk is underlain by aquifers of high/medium productivity. More prevalent areas are The Brecks, and Suffolk Coast & Heaths AONB.	High risk: Increasing demand and over abstraction, increasing saline intrusion.

[1] The Norfolk and Suffolk Natural Capital Compendium (https://norfolkbiodiversity.org/assets/Uploads/NCC-SCC-Natural-Capital-Assets-Evidence-Compendium-30oct20.pdf) identifies that soil bacteria diversity is relatively uniform across natural habitats and cultivated land. This information originates from the mean estimates of bacterial diversity in topsoil per 1km2 which have been extrapolated from sets of sample locations by CEH. It is acknowledged that agricultural activity can alter soil bacteria diversity and local assessments may show varying results.

Asset	Feature	Key trends	Risks
	Fenland/wetland soils	Drainage for agricultural production has led to considerable shrinkage and loss.	High risk: Climate change causing drying out of peatlands, reducing habitat extent and quality, risking natural carbon stores and increased emissions.
Habitats and Species	Priority habitats	Coastal saltmarsh, peatlands, and heathland habitats are regionally important.	High risk: Climate change, loss of habitat to sea level rise, coastal erosion, flooding, increased incidence of pests and diseases, invasive species, urbanisation.
	Extent and condition of SSSIs	Norfolk has 8.2% of land within a SSSI and Suffolk has 7.5%. Essex has 86 sites designated as SSSI.	Medium risk: Degradation through lack/reduced frequency of monitoring and appropriate management.
	Habitat connectivity	More than 75% of priority habitats are in patches under 10ha in size and connectivity needs to be improved.	Growing risk: Due to increasing development and urbanisation
	Natural woodlands	Very little ancient woodland (0.8%) in Norfolk and Suffolk. 5.1% is broadleaf and mixed woodland. Woodland cover of Greater Essex is 5.3% (195km²) of total land area, of which 3.5 % (128km²) is defined as ancient woodlands over 2 hectares in size, of which 73km² is Ancient Semi Natural Woodlands (ASNW).	Growing risk: Impacts of climate change, frequency of droughts and storms events, pressures from pest and pathogens.
	Lowland heath and dry acid grasslands	4,711ha of lowland heath, 8.4% of England's total holding of this habitat in Norfolk and Suffolk. 4,203ha of dry acid grasslands, 27.7% of England's total holding of this habitat in Norfolk and Suffolk.	Growing risk: Pollution, climate change, seasonal fires and change in precipitation levels.
	Saltmarsh and coastal habitats	Norfolk and Suffolk's coasts hold over 12% of England's total Saltmarshes and over 17% of vegetated shingle habitat.	High risk: Coastal erosion, sea level rise, invasive species, and nutrient enrichment.
	Wetlands and grazing marsh	Lowland fen within Norfolk and Suffolk, accounts for 19.4% of England's total holding and reedbeds account or 45.8%.	High risk: Wetland drying out, eutrophication, oxidation of peat, reducing habitat extent and quality.

Asset	Feature	Key trends	Risks
Freshwater	Surface water quality	Very few water bodies meet 'good' status, largely due to ecological shortcomings in Norfolk and Suffolk.	High risk: Risk to clean water provision due to increasing demand and pollution from agriculture and urban areas.
	Ground water quality	Overall 'poor' ground water status of virtually the whole of Norfolk and Suffolk.	Growing risk: Reduction in groundwater quality due to over abstraction, pollution and saline intrusion due to sea level rise.
	Water availability	Driest region in the UK, with projections indicating a regional net deficit of around 200Ml/d by 2050.	High risk: Projected deficit in future supply over demand, climate change may further impact.
	Flood risk	Over 11% of Norfolk and Suffolk is rated by the Environment Agency as having at least a 1 in 100 flooding risk in any given year. Approximately 50,000 houses in Essex are at risk of coastal flooding and 36,000 are at risk from surface water flooding.	Medium risk: Due to urban expansion and surface water flooding from impermeable surfaces. More intense rainfall due to climate change.
	Chalk rivers	Norfolk and Suffolk have 565km of chalk river, nearly 17% of England's total and hosts many distinctive species. Threats to these rivers include pollution, abstraction, sedimentation, and invasive species	Growing risk: Biodiversity loss due to pollution and invasive species.
	Recreational use of waterways	Recreation within the Broads generated over £600 million in 2017. Managing visitor and wildlife needs is an ongoing challenge.	Medium risk: Deterioration of water quality could have implications for recreational opportunities.
Coast and Marine	Marine habitats and protected areas	Over 90% of inshore/coastal marine habitats in Norfolk and Suffolk falls within Marine Protected Areas.	Growing risk: Invasive species, marine litter, underwater noise, and water quality.
	Fish stocks	Economic uncertainty regarding future of commercial fishing in the region due to regulation and sustainability of fish stocks from environmental pressures.	Medium risk: Increase in ocean temperature due to global warming.
	Seabird and migratory birds	North Norfolk particularly important for migration and provides winter refuge for large flocks of waders/wildfowl.	Medium risk: Reasons for not achieving GES need

Asset	Feature	Key trends	Risks
		Summer breeding of terns and other seabirds, wildfowl and wafers along the coast. Good Ecological Status (GES) is not being achieved for most birds.	to be investigated. Wind turbine collisions.
	Recreation	Coast attracts nearly 12 million day visits and total visitor spend of around £330m in Norfolk and Suffolk.	Medium risk: Sea level rise and loss of natural assets.
Atmosphere	Air quality - particles	PM2.5 levels in much of Norfolk and Suffolk, above the average for England. The annual concentration of human made fine particulate Matter in Essex in 2016 was 9.6µg/M3 (adjusted to account for population exposure) compared to England's average of 9.3 µg/M3.	Medium risk: Health and environment impacts from particles with increasing urbanisation. Transition to electric vehicles should help to mitigate this.
	Greenhouse gas emissions	Norfolk and Suffolk have higher per capita emissions (5.6 t/pp/yr) than the average for England (5.0t/pp/yr). Point-source emitters produce approximately one quarter of CO_2 emission in the two counties (2,088,303 tCO_2e).	High risk: Greenhouse gases have induced global warming.

In addition to the specific risks to natural assets highlighted in **Error! Reference source not found.**, the d ocument review identified drivers and pressures affecting the ability of natural capital assets to deliver ecosystem services:

- Changing climate: Mean summer and winter temperatures increasing, with projections for a further increase in summer temperatures of 1.2-1.6ºC by the 2040s.
- Environmental change – precipitation: Future projections suggest a decrease in mean summer precipitation and an increase in mean winter precipitation in the Region. Rainfall intensity is expected to increase, with implications for runoff, flooding and loss of soils.
- Environmental change – sea level rise: Local sea level rise projections show an increase in sea level between 2007 and 2100 e.g. projections for Great Yarmouth indicate a 0.2-0.4m rise by mid-century and potentially 0.6-1m+ by 2100.
- Social change: Population expected to increase with an increased proportion of elderly and further urbanisation.
- Economic setting: funding and resourcing are needed to deliver new or manage and maintain existing green infrastructure.

Issues and opportunities

There are potential impacts on natural capital and ecosystem services from direct land take or land use change or impacts on condition from transport related infrastructure development. Opportunities include contributing to biodiversity net gain and environmental net gain through enhancement of habitats and connectivity, and linked opportunities for carbon sequestration and water regulation and provision of recreational benefits. Opportunities and issues are detailed further in for each of the ecosystem services identified in Appendix D and incorporated with the related topics and ISA objectives.

6 Assessment Methodology

6.1 Scope of the assessment

The ISA is a high level and objective based assessment. The ISA objectives were developed to cover the ISA topics (as set out in **Error! Reference source not found.**) following a review of relevant P lans, Policies and Strategies, an appreciation of the baseline context and feedback from consultations at the Scoping Stage. These reviews are also reflected in the criteria to be used as the framework for the development and assessment of the Transport Strategy and SIP.

Table 6.1 ISA objectives

ISA Topic	ISA Objectives	Questions to consider in assessing performance against the ISA objectives
Population and Socioeconomics	Support local economic development and accessibility to economic opportunities, employment and community facilities	Is there potential to: ▪ Affect quality of life in terms of improved access to transport to jobs, schools, shops and other community facilities including for those without access to a car? ▪ Reduce and avoid creation of real or perceived severance from linear infrastructure? ▪ Reduce journey times for commuting? ▪ Improve reliability of journey times? ▪ Improve quality of travel and access to information? ▪ Support local economic development for employment and community facilities? ▪ Support employment and training opportunities? ▪ Support access for tourism and recreation ▪ Support changes resulting from effects of COVID/Brexit on the economy and transport
Equality and Diversity	Support and promote improved access for all	Is there potential to: ▪ Improve access for rural populations and towns outside main growth areas dependent on public transport? ▪ Support improved services for transport deserts? ▪ Improve physical access and opportunities for active travel for all groups with protected characteristics, including for example, the elderly and young, women, physically and cognitively disabled and mobility impaired people? ▪ Improve accessibility to services, facilities and amenities for all? ▪ Improved affordability of transport and access to electric vehicle transport (including e-bikes for example)?
Health	Protect and enhance health and well being	Is there potential to: ▪ Improve opportunities and access for active travel and raise public awareness of active travel? ▪ Recognise and address challenges for rural populations with poor public transport access ▪ Improve shared transport and co mobility opportunities ▪ Make active travel, safer, more convenient and more attractive? ▪ Reduce congestion, noise and air quality impacts from transport? ▪ Reduce dependency on private cars and increase active lifestyles ▪ Improve access to greenspace (such as parks and countryside) blue space (water related amenity areas) rivers, wetlands, lakes, and coast) and opportunities for physical activity?

ISA Topic	ISA Objectives	Questions to consider in assessing performance against the ISA objectives
Community Safety	Support and promote community safety	▪ Improve road user safety and reduce risk of collisions and road danger especially for active travel, including cyclists and pedestrians, as well as other vulnerable road users such as e-scooter users, horse riders and motor cyclists. ▪ Potential for adopting Vision Zero approach to improve safety ▪ Improve actual and perceived safety and security for users of public transport for all groups?
Biodiversity	Protect and enhance biodiversity Protect and enhance International and European sites	Are there potential adverse effects on or improvements to: ▪ European; (Natura 2000) or species protected in Annex II and IV of Habitats Directive and Annex I of Birds Directive? ▪ Nationally designated sites NNR/SSSI or protected species? ▪ Local, county biodiversity including Biodiversity Strategy objectives? ▪ Priority habitats and protected species ▪ Wildlife corridors or connectivity? ▪ Biodiversity enhancement and net gain (see also Natural Capital objective)? ▪ Potential to contribute to Further questions relating to natural capital below.
Water Environment	Protect and enhance water resources and water quality and contribute to reduction in flood risk and disruption from flood events	Is there potential for: ▪ Conflict with River Basin Management Plan proposed measures /or Water Framework Directive objectives? ▪ Is there potential to affect water quality through pollution ▪ Are there opportunities to contribute to improvements (such as removal of barriers as part of schemes)? Is there a potential to increase flood risk? ▪ Is there potential to increase surface water run off or ground water flood risk ? ▪ Is there potential to reduce existing flood risk vulnerability?
Air Quality	Contribute to the mitigation of air pollution issues from transport and optimize potential for reduction in air pollution	Is there potential to: ▪ contribute to improvements to air quality or to increase air pollution? ▪ Is there potential to contribute to air pollution reduction affecting sensitive habitats
Noise and Vibration	Contribute to mitigation of noise pollution as a result of transport and optimize potential for reducing noise/vibration	Is there potential to: ▪ reduce or increase the number of people exposed to high levels of transport related noise? ▪ Will areas of high tranquility be affected by increased disturbance or is there potential to increase tranquil areas?
Climatic Factors	Climate change mitigation: Contribute to achieving 2040 net zero carbon targets by reducing greenhouse gas emissions. Climate change adaptation: improve resilience to climate change for the transport	Is there potential for: ▪ Proposals to support modal shift, active travel, reduce traffic and contribute to reducing carbon emissions? ▪ Increase vulnerability or improve resilience of the environment and transport network and other strategic infrastructure to climate change? (Note flood risk increase addressed under water environment topic)

ISA Topic	ISA Objectives	Questions to consider in assessing performance against the ISA objectives
	network and promote improved environmental resilience to climate change.	
Landscape/ Townscape and Visual	Protect and enhance the character and diversity of the landscape/ townscape and avoid or minimise adverse visual effects on sensitive, valued and designated landscapes and public views	Is there potential to ▪ Impact or contribute to improvement to designated or sensitive and valued landscapes including the Broads, Areas of Outstanding Natural Beauty, rural landscapes, townscapes and coastal views or affect visual amenity ▪ Potential to cause light pollution in dark skies (as defined in the CPRE's interactive map England's Light Pollution and Dark Skies)? ▪ Impact protected landscapes and their settings?
Cultural Heritage and Archaeology	Protect cultural heritage and archaeological assets and contribute to improved access to cultural heritage sites	Is there potential to: ▪ Impact on, or to conserve and enhance, the significance of designated and non-designated heritage assets, including any contribution made to that significance by setting, and any Heritage at Risk historic landscapes or to archaeological interest (including coastal / marine based archaeology, old bridges and railway corridors and undiscovered archaeology)? ▪ Potential to improve access to cultural heritage sites?
Soils, Geology and Contaminated Land	Avoid conflicts with geological sites of value. Minimise loss of soil resources and contribute towards the appropriate management of soil resources and quality.	Would there be any effects on: ▪ Designated geological sites, valuable soils or potential for pollution from contaminated land sites? ▪ Would peat and wetland soils be at risk?
Material Assets and Resources	Promote the sustainable use of natural resources including land and mineral bearing land, encourage reuse, recycling and waste minimization and effective use of existing infrastructure.	Is there potential for: ▪ Conflicts with critical infrastructure or with existing and planned land use or valuable agricultural land? ▪ Does the strategy encourage: ▪ Reuse of existing transport infrastructure and/or brownfield sites? ▪ Change to renewable energy for transport
Natural Capital and Ecosystems Services	Protect natural capital and associated ecosystem services, whilst seeking to provide opportunities for enhancement	▪ Is the strategy likely to result in change to natural capital and associated ecosystem services and is there scope for contributing to future requirements for biodiversity and environmental net gain to be accommodated within strategy implementation? ▪ Will there be severance or loss of connectivity or opportunity to improve connectivity?

Interaction between topics

The potential interaction, in particular to consider potential cumulative and in combination effects, across ISA topics is recognised and summarised in Error! Reference source not found..

Table 6.2 Interactions between topics

	Population and Socioeconomics	Equality and Diversity	Health	Community Safety	Biodiversity	Water Environment	Air Quality	Noise and Vibration	Climatic Factors	Landscape/ Townscape and Visual	Cultural Heritage and Archaeology	Soils, Geology and Contaminated Land	Material Assets and Resources	Natural Capital and Ecosystem Services
Population and Socioeconomics														
Equality and Diversity	■													
Health	■	■												
Community Safety	■	■	■											
Biodiversity	■		■											
Water Environment	■		■		■									
Air Quality	■	■	■		■									
Noise and Vibration	■	■	■		■									
Climatic Factors	■	■	■		■	■	■							
Landscape/Townscape and Visual	■	■	■	■	■	■			■					
Cultural Heritage and Archaeology	■		■			■	■	■	■	■				
Soils, Geology and Contaminated Land			■		■	■			■	■	■			
Material Assets and Resources	■	■	■	■		■	■	■	■	■	■	■		
Natural Capital and Ecosystem Services	■	■	■		■	■	■	■	■	■	■	■	■	

6.2 Influencing the Transport Strategy and SIP through the ISA

Development of the Transport Strategy and draft SIP and their finalisation and completion of the ISA has been an integrated and iterative process, with ISA mitigation recommendations contributing to the evolution of the Transport Strategy.

A Sustainability Action Plan and ISA Monitoring Plan have been developed as draft for consultation based on the ISA assessment of the draft Transport Strategy and SIP. Both Plans provide a framework and mechanism for monitoring the beneficial and adverse effects (including cumulative effects) of the Transport Strategy and SIP. The results of monitoring then provide an evidence base to inform future revisions of the Transport Strategy and SIP.

6.3 Assessment approach

The assessment provided within this ISA Report considers both the Transport Strategy itself and interventions included within the accompanying draft Strategic Investment Programme (SIP)

The assessment regulations require consideration of alternative approaches or options; a description of how a proposed approach was selected; as well as assessment of potential significant adverse effects. These are described for the Transport Strategy and SIP separately below.

Assessment of the Transport Strategy

The Transport Strategy has been developed with consideration of a range of economic and population growth and post Covid return to workplace scenarios. These represented a range of future conditions that the Transport Strategy would need to respond to and be delivered within. The assessment considers the viable alternative approaches that the Transport Strategy could adopt before detailing the proposed approach and how this is proposed to be taken forward as described in the Transport Strategy.

Alternatives

Five potential transport approaches have been considered during development of goals included under the Transport Strategy strategic pathways in addition to a do minimum/business as usual (BAU) or without strategy scenario. These are:

- **Approach 1**: Focus primarily on promotion and facilitation of the use of alternative fuels.
- **Approach 2**: Focus primarily on promotion and facilitation of modal shift towards passenger transport and active travel modes.
- **Approach 3**: Focus primarily on improving connectivity
- **Approach 4**: Combined approach to delivery including both promotion and facilitation of the use of alternative fuels and also modal shift towards passenger transport and active travel modes.
- **Approach 5**: Combined approach to delivery including both promotion and facilitation of the use of alternative fuels and also modal shift towards passenger transport and active travel modes with additional demand management to address potential induced demand from improvements to connectivity

A high-level assessment of these approaches has been undertaken using the criteria set out in **Error! R eference source not found.** to identify which would be the most supportive for the ISA objectives and help facilitate identification of goals under the strategic priorities and associated pathways. The assessment is also informed by baseline analysis and key trends set out in section 5.

Scenario analysis conclusions from the ESC phase 1 carbon emissions study are also considered in terms of potential for meeting different net zero targets.

Table 6.3 Significance criteria for assessment of the Transport Strategy and compatibility with ISA objectives

Description of Effect/Risk	Assessment against objectives
The transport strategy objective or goal has potential for contribute significant positive effect on the ISA receptors associated with this or contribute to achieving the objective.	+
The transport strategy objective or goal has potential for neutral or significant positive effects on the environmental receptors associated with this objective depending on how the policy or objective is delivered.	0/+
The transport strategy objective or goal has potential for mixed significant positive & negative effects on the environmental receptors associated with this objective.	+/-
The transport strategy objective or goal has potential for neutral effect on the environmental receptors associated with this objective.	0
The transport strategy objective or goal has potential for neutral or significant negative effects on the environmental receptors or conflicts with the ISA objective depending on how the policy or objective is delivered.	0/-
The transport strategy objective or goal has potential for significant negative effect on the environmental receptors or conflicts with the ISA objective.	-
The transport strategy objective or goal effects are uncertain/there is insufficient information on which to determine effect on potential environmental receptors associated with this objective at this stage.	?

Proposed Transport Strategy

The assessment of the Transport Strategy has been undertaken in two stages as set out below. At each stage, the assessment criteria established in Table 6.4 have been used to identify where objectives or goals are supportive of the ISA objectives or where there is potential for conflict.

- Assessment of the transport strategy against the ISA objectives, including recommendations regarding the nature of the objectives have been made where opportunities to improve alignment with the ISA objectives have been identified.
- Assessment of goals and measures included under each of the four strategic priority pathways for the Transport Strategy against the ISA objectives, including recommendations regarding the content and delivery of goals and measures in order to better align with the ISA objectives and guide the identification of interventions to be included in the SIP.

Cumulative effects

The assessment of cumulative effects for the Transport Strategy considers where positive or negative impacts on the ISA objectives would occur either as a result of:

- Additive or synergistic effects between goals and measures included under each of the four strategic priority pathways (i.e intra-plan cumulative effects).
- Additive or synergistic effects between the Transport Strategy and other national or regional level plans or policies (i.e. inter-plan cumulative effects).

Assessment of the SIP

Assessment of the SIP is provided in Volume 2 of the ISA.

Interventions included within the 'Approach to the SIP' and identified for delivery within a 0-5 year timescale, termed priority interventions, have been assessed in accordance with the process described below under 'Assessment of the SIP'.

Interventions planned for delivery within a 5-10 year timescale have not been assessed further at this stage as the Transport Strategy and SIP will be regularly updated to ensure that they remain relevant to the evolving transport challenges that the region faces and continue to support the Government in achieving national aspirations for new homes and jobs, levelling up, boosting international trade, and achieving net zero as we recover from the COVID-19 pandemic. As such, there is some uncertainty regarding the nature and delivery of schemes currently included in the SIP for the 5-10 year timescale.

Alternatives

All potential interventions included within the draft SIP have been subject to a high-level risk-based assessment for compatibility with the ISA objectives in accordance with the criteria set out in **Error! Reference source not found.**. This was undertaken to identify options considered at higher risk of conflict with the ISA objectives and contribute towards the planned delivery timescales for interventions. The higher risk options are where possible scheduled towards the end of the delivery period to allow time for re-evaluation of need/alternatives and further study to inform mitigation recommendations.

Proposed Strategic Investment Programme (SIP) Approach

Each intervention included within the SIP with a delivery timescale of 0-5 years has been assessed against the ISA objectives in accordance with the nine-point significance set out in **Error! Reference source not found.**. ISA mitigation is identified and recorded against each option and ISA objective combination (where required).

Table 6.4 Significance criteria for assessment of SIP interventions against ISA objectives

Description of Effects/Risks	Scale of Effect
Major benefits / contribution to meeting ISA objectives (widespread/large scale)	+++
Moderate benefits /contribution to meeting ISA objectives	++
Minor benefits /contribution to meeting ISA objectives (local and small scale)	0/+
Neutral or not applicable	0
Minor adverse effects or potential conflicts with ISA objectives (local and small scale)	0/-
Moderate adverse effects or potential conflicts with ISA objectives	--
Major adverse effects or potential conflicts with ISA objectives (widespread / large scale)	---
Mixed positive and negative	-/+
Uncertain	?

Cumulative effects

The assessment of cumulative effects considers:

- Additive or synergistic effects on ISA objectives and individual receptors arising from one or more of the options included within the SIP for delivery within 0-5 years (i.e. intra-plan cumulative effects)
- Additive or synergistic effects on individual ISA objectives and individual receptors arising from one or more of the options included within the SIP for delivery within 0-5 years and (a) sub-regional, county or local level plan and policies or (b) planned development within the study area (i.e. inter-plan cumulative effects).

For the purposes of the assessment of inter-plan cumulative effects, the following are defined as planned development:

- Nationally Significant Infrastructure Projects (NSIPs) listed on the Planning Inspectorate's register of projects (Planning Act 2008)

- Development of transport systems authorised by Transport and Works Act Order (Transport and Works Act 1992)
- Hybrid bills currently before Parliament
- Committed transport schemes identified in the draft SIP as schemes in the region that are either under construction, have planning consent or committed funding to take forward.

6.4 Assumptions and limitations

Assumptions

The assessment for the Transport Strategy is based on technical judgement, knowledge of similar measures and consideration of how the proposed measures are likely to be carried out and contribute or conflict with each ISA.

The assessment takes the procedures or legislative protection identified below into account and the standard good practice measures that are expected to be applied. These include:

Studies and Surveys

- Feasibility and scheme option studies aimed at avoiding adverse effects on designated sites and protected structures following Design Manual for Roads and Bridges (DMRB) and TAG requirements current at the time of scheme assessment.
- Studies, surveys and consultation on environmental and social effects of development proposed under the strategy and associated SIP

Standard good practice approaches are applied to design and construction

- Alignment/siting of new or improved infrastructure applying hierarchy of avoid, minimize, mitigate and compensate to keep adverse impacts to a minimum
- Identification of relevant mitigation expected to support consenting and licensing requirements
- Application of good practice approaches to construction and pollution management including appropriate supervision and control.

Operational management

- Measures to meet legal obligations during operational management of transport infrastructure or supporting measures, such as precautions for pollution prevention, safety during maintenance activities or meeting licensing requirements for protected species.

Limitations

The assessment of the Transport Strategy proposals is high-level and focused on how they support strategic objectives with the identification of appropriate mitigation measures aim to reduce uncertainty and risk so that intended outcomes are achieved.

The level of availability of public information on design and environmental impacts of priority interventions included in the draft SIP is variable. Locally designated areas were not consistently available for mapping across the region for example. Interventions range from ideas to well-developed schemes under preparation for funding. In many, cases however spatial extents, defined routes and sites are not known, or proposed measures are not fully defined.

The level of uncertainty associated with the interventions is recorded for each intervention assessment. Mitigation measures are also identified to minimise uncertainty and risk for the interventions taken forward and are expected to be developed and assessed further at the project level. For schemes within the six strategic corridors further studies will be undertaken to inform SIP proposals and there will be an opportunity for this work to include additional information and indicative routes to reduce uncertainty in the assessments and identify relevant opportunities.

There are specific uncertainties over transport behaviour post pandemic and extent of return to work places that will potentially affect carbon emission modelling however, proposals for future work will be able collect relevant data to this will be addressed and considered in strategy and SIP progress monitoring.

7 Assessment of the Transport Strategy

7.1 Strategy alternatives

As part of developing the Transport Strategy, a series of scenarios were considered and the results compared against the proposed wider outcomes and the four Strategic priorities (See Transport Strategy Evidence Base 1C Initial Future Scenarios: https://www.transporteast.org.uk/consultation-documents).

The purpose of the scenario development and testing procedure was to identify a set of possible futures for the region, to quantify these and then to explore their implications for the ability of the adopted Transport Strategy to deliver both the transport and wider regional outcomes. Economic, Spatial and Workplace assumptions underpinned a range of alternative potential outcomes for the Transport East area, see below:

Three Economic Trajectories

- **Central Trajectory** – The baseline economic trajectory for the local authority districts within the Transport East area, representing a "business-as-usual" case.
- **High Investment, High Housing Growth** – This trajectory is intended to represent the ambitions of the two LEP areas covering the region, with high levels of investment leading to growth in productivity, employment and GVA in key sectors, and regional housing needs being fully met.
- **Low Investment, Low Housing Growth** – This trajectory is intended to represent a situation in which both investment in the region and workers are lost to other areas of the UK who have taken more proactive steps to develop their region, resulting in a more pessimistic outlook for the East.

Two Spatial Scenarios

- **Centralised** – Urban growth rate doubled after Local Plan period (up to 2035) and rural growth rate scaled down accordingly - 52% of people living in the 13 largest urban areas.
- **Dispersed** – Urban growth rate halved after Local Plan period (up to 2035) and rural growth rate scaled up accordingly – 47% of people living in the 13 largest urban areas.

Two Workplace Scenarios

- **Back to normal –** Share of people working remotely by occupation will return to 2019 levels – 15% of people working remotely.
- **Remote –** Share of people working remotely by occupation will be 32% of people working remotely at least 50 % of the week.

(Note: remote working shares were calculated at an occupational level, hence changes to projected occupational composition also directly impacts the overall proportion of remote workers. Assumptions were based on a combination of workforce remote working data taken before and during the COVID-19 pandemic, and research by Adams-Prassl et. al into the likely future remote working potential[212]

The results of scenario testing have demonstrated that location of growth and take-up of remote working would affect the delivery of the "optimum economic vision" for the region.

For example, if future growth was more centralised (around urban areas), with high participation in remote working, the transport solutions might focus on local mode shift to sustainable modes. The other scenarios presented additional transport challenges, for example a dispersed growth trend, or return to higher long-distance commuting, could increase demand for car use, and alternative fuels may need to play a bigger role in decarbonisation.

In all scenarios, high levels of investment and growth would increase productivity, prosperity and wage levels within the region while remote working would offset the potential emissions from the impact of high growth and locating growth in urban areas would reduce car dependency.

Hybrids of all the scenarios could play out in the future, and it is recognised that the Strategy needs to be resilient and flexible to meet the needs of the region.

Transport East are looking to develop a clear delivery pipeline that sets out key actions / initiatives / schemes that are required under each of the four key themes to deliver the strategic actions of each

pathway. In taking this approach there is flexibility to ensure that Transport East addresses the regional challenges, enables growth and is aligned to central Government's priorities. **Error! R eference source not found.** shows the potential strategic approaches considered for each strategic priority.

Table 7.1 Transport East Emerging Pathway Activities

Strategic priorities	Potential Strategic Approaches Considered
Decarbonisation to net-zero	▪ Reduce Demand: for carbon intensive transport trips through local living by making it easier for people to access services locally or by digital means. ▪ Shift Modes: by supporting people to switch from private car to active, shared and passenger transport and good to move to more sustainable modes like rail. ▪ Switch Fuels: with all private, fleet and freight vehicles switching to net zero carbon fuels at the earliest opportunity ▪ Zero Carbon Growth: by supporting authorities and developers to plan, locate and design new development and land use planning interventions the reduces the need for people to make carbon intensive transport trips in the future.
Connecting Growing Towns and Cities	▪ Intra-Urban Connectivity & Accessibility: within our towns and cities improve connectivity and accessibility for walking, cycling and passenger transport to support sustainable access to services ▪ Inter-Urban Connectivity & Accessibility: deliver faster and more reliable transport connections between our growing towns, cities and economic corridors and to the rest of the UK, to support business growth. skills development, and employment ▪ Fully integrate transport networks, services and operations across the Transport East region, through a customer focused approach, enabling seamless and safe end-to-end journeys by sustainable modes that are attractive to all people.
Energising coastal and rural communities	▪ Getting people to places sustainably: Use of alternative fuels and vehicle trips are reduced by switching modes. The role of active modes to reduce car dependency can improve local health indicators and leisure and tourism opportunities. ▪ Getting services to people: Connectivity for businesses, and how transport accessibility and connectivity can assist deprivation levels in rural and coastal areas. Improving levels of rural/coastal accessibility via passenger transport facilities & rural hubs. ▪ Substitute transport trips with digital: Vehicle trips substituted through digital transport and land use planning. ▪ Connectivity of coastal areas: Improvement in connectivity and accessibility along 500 miles of coastline and connect coastal communities & economies.
Unlocking International Gateways	▪ Improve connectivity, journey time and reliability for freight, passengers and employees to ports and airports ▪ Move goods and people sustainably to ports and airports Alternative Fuels: Charging and Hydrogen infrastructure plus electrify by shifting modes. ▪ Mode Shift: HGV Shift to electrified rail or short sea shipping freight. Also, mode shift for employees. ▪ Increase use of alternative fuels for both ports and airports.

The scenarios considered reflect the wider external factors influencing economic growth, employment, working patterns and how these might need to be supported by or be affected by approaches that can be taken by the Transport Strategy.

Energy Systems Catapult (ESC) was commissioned by TE to establish a current baseline of carbon emissions from transport modes within the TE region area and to map possible emission reduction pathways to achieve environmental goals between now and 2050[213]. This was a phase 1 study (published December 2021 www.transporteast.org.uk/strategy/transport-strategy/) with phase 2 planned to cover identification of Decarbonisation Pathways.

The ESC Phase 1 study has been reviewed to inform the carbon assessment as part of the update to

the ISA following TE Transport Strategy consultation. The study modelled the carbon baseline across the region, covering "on road" and rail transport modes with the following findings:

- total vehicle kms travelled in the TE region were 22,617million in 2018
- CO2 footprint of 2.44 Mt CO2 from cars & Taxis
- CO2 footprint of 2.39 Mt from LGVs & HGVs.
- total CO2 emission footprint of 5.35MtCO2 in 2018 including public transport and rail
- Car and good vehicle footprint by area showing rural areas account for 47%. of emissions

The ESC study mapped CO2 intensity across region highlighted and identified that key points of intensity for emissions are:

- Junctions between main motorways and A road infrastructure
- Rural area transport emissions with 45% of the population of the TE region in rural areas - noting that miles travelled per person in an urban setting are 14% and 10% lower than those travelled in a smaller town and a rural environment respectively.
- Main transport corridors featuring dual carriageways – particularly out to the ports of Harwich and Felixstowe or around urban conurbations such as Ipswich and Norwich.

The ESC study reported modelling for four scenarios to explore how a net zero position could be achieved:

- Business As Usual (BAU)
- Net Zero by 2050 – which aligns with UK Government Strategy
- The Sixth Carbon budget with a 78% reduction in emissions by 2035
- Paris 10 years Early – A net zero position by 2040

Scenario	Assumptions	Results
Business As Usual (BAU)	Short term - expected increase in CO2 due to increase in vehicle kms travelled. Longer term - CO2 emissions falls post 2030 due to increased number of EVs and hybrid EVs on the road after 2030 - based on likely falling costs of batteries changing competitiveness with internal combustion engine (ICE) vehicles Emissions from public transport are assumed not to change significantly and EVs and hybrid EV uptake increases with ICEs still comprising around 50% of on road vehicles by 2050	180 Mt CO2 Net Zero not met by 2050
Net Zero by 2050	Current ICE and PHEV bans are implemented in 2030 and 2035 respectively as in "Decarbonising Transport"22 the UK Government's proposed commitments to transport decarbonisation. • There is a ban on HGV ICE sales in 2035 (5 years before current proposed ban). • Incentives to promote the uptake of zero emission vehicles to drive adoption are deployed: ○ Infrastructure – centrally planned roll out of infrastructure that allows adoption of smart charging for home charging and the provision	106 Mt CO_2 41% reduction on the BAU scenario.

Scenario	Assumptions	Results
	of on-street charging for consumers without access to off-street parking. ○ Vehicle – further vehicle grants beyond the current incentives. ○ Fiscal / Tax incentives – applied to vehicles and electricity/hydrogen23 as a transport energy source. Equally our scenarios include the adoption of a carbon tax on liquid fuels (in addition to fuel duty). • no incentives for zero emission HGV uptake.	
The Sixth carbon budget with a 78% reduction in emissions by 2035	There is a ban on ICE sales in 2025 for both cars and LGV – which would require the UK Government to announce that it is advancing its proposed bans on each vehicle type by 5 and 10 years respectively. • a ban on HGV ICEs in 2030 which is 10 years before previous commitments. • no further increase in vehicle kms/per person. • incentives for the uptake of zero emission vehicles to drive adoption as above in the Net Zero by 2050.	82 $MtCO_2$ 54% reduction on the BAU scenario
Paris 10 years Early – A net zero position by 2040	As for the Sith carbon budget scenario above with addition of: • A ban on HGV ICEs sales is implemented in 2025 - this is 15 years ahead of the current proposal. • Miles travelled per annum remain static in terms of vehicle kms or HGV fleet size. • A decarbonised public transport system is fully operational by 2040.	65 Mt CO_2 39% reduction on the Net Zero by 2050 scenario 64% reduction on a BAU scenario.

Achieving net zero position by 2040 was identified as ambitious and challenging and meeting the target was noted to be limited by the residual emissions from the HGV fleet and the residual petrol and diesel car population so vehicles brought before 2025 could still be a significant source of CO_2 emissions.

In summary the key findings from the ESC study were that to achieve net zero target by 2040 the following actions would be required:

- Earlier intervention saves more CO_2 over time – a “sooner the better” approach is required;
- More rapid switching to EV will be an important contribution but a switch to EVs alone would not be sufficient;
- A shift in transport behaviour to reduce vehicle kms with modal shift for freight, commercial transport and people; Mobility as a Service across the region and cross council coordination;
- Nearly half of emissions are from freight much of which is enroute to and from major port

infrastructure; These are “national routes” and a modal shift to rail freight;
- Jusr under 50% of emissions are derived from non-urban areas and this is potentially under-estimated. The situation presents a particular challenge given the high use of private vehicles and there will need to be an accelerate shift to affordable EV;
- To address older ICE vehicles still being part of transport fleet post 2035 – especially for HGVs, proactive pursuit of switching will be required
- Supporting local authority initiatives to complement sustainable transport strategy (such as planning policy / rural broadband provision/ town regeneration).
  Business cases for public transport in rural areas needs to shift emphasis towards outcome based policy (for eample less CO2 / imprved air quality / reduced road deaths / less congestion) rather than financial metrics.

Further work on the measures for decarbonisation is included as part of the Phase 2 work.

Alternative approaches considered for meeting Transport Strategy objectives

Five potential approaches to the development of activities included under the strategic priorities and associated pathways were considered during development of the Strategy and in response to consultation:

1. Focus primarily on promotion and facilitation of the use of alternative fuels- **switch fuels.**
2. Focus primarily on promotion and facilitation of modal shift towards passenger transport and active travel modes – **shift modes.**
3. Focus primarily on **improving connectivity and accessibility**
4. Combined approach to delivery including both promotion, encouraging use of alternative fuels and also modal shift towards passenger transport and active travel modes **– switch fuels and modal shift with improved connectivity and accessibility**
5. Combined approach as for approach 4 above but including additional support for modal shift through additional demand management measures to address potential for induced traffic- **switch fuels and modal shift with improved connectivity and accessibility a with sustainable transport approach including** adoption of ISA recommendations to support environmental and social objectives.

These approaches were also compared to a do minimum or business as usual (BAU) approach which would only include committed development without the Transport Strategy being implemented. These schemes are expected to be taken forward and are outside the influence of the TE Transport Strategy.

Error! Reference source not found. assesses the five transport approaches considered during d evelopment of goals included within the strategic pathways as outlined in section 2.2 against the ISA objectives (see **Error! Reference source not found.**) along with the do minimum/BAU scenario. The k ey elements of the assessment are as follows:

Do minimum/BAU - this assumes no additional regional actions over already committed developments. As indicated in the carbon emission scenario modelling, although carbon emissions are likely to reduce with the uptake of EV net zero carbon emissions target for 2050 is unlikely to be met. Overall vehicle km travelled/per person would be expected to increase. Some overall air quality improvements would be expected with EV uptake with reduced tailpipe emissions although improvements would be much slower than for approaches with proactive measures. No significant region wide improvements to access and inclusivity, public transport and active travel provision are assumed

Approach 1: Switch fuels only approach is assessed as having a mixed positive/negative impact on the population objective because private electric vehicles (EVs) are currently expensive to purchase although considerably cheaper to run than conventional fuelled vehicles and therefore this approach would have limited potential for accessibility improvements for lower income households without other specific measures such as improved access to shared transport schemes and charging infrastructure availability. Switching fuels would also apply to public transport and HGV. Overall benefits to carbon emissions would be expected but would not be adequate on their own to meet strategy objectives.

Approach 2; Shift Modes only approach is assessed as having mixed positive/negative effects against the people and equalities objectives. This is because whilst passenger transport is cost effective relative to the use of private vehicles and can therefore be more accessible for low-income households. However public transport is not always accessible for people with disabilities unless their needs are appropriately accommodated. In addition, in less densely populated and rural areas demand may appear to be insufficient for passenger transport options to be commercially viable. In rural areas journey distances may be too great for active travel, limiting the scope of modal shift improvements that could be achieved. Measures supporting modal shift have potential overall to contribute to reducing private vehicle km/person.

Approach 3; Connectivity and accessibility improvements- measures addressing current congestion or improving connectivity along the six strategic corridors could include infrastructure construction works to upgrade to road or rail infrastructure or new infrastructure. In some cases measures could improve traffic flow and reduce local air pollution, these works may include land take with potential for habitat loss and fragmentation as well as landscape and heritage impacts. On its own Approach 3 is unlikely to contribute to meeting climate change or air quality objectives more than the do minimum/BAU approach.

Approach 4 Combined approach - switch fuels and modal shift with improved connectivity and accessibility. This approach includes the benefits of proactive measure to support both switching fuels with modal shift for reducing carbon emissions and air pollution, and connectivity benefits for the economy and accessibility. However, it does not address potential for induced traffic increase, or measures to address rural accessibility and inclusivity and would be limited to individual scheme based approaches on natural capital and biodiversity net gain.

Approach 5 Combined approach - switch fuels and modal shift with improved connectivity and accessibility with a sustainable transport approach. This approach provides the greatest potential to reduce to carbon emissions supporting uptake of EVs and alternative fuels use and modal shift to public transport and active travel. Additional regional demand management measures would also contribute to avoiding induced traffic effects and commitments to sustainable transport applying the transport strategy wider outcome aims.

Approaches 1, 2, 4 and 5 would reduce transport related carbon and air pollutant emissions to an extent, with direct positive effects against the climate and air ISA objectives and indirect positive effects against the biodiversity, water and natural capital ISA objectives. Approach 3 would address current connectivity issues and support access and economic growth.

New infrastructure construction required for alternative fuels (for example, a charging network for EVs) would be relatively small-scale local interventions. New infrastructure required to facilitate modal shift towards passenger transport and active travel modes could include potential to re-allocate existing road space. However, where land take is associated with supporting modal shift or connectivity there could be associated effects on biodiversity, landscape, heritage and soils and geology.

Modal shift towards the use of passenger transport and active travel under Approaches 2 and 3 is assessed as having a neutral to positive effect against the community safety objective. Whilst DfT road accident statistics[214] show that bus passengers have a lower casualty rate per mile than private vehicle passengers, walkers and cyclists do not. There is evidence to suggest that accident rates may decrease when the number of people undertaking active travel increases[215.] Overall effects are likely to be dependent on how the approach is delivered and the degree of modal shift achieved. Nevertheless, a focus on passenger and active transport provides an opportunity to improve the quality of environment of existing and new supporting infrastructure through design such that perceptions of safety are improved.

Overall, Approach 5 (combined approach for sustainable transport) performs best against the ISA objectives as it provides flexibility, and inclusivity, in the delivery of accessibility and connectivity improvements with traffic demand management.

Table 7.2 Assessment of transport approaches against ISA objectives

Transport approaches		ISA objectives													
		Population	Equalities	Health	Safety	Biodiversity	Water	Air	Noise/vibration	Climate	Landscape	Heritage	Soils/geology	Material assets	Natural capital
0	Do minimum/BAU - without Transport Strategy implementation	-	-	-	-	0/-	0	-	0/-	-	0	0	0	0	0/-
1	Focus primarily on promotion and facilitation of the use of alternative fuels - Benefits for air quality and noise in urban areas and to climate change carbon targets	0	0	+/0	0	+/0	+	+	+/0	+	0	0	0	0	0
2	Focus primarily on promotion and facilitation of modal shift towards passenger transport and active travel modes	+/-	+/-	+	+/0	+	+	+	+/0	+	0	0	0	0	0

Transport approaches		ISA objectives													
		Population	Equalities	Health	Safety	Biodiversity	Water	Air	Noise/vibration	Climate	Landscape	Heritage	Soils/geology	Material assets	Natural capital
3	Improved connectivity and accessibility – including through infrastructure development	+/-	+/-	+/-	+/0	-	0/-	0/-	-	-	-	-	-	-	-
4	Combined approach to delivery including both promotion and facilitation of the use of alternative fuels and also modal shift towards passenger transport and active travel modes and improved connectivity	+/-	+/-	+/0	+/0	-	0/-	0/+	0/+	+	-	-	-	-	-
5	Combined approach including additional demand management to address induced traffic and additional inclusivity initiatives and support for biodiversity recovery initiatives as part of coordinating biodiversity and environmental net gain	+/0	+/0	+	+	+/-	+/-	+	+	+	+/-	0/-	0/-	+/-	+/-

7.2 Proposed strategy

Wider outcomes

Error! Reference source not found. provides an assessment of the draft Strategy wider outcomes a gainst the ISA objectives, including an assessment of significance following inclusion of the ISA mitigation recommendations. Justification for the assessment of effects against ISA objectives for each of the seven wider outcomes is set out below.

- Wider Outcome 1 would have a positive impact on the climate objective as it supports reductions in carbon emissions. Wider Outcomes 4 and 7 also have potential for indirect positive impacts on the climate objective through facilitation of active travel modes and support for the sustainable energy sector.
- Potential for positive effect on the population and equality objectives are identified for Wider Outcomes 2 and 6 which would likely have a beneficial impact on employment and training opportunities and prosperity throughout the region.
- Wider Outcomes 2, 3, 4, 5 and 6 are considered likely to have potential for positive impacts on the health objective through support for wider determinants of health including access to work and education, healthcare services, housing and the natural environment, and also indirectly as a result of a positive effect on the safety objective under Wider Outcome 5 only.
- Wider Outcome 3 could include measures involving construction works to support economic and connectivity objectives have a neutral/negative or positive and negative effects on all objectives relating to the of the physical environment (i.e. air, noise, biodiversity, water, landscape, heritage, material assets, soils/geology, natural capital) and climate.
- Wider Outcome 4 would likely have positive or neutral impacts on the landscape and material assets objectives. However, the potential impacts of both Wider Outcomes 2 and 4 on the physical environment is dependent on how they are implemented. For this reason, the effects are assessed as uncertain for ISA objectives relating to the physical environment with the exception of the landscape and material assets objectives.
- Wider Outcome 5 could potentially have an indirect positive impact on the biodiversity, air, noise and natural capital objectives. For this to be the case, interventions would support modal shift and active travel including provision of recreational walking, cycling facilities and access to leisure facilities or outdoor recreation.

Table 7.3 Assessment of Transport Strategy wider outcomes

Wider outcomes		ISA objectives													ISA recommendations
		Population	Equalities	Health	Safety	Biodiversity	Water	Air	Noise/vibration	Climate	Landscape	Heritage	Soils/geology	Material assets	Natural capital	
1	Reducing carbon emissions to net zero by 2040	0	0	+	0	0	0	+	0	+	0	0	0	0	0	Acknowledgement of time frame for achievement of net zero emissions, which should meet or preferably better the Climate Act (2008) (2050 Target Amendment Order) 2019 target and interim targets included in relevant UK Government Carbon Budget Strategy response: wording amended to include 2040 time constraint
2	Promoting active, healthy and safe lives for all	0	+	+	+	+/0	0	+/0	+/0	+/0	0	0	0	0	+/0	'Promoting active, healthy and safe lives *for all*' to increase emphasis on inclusivity of this statement Strategy response: proposed amendment accepted.

Wider outcomes		ISA objectives													ISA recommendations
		Population	Equalities	Health	Safety	Biodiversity	Water	Air	Noise/vibration	Climate	Landscape	Heritage	Soils/geology	Material assets	Natural capital	
3	Promoting and supporting a productive, sustainable and diverse economy	+	0	+	0	+/-	0/-	0/-	0/-	0/-	0/-	0/-	0/-	+/-	+/-	Amend to 'Promoting and supporting a productive, *sustainable* and diverse economy Strategy response: proposed amendment accepted. Potential for some measures to include upgrading or new infrastructure with associate effects depending on location
4	Supporting access to education, training and employment opportunities for all	+	+	+	0	0	0	0	0	0	0	0	0	0	0	'Supporting access to education, training and employment opportunities *for all*' to increase emphasis on inclusivity of this statement Strategy response: proposed amendment accepted.

Wider outcomes		ISA objectives													ISA recommendations
		Population	Equalities	Health	Safety	Biodiversity	Water	Air	Noise/vibration	Climate	Landscape	Heritage	Soils/geology	Material assets	Natural capital	
5	Facilitating the sustainable energy sector	+/0	0	0	0	0	0	0	0	+	0	0	0	0	0	Include commitment to prioritising support for sustainable energy sector, rather than just including the sustainable energy sector. Strategy response: proposed amendment accepted.
6	Helping our growing areas to develop sustainably to create high quality, distinctive places to live, work and visit	+	+	+	+/0	0	0	0	0	+/0	+/0	+/0	0	+/0	0	Amend to 'create high quality, *inclusive*, distinctive *and resilient* places to live, work and visit' Strategy response: proposed amendment accepted.
7	Protecting and enhancing the built and natural environment	0	0	+/0	0	+/0	+/0	+/0	0/+	0/+	+/0	+/0	+/0	+/0	+/0	No amendments identified Strategy response: none required.

Strategic priorities and goals under associated pathways

An assessment against the ISA objectives for all activities included under each of the four Transport Strategy strategic priorities and associated pathways are provided in the following subsections and tables:

- **Decarbonising transport:** Net zero carbon emissions from transport by 2040, building on our status as the UK's premier renewable energy region –**Error! Reference source not found.**;
- **Connecting growing places:** Enhanced links between the fastest growing places and business clusters, improving access for people to jobs, supplies, services and learning; thereby enabling the area to function as a coherent economy with improved productivity – **Error! Reference s ource not found.**;
- **Energising rural and coastal communities:** A reinvented sustainable coast for the 21st century which powers the UK through energy generation. Supporting our productive rural communities and attracting visitors all year -**Error! Reference source not found.**; and
- **Unlocking international gateways:** Better connected ports and airports to help UK businesses thrive, boosting the nation's economy through better access to international markets and facilitating foreign direct investment – **Error! Reference source not found.**.

Mitigation and enhancement opportunities have been identified and a potential significance of effect assigned against each goal taking into account the mitigation measures identified in **Error! R eference source not found.**. The goal specific ISA mitigation measures identified against specific pathways and goals are outlined in the assessment tables (Tables 7.5 to 7.8). These mitigation measures will be implemented through the Sustainability Action Plan and Monitoring Plan (see **Error! R eference source not found.**).

Table 7.4 General ISA mitigation measures for the Transport Strategy

General ISA mitigation measures for the Transport Strategy
The measures are to be implemented by Transport East and the Partners responsible for the individual schemes: ▪ Strategy Goals and measures will be supportive of the Integrated Sustainability Assessment (ISA) Objectives ▪ Carbon emissions resulting from the construction, operation or implementation of goals and measures implemented under the four strategic pathways will overall lead to a net reduction in transport related carbon emissions within the TE region in line with the UK Government's 78% emissions reduction by 2030 and 2050 net zero targets. ▪ Policies, programmes and new infrastructure design will be inclusive in nature and reduce risk of transport (particularly) collisions, crime and anti-social behaviour – recommendations from the EqIA to be followed (section 7.2 Table 7.9). ▪ Where new infrastructure development required is required, the following general principles will apply where practicable: – Design will seek to minimise capital carbon emissions, will be compliant with PAS 2080:2016 and PAS 1878:2021 – Land take from designated or priority habitats, housing, commercial premises (including agricultural land holdings), heritage assets (including Registered Parks and Gardens) and valuable soils including Best and Most Versatile (BMV) agricultural land and peatland soils will be avoided – Risks of disturbance to wildlife (including protected species) and to unknown archaeology will be minimised – Infrastructure proposals will adopt context sensitive design and be sited to minimise negative impacts on landscapes, townscapes and visual amenity and on the setting of built heritage assets – Infrastructure will be designed and sited such that flood risk is not worsened, or preferably improved – Brownfield sites will be used in preference to greenfield land – Infrastructure will be designed for resilience to the latest likely worst case climate projections (currently considered to be UK Climate Projections 2018 (UKCP18) Representative Concentration Pathway (RCP) 8.5)

General ISA mitigation measures for the Transport Strategy

  - Statutory biodiversity net gain target of 10% across the SIP implemented consented schemes will be exceeded and for each individual consented scheme biodiversity net gain requirements will be met.

- New infrastructure development will be subject to environmental assessment, including Environmental Impact Assessment (EIA) (either statutory or non-statutory), and including Landscape and Visual Assessment (LVIA), Habitat Regulations Assessment (HRA), Water Framework Directive (WFD) compliance assessment, Flood Risk Assessment (FRA), Equalities Impact Assessment (EqIA) and Health Impact Assessment (HIA) as appropriate. These assessments will be undertaken at project level, and mitigation recommendations therein adhered to during construction and operation.

For each of the draft Transport Strategy strategic priorities, a number of goals are identified along with proposed actions to achieve them. These are assessed against the ISA objectives in the sections below.

Decarbonisation

- Goals 1 and 4 would have positive effects on **the population, socioeconomics** and **equalities** objectives arising from support for development of new housing in proximity to jobs. Improved public transport access would help support good quality of life and access to employment, education and other key community facilities. Support for improved road and rail digital connectivity would likely help improve access economic opportunities for residents of rural areas and address existing economic inequalities across the region.
- Goals 2 and 3 could potentially have negative effects on the **population** and **equalities** objective unless the ISA mitigation recommendations provided in **Error! Reference source not found.** w hich seek to ensure that social groups who have more difficulty accessing active or passenger travel modes, or who may have more difficulty making accessing the EV market or making use of charging infrastructure, are catered for. This required that groups are not disadvantaged by private vehicle demand management measures. However, with the proposed ISA mitigation in place, effects on these objectives are assessed as neutral/positive.
- **All goals** are anticipated to have a positive or neutral/positive impact on the **air quality, climate, biodiversity** and **natural capital** objectives linked to reductions in carbon and transport related air pollutant (including NOx, PM and SO2) emissions. These would be achieved through modal shift away from the use of conventionally fuelled private vehicles and measures to reduce demand on the transport network.
- Modal shift and demand management may also reduce transport related **noise** emissions while modal shift towards EVs is anticipated to have a beneficial effect on traffic related noise emissions in urban areas. As a result, performance against the **noise** objective are assessed as neutral/positive for all goals.
- Impacts on the **landscape, heritage, soil/geology, material assets** objectives are assessed as neutral as new infrastructure required infrastructure required to support EV charging and digital connectivity roll out. This is likely to be small scale and predominantly located within the physical footprint of the existing transport network, and whilst reduced traffic movements on the highway network arising have potential for positive impacts on townscapes and built heritage assets there is currently no evidence to confirm that this impact would be significant.

Table 7.5 Transport Strategy strategic priority assessment: Decarbonisation pathway

Decarbonisation: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
Goal 1: **Reduce demand for carbon intensive transport trips** through local living by making it easier for people to access services locally or by digital means			
▪ Work in partnership with government, National Highways and Network Rail to improve digital connectivity along main roads and railways, using evidence from our strategic network and corridor studies ▪ Partner with the region's private sector to foster digital innovation, to make the best use of transport networks and discourage unnecessary travel. ▪ Coordinate with partners to make sure our Transport Strategy and Investment Programme fully aligns with and supports: – the Government and telecommunications providers' plans to roll-out ultra-fast broadband and 5G mobile in the region. – the work of our local authorities, developers, and telecommunications providers to embed improved digital connections in new developments across the region.	No amendments are identified to the goals in addition to the general ISA mitigation recommendations listed in **Error! Reference source not found.**. Strategy response: none required.	Population	+
		Equalities	+
		Health	0/+
		Safety	0
		Biodiversity	0/+
		Water	0/+
		Air	0/+
		Noise/vibration	0/+
		Climate	0/+
		Landscape	0
		Heritage	0
		Soil/geology	0
		Material assets	0

Decarbonisation: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
		Natural capital	0/+
Goal 2: Shift modes - by supporting people to switch from private car to active, shared and passenger transport, and goods to more sustainable modes like rail			
▪ Work with Local Authorities to build on successful shared-transport schemes and extend further across the region. ▪ Lead the development of a regional Future of Freight plan to identify sustainable solutions for goods movement, including rail and water to reduce freight demand on the road network. ▪ Improve regional evidence around EV charging demand and assist regional partners to accelerate public charging infrastructure. ▪ Work to develop a 'place-based' approach to transport decarbonisation that identifies the most effective interventions for our unique communities	▪ Make specific reference to making sustainable transport options easier to use and more attractive for all people, including groups who may find active and public transport modes more challenging to make use of such as: – people with disabilities (including physical disabilities, intellectual disabilities, sensory disabilities and mental illnesses) – people with caring responsibilities who are more likely to be undertaking trip chaining journeys – groups who express greater levels of concern regarding personal safety when using active or passenger transport modes, including women, disabled people and black and ethnic minority (BAME) individuals – shift workers and night workers. ▪ Commitment to consideration and mitigation of the potential differential impact on implementing demand management measures to reduce private car use on access to economic opportunities, community facilities and social opportunities for the groups listed in the bullet point above for whom active and passenger transport modes are less accessible.	Population	0
		Equalities	0/+
		Health	0/+
		Safety	0/+
		Biodiversity	0/+
		Water	0/+
		Air	+
		Noise/vibration	0/+
		Climate	0/+
		Landscape	0
		Heritage	0
		Soil/geology	0
		Material assets	0

Decarbonisation: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
	Strategy response: Inclusion of 'A Strategy for everyone' within Chapter 4 Strategic Approach, measure SSA-GEN-2 within the Sustainability Action Plan and measures against the equalities objective	Natural capital	0/+
Goal 3: **Switch fuels** - with all private, passenger transport, fleet and freight vehicles switching to net zero carbon fuels at the earliest opportunity			
▪ Lead a region-wide Electric Vehicle infrastructure task force in collaboration with the Office for Zero Emission Vehicles, local authorities, neighbouring regions and other partners to accelerate the roll-out of inclusive charging infrastructure and identify the sub-regional actions need to unblock and speed delivery. ▪ Create a partnership with National Grid and UK Power Networks to make sure the roll-out of charging infrastructure in the East aligns with plans for upgrading electricity supply networks and is powered by clean energy sources. ▪ Coordinate partner organisations including Net Zero East, Hydrogen East, National Highways, Network Rail and local authorities to elevate and make the case for investment in the East to decarbonise vehicle fleets and networks, including operational fleets, buses, taxis, private hire, trains and freight. ▪ Accelerate the roll-out of ultra-rapid EV charging points on the Strategic Road Network, working with National Highways and using evidence from our strategic corridor connectivity studies. ▪ Work with government and partners to identify barriers to people and businesses switching fuels across our region and make the case for solutions that will work best in the East – potentially including plug-in grants for cars and financial incentives to support zero emission buses, taxis, private-hire and freight vehicles. ▪ Working in partnership with Local Authorities and other Sub-national Transport Bodies, increase the regional evidence regarding transport	▪ Include commitment to provide support for the use of renewable energy sources in supporting electric vehicle charging supply networks ▪ Consider including new measure around supporting LTAs with electric vehicle charging infrastructure outwith the SRN and MRN. At home charging, or another alternative of equivalent convenience and which facilitates overnight charging, is likely to be key in facilitating the uptake of EVs, and approximately one third of residential dwellings in the UK do not have access to off-road parking. ▪ Consider including commitment to support plug in grants for wheelchair accessible taxis. People with mobility difficulties make three times more trips by taxi or private hire vehicle annually than those without mobility difficulties.[216] Strategy response: Amendment to wording of second measure under this goal to specify clean energy sources, and to wording of fifth measure to include taxis and PHVs.	Population	0
		Equalities	0
		Health	0/+
		Safety	0
		Biodiversity	0/+
		Water	0/+
		Air	+
		Noise/vibration	0/+
		Climate	+
		Landscape	0
		Heritage	0
		Soil/geology	0/+

Decarbonisation: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
carbon emissions, to provide clarity on our trajectory to net zero, including development of a transport carbon budget. ▪ Work with other Sub-national Transport Bodies to map demand for pan-regional alternative fuel infrastructure.		Material assets	0
		Natural capital	0/+
Goal 4: Zero Carbon Growth by supporting authorities and developers to plan, locate and design new development that reduces the need for people to make carbon intensive transport trips in the future			
▪ Create an East of England 'future network plan' and lead 'strategic corridor connectivity studies' to support local authorities with new evidence to: ▪ Deliver new housing close to local jobs and essential services, and in areas with high levels of sustainable transport accessibility. ▪ Complete reviews of planning applications to make sure associated transport proposals maximise opportunities supporting the use of alternatives to conventional motor vehicles, including electric vehicles and sustainable modes. ▪ Deliver a Future of Freight Plan for the East, to inform planning authorities, logistics businesses and their supply chains of the potential for consolidating freight transport at a strategic scale. ▪ Through our Decarbonisation Pathway and analytical framework, provide evidence and guidance to support local authorities and national government to strengthen carbon reduction requirements of Transport Assessments and Travel Plans for new developments in the East, including measures to reduce car dependency.	No amendments identified. Whilst the focus on supporting the use of alternatives to conventional motor vehicles and reducing car dependency requires consideration in terms of impacts on access to economic and social opportunities for low income households, people with disabilities and other social groups who are less able or less comfortable making use of alternative modes, these potential impacts are considered to be addressed via measures and ISA mitigation recommendations provided under Goal 3 and Goal 4 of this pathway. See Goals 2 and 3 for Strategy response.	Population	+
		Equalities	0
		Health	0/+
		Safety	0/+
		Biodiversity	0/+
		Water	0/+
		Air	+
		Noise/vibration	0/+
		Climate	+
		Landscape	0
		Heritage	0

Decarbonisation: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
		Soil/geology	0
		Material assets	0
		Natural capital	0/+

Connecting growing towns and cities

- All goals would have a positive or neutral/positive effect on the **climate** objective and neutral/positive impact on the **air** objective arising from support for modal shift towards passenger transport and active travel and reduced congestion on the Strategic Road Network (SRN) and Major Road Network (MRN).
- Support for increased physical activity levels through active travel, reduced risks of road collisions and reduced exposure to air and noise pollution would also all make a positive contribution towards the **health** objective.
- **All goals** are also assessed as having a positive or neutral/positive impact on the safety objective through support for pedestrian and cyclist prioritisation over traffic and better accommodation of sustainable travel modes within design, reduced congestion on the SRN and MRN and support for Brake's 'Vision Zero' initiative.
- Reduced transport air pollutant emissions would make a positive contribution to the **biodiversity** and **soils/geology** objective for Goals 5, 6 and 7, but where new highway and rail infrastructure is required to facilitate measures under Goal 6 then this is likely to have a negative impact on these objectives due to associated land take and disturbance and therefore effects are assessed as neutral/positive for Goals 5 and 7 and mixed positive/negative for Goal 6.
- Construction of new highway and rail infrastructure has potential negative impacts **on landscape, heritage, soils/geology, material assets** and **natural capital** objectives depending on how schemes are delivered. Potential positive impacts on the **soils/geology** objective could arise where brownfield sites are reused or opportunities for remediation are taken up. The material assets and resources objective may also benefit through the re-use of existing infrastructure, particularly EV charging on the SRN. Impacts on **the landscape and visual, cultural heritage, soils and geology, material assets and resources** and **natural capital and ecosystems services** objectives are highly dependent on the nature and location of any new infrastructure, and so a negative/neutral effect is assessed as a reasonable worse case outcome at strategy level for Goal 6.

Table 7.6 Transport Strategy strategic priority assessment: Connecting growing towns and cities pathway

Connecting growing towns and cities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA Recomm.
Goal 5: **Within our towns and cities** improve connectivity and accessibility for walking, cycling and passenger transport to support sustainable access to services, education, training, employment and leisure			
Increase the capacity and capability of local authorities in urban areas to deliver a step-change in urban connectivity through: ▪ Commissioning and providing enhanced regional level data and evidence to strengthen co-ordinated multi-modal transport plans ▪ Developing a toolkit to help planners in the East design urban roads and streets prioritising sustainable modes, reflecting our region's unique features ▪ Make the case for increased, stable and long-term funding for local authorities to deliver and maintain holistic, integrated and high-quality public transport and active travel in urban areas. Allowing them to balance the needs of all users in constrained streets. ▪ Lead an action plan to identify and drive forward regional-level projects to complement Local Transport Authorities' local Bus Service Improvement Plans, accelerating the delivery of comprehensive networks of accessible, high frequency 'turn up and go' bus services supported by real-time information and integrated cashless ticketing. ▪ Lead our sub-national Active Travel, Bus and Rail action groups, and implement the regional recommendations of our bus and active travel strategies, to make sustainable transport more accessible, easier to use and more attractive to all people. ▪ Lead an action plan to identify and drive forward regional-level projects supporting the development, construction and maintenance of comprehensive and integrated walking, cycling and wheeling networks in the East, supported by dedicated safe and inclusive infrastructure, high quality signage and way-finding with priority over traffic	Strategy should make specific commitment to ensuring public transport improvements and improvements to walking and cycling infrastructure will be made accessible for those with disabilities, people with caring responsibilities who are more likely to be undertaking trip chains or groups who express greater concern for personal safety when using public transport or undertaking active travel (including ethnic minorities and women), and how demand management measures will avoid disproportionate negative impacts on these groups. Strategy response – amendments to wording of second and fourth measures under this goal to emphasise inclusivity. Inclusion of 'A Strategy for everyone' within Chapter 4 Strategic Approach, measure SSA-GEN-2 within the Sustainability Action Plan and measures against the equalities objective within the draft Monitoring Plan.	Population	+
		Equalities	0/+
		Health	0/+
		Safety	0/+
		Biodiversity	0/+
		Water	0/+
		Air	0/+
		Noise/vibration	0/+
		Climate	+
		Landscape	0/+
		Heritage	0
		Soil/geology	0
		Material assets	0
		Natural capital	0/+

Connecting growing towns and cities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA Recomm.
Goal 6: **Deliver faster and more reliable transport connections** between our growing towns, cities and economic corridors and to the rest of the UK, to support business growth, skills development and employment			
▪ Lead regional network analysis and corridor connectivity studies to present a new and compelling case for investment in existing and future priorities on our strategic corridors. ▪ Lead strategic thinking on the enhanced role of rail in the East to 2050, through the formation of a Transport East Rail Task Group. Produce a Rail and Mass Transit Plan for East setting out the next generation of investment priorities for the region. ▪ Enhance the business cases for investment in our rail priorities in the East and accelerate delivery of our priorities, including proposals to deliver faster and more capacity on the Great Eastern Main Line, West Anglia Main Line, Thameside Line, and the Eastern Section of the East West Main Line between Oxford and the Transport East region. ▪ Work with National Highways and local authorities through the RIS process to enhance the case for investment in of our high priority road network connections to deliver reliable, fast and safe journeys, including the A47, A14, A11, A120, A12, A13, A127, M25 and M11. ▪ Lead new thinking on the future use of roads in the region, including unlocking game-changing Rapid Passenger Transit networks, autonomous vehicles, shared transport and integration with other modes and technologies, to ensure users of our road network are collectively achieving our decarbonisation and economic growth goals.	Include emphasis on sustainable future use of roads in the region. Goal includes use of existing infrastructure and also potential new infrastructure -see ISA mitigation recommendations to minimise impacts from these and also opportunities to consider early in design or for maintenance (for example changing verge cutting regimes to enhance biodiversity).	Population	0/+
		Equalities	0
		Health	0/+
		Safety	0/+
		Biodiversity	+/-
		Water	+/-
		Air	0/+
		Noise/vibration	?
		Climate	0/+
		Landscape	0/-
		Heritage	0/-
		Soil/geology	0/-
		Material assets	+/-

Connecting growing towns and cities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA Recomm.
▪ Create a new regional level analytical and modelling function to enhance the region's understanding of people's movement, inform our strategic network plans and test new solutions. ▪ Work with Local Transport Authorities and infrastructure bodies to promote the effective maintenance and management of the transport network, to ensure the strategic transport network provides reliable and safe journeys.		Natural capital	+/-
Goal 7: Fully integrated transport networks, services and operations across the Transport East region through a customer focussed approach, enabling seamless and safe end-to-end journeys by sustainable modes that are attractive to all people			
▪ Work with local authorities to make sure their multi-modal transport plans are developed with users at the centre, considering the needs of different groups particularly those with protected characteristics under the Equality Act. Areas to explore include the provision of services, affordability, door-to-door journeys, and the role of transport in creating high-quality, safe public spaces. ▪ Coordinate with partners, including the police, to promote and make the case for greater investment in a Vision Zero 'safer systems' approach to eliminating road danger across the region. ▪ Lead our sub-national Active Travel, Bus and Rail action groups, and implement the regional recommendations of our bus and active travel strategies, to make sustainable transport easier to use, more accessible and more attractive to people. ▪ Work with transport operators at a regional level to increase the integration of different transport modes e.g. integrated ticketing Undertake research and analysis to better understand travel behaviours, motivations and drivers of change.	▪ Include specific reference to support for reducing road danger and road collision rates for vulnerable groups including children (particularly in areas of high deprivation), pedestrians and cyclists. ▪ Mitigation recommendation relating to bus and active travel strategies as outlined against Goal 4. Strategy response: Measure S3 against Safety objective within the draft Monitoring Plan. Also see Strategy response to Goal 4.	Population	+
		Equalities	0/+
		Health	+
		Safety	+
		Biodiversity	0/+
		Water	0/+
		Air	0/+
		Noise/vibration	0/+
		Climate	0/+
		Landscape	0/+
		Heritage	0
		Soil/geology	0

Connecting growing towns and cities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA Recomm.
		Material assets	0
		Natural capital	0/+

Energising rural and coastal communities

- Effects upon the **population** and **equalities** objectives are assessed as positive or neutral/positive for both goals as a result of support for transport and digital connectivity for rural populations and the benefits that these bring in terms of access to economic opportunities and reduce inequalities. The **health** objective is also assessed as neutral/positive for both goals as support for delivery of demand responsive public transport services and 'lifeline' bus routes would likely improve access to healthcare, community facilities and social and leisure opportunities in isolated areas. Improvements to the public rights of way network and East of England coastal path will also support increased rates of physical activity through increasing the attractiveness of outdoor recreation and potentially also contribute to active travel.
- Support for the transition to electric vehicles in rural and coastal areas, development of Bus Service Improvement Plans, demand responsive public transport and PRoW network improvements under Goal 8 would help reduce transport carbon and air pollutant emissions, and therefore a neutral/positive effect is assessed against the **climate, air, biodiversity** and **soil/geology** objectives is assessed.
- Should new rail infrastructure (or other types of new infrastructure as identified as necessary under the Coastal Connectivity Sub-National Action Plan) be required under Goal 9 then there is potential for negative impacts on the **biodiversity, noise, landscape, heritage, soils/geology** and **natural capital** objectives depending on design and routing (the detail of which is not available at Strategy level).
- Water based transport also could have negative impacts on **biodiversity** and **landscape** objectives depending on the nature and location of the proposals (the detail of which is not available at Strategy level). For this reason, the effects against the **biodiversity, water and natural capital** objectives are assessed as mixed positive/negative and effects against the **landscape, heritage, soils/geology** and **material assets** objectives are assessed as negative/neutral at Strategy level as a reasonable worst-case assessment.

Table 7.7 Transport Strategy strategic priority assessment: Energising rural and coastal communities

Energising rural and coastal communities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
Goal 8: Increasing accessibility to education, training, services and employment for rural communities			
▪ Create a Centre of Excellence for Rural Mobility in the East, to make the case for investment in our rural and coastal communities and tackle regional and national blockers to better, more inclusive rural transport services and supporting infrastructure. ▪ Lead and co-ordinate the English Sub-national Transport Bodies to champion rural outcomes with national government. ▪ Establish a sub-national EV task force to support local authorities across the East to unblock and accelerate the roll-out of charging infrastructure in rural and coastal communities, powered by clean energy. ▪ Lead an action plan to drive forward regional projects to maximise the benefits from Local Transport Authorities' local Bus Service Improvement Plans – tackling integrated ticketing, cross-border travel, and financial sustainability. ▪ Showcase our local authorities' and LEP transport innovation in rural communities through a best practice guide and develop a strategic business case to scale-up, fund and roll-out more rural transport innovation across the region. ▪ Through our Sub-national Active Travel Strategy, set out the East's unique case for investment and investment in walking and cycling infrastructure for all people in rural and coastal areas, encouraging more active lifestyles and integrating with regional tourism and health strategies. ▪ Lead strategic co-ordination with local authorities, infrastructure delivery bodies and Sustrans to plan and make the case for investment in regional active travel networks (walking, cycling, wheeling and rights of way), including long-term maintenance. ▪ Work with Local Transport Authorities and infrastructure bodies to promote the effective maintenance of the local transport network, to ensure it provides reliable and safe journeys.	▪ Strategy should make specific reference to support for increasing the accessibility of the rights of way network for people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities and mental illness). ▪ Consider including targets relating to improving access to healthcare facilities by active travel and public transport modes. Strategy response: amendments to wording of goal to emphasise inclusiveness for measures relating to public transport, walking and cycling. Measure P2 against Population objective within draft Monitoring Plan.	Population	+
		Equalities	0/+
		Health	0/+
		Safety	0
		Biodiversity	0/+
		Water	0/+
		Air	0/+
		Noise/vibration	0
		Climate	0/+
		Landscape	0
		Heritage	0
		Soil/geology	0
		Material assets	0

Energising rural and coastal communities: Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recomm.
		Natural capital	0
Goal 9: **Improving connectivity along our 500 miles of coastline** - and connect our coastal towns and communities to the rest of the region and UK, to support levelling up, and boost our coastal industries, including Energy, Shipping and Tourism.			
▪ Evaluate and promote the transport needs of our coastal towns as part of our strategic network plan and corridor studies, to improve sustainable connections from our coast with the rest of the region and the UK. ▪ Through our new Rail Group, work with government, Network Rail and Great British Railways to prioritise investment in rail to better connect our coastal communities with the rest of our region and the UK. ▪ Co-ordinate our partners and local authorities to establish an investment programme to tackle severance and level-up communities along our 500- mile coastline, identifying the best value and most sustainable projects potentially including water-based transport for coastal communities, active travel improvements and the East of England coastal path.	Strategy should commit to exploring and developing sustainable transport modes in fulfilling the identified coastal connection needs. Strategy response: amendments to wording of first measure.	Population	+
		Equalities	0/+
		Health	0/+
		Safety	0/+
		Biodiversity	+/-
		Water	+/-
		Air	0/+
		Noise/vibration	?
		Climate	0/+
		Landscape	0/-
		Heritage	0/-
		Soil/geology	0/-
		Material assets	0/-
		Natural capital	+/-

Unlocking international gateways – Ports and Airports

- All goals under this strategic pathway would have neutral/positive or neutral impact on the **population** and **equalities** objectives, through support for local and regional economies.
- Goal 10 is assessed as having mixed positive/negative effects against the **health, biodiversity**, **water, air, noise, material assets** and **natural capital** objectives. Measures to consider options for reducing road freight and a reduction in freight related issues of congestion would help reduce carbon, air pollutant and noise emissions associated with freight movement. Measures to support new highway and ro-ro freight park construction and other measures under this goal such as extending the West Anglia main line upgrades, extending the EWR east of Cambridge and also initiatives to address significant road network pinch-points have potential for negative impacts on these and upon the landscape, heritage and material assets objectives due to changing traffic patterns, land take and induced land use change (particularly in proximity to ro-ro freight parks).
- The likelihood and significance of such negative effects are highly dependent on the scale, location and nature of interventions and therefore the effects are assessed as mixed positive/negative for the **biodiversity, soils/geology** and **natural capital** objectives at Strategy level and neutral/negative for the material assets, landscape and heritage objectives. ISA mitigation has been identified to minimise the risk of negative impacts arising.
- Goals 11 and 12 is assessed as having positive or neutral/positive effects on the **health, biodiversity, water, air, climate** and **natural capital** objectives associated with support for the decarbonisation of the freight industry, which would help reduce transport-related emissions of air pollutants such as NO2 as well as reducing carbon emissions. No significant impacts on other objectives are anticipated under Goal 11.
- Measures under Goal 12 to improve rail and other sustainable transport connections to ports, establish rail freight hubs at ports with existing rail infrastructure and promote an expansion of short sea shipping could help reduce carbon emissions associated with freight transport with positive effect on the **climate** objective. Measures to promote modal shift towards short sea shipping and manage demand on the local road network surrounding ports under Goal 12 could potentially have a positive impact on the safety objective by reducing the risk of road collisions.
- Modal shift has potential for positive effects against the **air, noise, biodiversity** and **natural capital** objectives through reduced air pollutant emissions from land-based transport. However increased shipping can also increase risk of marine pollution and noise disturbance to marine fauna.
- Short sea shipping (including construction of new supporting infrastructure) and new rail infrastructure (if required) could also potentially have a negative impact on these objectives and also the **landscape, heritage** and **material assets** objectives associated with air and noise pollutant emissions, land take, ground disturbance, water pollution, habitat severance and disturbance to wildlife and noise and views of new infrastructure. ISA mitigation has been identified to minimise the impact of these potential negative impacts, however at the Strategy level there is uncertainty on the likelihood of ISA mitigation successful delivery. For this reason, the significance of effect on these receptors is assessed as neutral/negative with ISA mitigation in place.

Table 7.8 Transport Strategy strategic priority assessment: Unlocking international gateways (Ports and Airports)

Unlocking international gateways Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recom.
Goal 10: **Improve connectivity, journey time and reliability** for freight, passengers and employees to ports and airports			
▪ Make the case for investment to ensure road improvement projects facilitating freight flows are prioritised through programmes such as the National Highway's Roads Investment Strategy. ▪ Lead the development of a regional Future of Freight plan to identify sustainable solutions for goods movement, high priority road network improvements and options increasing rail freight capacity. ▪ Produce key corridor studies to support the development of freight parks to better manage the flow of HGVs and reduce congestion on roads. ▪ Collaborate with government, airport operators and local authorities to strengthen accessible rail connections to all our airports including upgrades to the West Anglia Main Line and extending East West Rail east of Cambridge. ▪ Support initiatives to address significant road network pinch-points around airports, exploring the potential for incorporating more bus priority in the process. ▪ Work with port and airport operators, and local authorities to identify new rail, bus and coach connections, and explore mass rapid transit options to support staff and passenger trips	▪ Qualification of support for road improvement schemes – sustainable freight modes should be prioritised wherever practicable. ▪ Freight parks to be located on brownfield sites wherever practicable, air quality and noise assessments undertaken to ensure no unacceptable impacts on local sensitive receptors. Strategy response: ISA monitoring plan includes the development of targets relating to the use of brownfield sites and use of noise and air quality modelling to inform site selection and identify appropriate mitigation where required. ▪ Inclusion of commitment of consideration of accessibility of rail connections to airports for people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities and mental illness) and the perceived safety of rail travel for people travelling late at night and early in the morning (particularly groups who feel less safe on public transport such as BAME individuals217218, disabled people and women219220). ▪ Goal 1 of the decarbonisation pathway includes measures to support the rail decarbonisation, and therefore no additional ISA mitigation recommendations are identified against this goal.	Population	+
		Equalities	0
		Health	+/-
		Safety	0/+
		Biodiversity	+/-
		Water	+/-
		Air	+/-
		Noise/vibration	+/-
		Climate	+/-
		Landscape	0/-
		Heritage	0/-
		Soil/geology	+/-
		Material assets	+/-

Unlocking international gateways **Goals**	**Goal specific ISA recommendations (and Strategy response)**	**Assessment**	
		ISA Objective	**Post-ISA recom.**
	Strategy response: revision to wording of first measure under this goal. Inclusion of 'A Strategy for everyone' within Chapter 4 Strategic Approach	Natural capital	+/-
Goal 11: Move goods and people sustainability to ports and airports by shifting modes			
▪ Through the Transport East Rail Task Group, work in partnership with government, Network Rail and other Sub-national Transport Bodies to secure improvements to the rail network serving major ports and airports, tackling constraints affecting our region. ▪ Work with major ports with existing rail connections to establish rail freight hubs to help improve sustainable connections for local businesses and smaller ports to support mode shift. ▪ Promote the improvement of passenger rail services to ports with significant ferry/cruise services including accessibility enhancements, and support initiatives to better integrate rail-sea travel. ▪ Work with ports, water authorities and logistics businesses both within the region and around the UK (particularly along the north-east coast) to scope the case for, and promote, an expansion of short-sea and coastal shipping. ▪ Work with local authorities and port operators to improve sustainable and inclusive connections to airports and ports, and surrounding business clusters for staff, alongside initiatives to encourage take-up and manage demand on the local road network including active travel and shared mobility solutions. ▪ Support airport operators with developing Airport Surface Access Strategies with ambitious mode share targets, considering the potential for complementary measures to encourage all people to shift mode.	▪ Inclusion of commitment to support development of rail freight hubs on brownfield sites ▪ Inclusion of commitment to improve accessibility of passenger rail services and help facilitate active travel and bus services connecting airports and residential areas to be accessible for people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities and mental illness), and are perceived as safe and convenient by staff travelling late at night and in the early hours of the morning (particularly groups who feel less safe on public transport such as BAME individuals, disabled people and women). ▪ Inclusion of commitment to support development of, and promote use of, low emission shipping fuels and zero or low emissions buses for airport access. ▪ Airport Surface Access Strategies to include specific consideration of accessibility needs of people with disabilities. people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities and mental illness) can be accommodated in desired modal shift targets. Strategy response: Inclusion of 'A Strategy for everyone' within Chapter 4 Strategic Approach, measure SSA-GEN-2 within the	Population	0/+
		Equalities	0/+
		Health	0/+
		Safety	0/+
		Biodiversity	+/-
		Water	+/-
		Air	+/-
		Noise/vibration	+/-
		Climate	0/+
		Landscape	0/-
		Heritage	0/-

Unlocking international gateways **Goals**	**Goal specific ISA recommendations (and Strategy response)**	**Assessment**	
		ISA Objective	**Post-ISA recom.**
	Sustainability Action Plan. Draft Monitoring Plan includes development of a target relating to use of brownfield land for new developments (M2). Sustainability Action Plan measure SSA-GEN-6.	Soil/geology	0/-
		Material assets	0/-
		Natural capital	+/-
Goal 12: Increase use of alternative fuels for both ports and airports			
▪ Lead strategic thinking and develop evidence to accelerate hydrogen and EV infrastructure across the East. ▪ Engage regionally and nationally with logistics businesses and HGV operators to promote the transition to low carbon freight. ▪ Collaborate with local authorities, the freight industry, and government to provide a regional voice at national level, to make the case for further financial support to incentivise operators to transition to new zero emission vehicles. ▪ Collaborate with local partners to promote the acceleration of research and development into alternative fuels for ports and freight transport, supporting the export of best practice to boost the regional economy. ▪ Work with airport operators and local authorities to support measures at airports to encourage the use of EVs powered from clean energy sources. ▪ Work with bus and coach operators and logistics businesses to promote the use of alternative fuels for vehicles serving airports. ▪ Support the government's Jet Zero approach to eliminate carbon emissions from aviation and promote research and development of alternative fuels in the region, including for aircraft and ground transport operations	Inclusion of commitment to support EV charging at airports powered by renewable energy sources as far as practicable (in line with mitigation recommendations under goal 4 of the decarbonisation pathway to support prioritisation of renewable energy sources within the EV charging infrastructure. Strategy response: wording of first measure under goal amended. ISA Recommendation - See Section 9 Sustainability Action Plan: SSA GEN 5	Population	0
		Equalities	0
		Health	0/+
		Safety	0
		Biodiversity	0/+
		Water	0/+
		Air	+
		Noise/vibration	0
		Climate	+
		Landscape	0
		Heritage	0
		Soil/geology	0

Unlocking international gateways Goals	Goal specific ISA recommendations (and Strategy response)	Assessment	
		ISA Objective	Post-ISA recom.
		Material assets	0
		Natural capital	0/+

Equality Impact assessment

Equality effects can be classified as 'disproportionate' or 'differential.' Disproportionate effects occur when an intervention has a greater proportional effect on a protected characteristic group in a particular location, when compared with the general population. Differential effects occur when members of a protected characteristic group are affected differently by an intervention because of specific needs, sensitivities or vulnerabilities related to their protected characteristic. The assessment has drawn on available literature to consider the likely differential effects of the Transport Strategy on protected characteristic groups. Issues deemed relevant to each protected characteristic groups are outlined in Table 7.9.

Table 7.9: Potential equality effects on protected characteristic groups

Protected Characteristic	Relevant equality issues
Age	Children and young people: New infrastructure can divide communities and change the normal journey routes of some individuals. For children, a change in route might take them across dangerous road or rail crossing points, placing them at increased risk of an accident. Children are limited by their physical, cognitive and social development, making them more vulnerable to transport accidents[221]. For children and young people, access to reliable public transport can be critical for accessing education[222]. Elderly populations: Evidence suggests that older people have a lesser likelihood to be able to walk for long distances. For this reason, the introduction of a physical barrier within the local community could increase their journey times and reduce their ability to access community facilities[223]. Older people are also more sensitive to impacts from air pollution that may arise from construction and operation of transport infrastructure[224].
Disability	Environmental impacts of transport: People with certain pre-existing health problems are more sensitive to impacts from air pollution that may arise from construction and operation of transport infrastructure[225]. Car dependency: Members of communities with disabilities are much more likely to be dependent upon public transport than car use. This dependency means that any changes to local transport infrastructure could have a direct impact on their lifestyle and wellbeing[226]. Accessibility: In the UK the transport accessibility gap currently stands at 38%, which means that disabled people take 38% fewer trips than those without disabilities[227]. Two in five (40%) people with physical or hidden disabilities frequently experience difficulties when travelling by train, and 57% of disabled people find using airports or flying difficult (ibid.). For these individuals, better transport accessibility and inclusivity does not mean a 'marginally better' journey – it means a transformational intervention, giving them the freedom to access opportunities and services that would have otherwise been precluded (ibid.). This includes requirements for step free access, signage supporting those with needs and lift access for those with mobility challenges.
Sex and Gender	Time poverty: Women's multiple roles and their associated 'time poverty' impacts significantly on the ways they travel. It influences how much time they spend travelling. It influences who they travel with and for what purpose. Perhaps most significantly, it influences the scheduling of the journeys that are made. Women's greater 'time burden' often means that their trips need to be made between doing other household tasks. As a result, any changes in travel time impact upon their other time tasks. Reliability and the ability to minimise the knock-on effects

Protected Characteristic	Relevant equality issues
	of travel disruption upon other tasks are, therefore, much more important for women's travel than for men's[228]. Safety: Across the UK, women and men use transport differently. Women are 10% more likely than met to report feeling unsafe on public transport[229]. In the UK, 86% of women aged 18-24 and 71% of women of all ages have experienced sexual harassment in public spaces, including public transport[230]. Any changes to transport systems may be vital to women's safety and curtail women's access to basic services, work opportunities and social activities, particularly in older women, disabled women and women in rural areas. Travel patterns: Whilst gender differences in car use are declining, women are still less likely to be the main driver in the household[231]. Some 30% of women have no access to a car particularly during the working day because either they cannot afford one or the family car is used by their partner for work[232].
Gender Reassignment	Safety: Research reveals how the fear of anti-LGBTQ discrimination and violence have profound impacts on LGBTQ identity and visibility, and safety perceptions affect mobility opportunities and choices[233]. This research identifies that LGBTQ participants are not necessarily physically excluded from mobility opportunities, rather, they pay hidden costs to travel safely which take the shape of identity and visibility comprises and heightened levels of fear while travelling (Ibid.).
Marriage and Civil Partnership	Equality: The overall treatment of people across the system and institution of marriage, civil partnerships and cohabiting couples is not always consistent, or equitable, and this can have a direct bearing on economic equality. However, there is no evidence to suggest that this protected characteristic group experiences transport differently as a result of their family status. Vulnerability and changes in transport costs: Lone parent families are vulnerable to transport poverty; children and parents in lone-parent families are the least likely of any household type to have private transport, and the price of public transport excludes many young people, and mothers and children, from its use[234]. In addition, households with low incomes, ethnic minority community members, and those that have children or household members with mobility problems are also at risk of transport poverty[235]. Rural and semi-rural communities are also more at risk because they lack access to alternatives to car-use. These groups without transport would be particularly vulnerable to both social and spatial isolation (ibid.).
Pregnancy and maternity	Environmental impacts of transport: Pregnant women are sensitive to impacts from air pollution, with exposure having negative effects including the potential to disrupt a baby's development[236] (Medical News Today, 2020). Accessibility: Evidence suggests pregnant women and mothers with young children are more likely to use public transport to access community and healthcare facilities, which plays an important role in supporting social inclusion for this group[237]. The accessibility and design of physical spaces may also affect the ability of parents with young children to navigate public transport freely, especially if using pushchairs (ibid.).
Race	Vulnerability to changes in transport costs: Evidence suggests that Black Asian Minority Ethnic community members are often over-represented within lower income groups and therefore have increased vulnerability to changes in transport fares[238].

Protected Characteristic	Relevant equality issues
	Introduction of new transport corridors: The barrier presented by new transport corridors may result in spatial segregation which ethnic minority communities can be more susceptible to, especially those from low-income household who may face limitations in the set of residences, destinations, and transport modes they can choose. This has the potential to re-enforce or exacerbate societal divisions[239].
Religion or belief	Safety: Perceptions of safety are particularly important for people from particular religious or faith communities, for whom concern about hate crime is a particular issue. In the 2018-19 period, religious hate crimes in England and Wales increased by 3%. In the same period 12% of hate crimes were estimated to involve more than one motivating factor, with the majority of crimes relating to both race and religion[240]. Some religious groups tend to have a higher number of children and multigenerational households. In some cases, older generations may not have English as a first language, while younger generations may have a large number of children. Although evidence is not widespread, the everyday realities shown through the media highlights the gendered nature mobility has among some religious communities. Young people: The geographical distribution of faith schools means that younger people at these schools may have to travel further distances to access a particular school[241]. Alongside the fear of crime, as recognised above, this particular group of people will have a distinct set of needs when using public transport.
Sexual Orientation	Safety: research reveals how the fear of anti-LGBTQ discrimination and violence have profound impacts on LGBTQ identity and visibility, and safety perceptions affect mobility opportunities and choices[242]. This research identifies that LGBTQ participants are not necessarily physically excluded from mobility opportunities, rather, they pay hidden costs to travel safely which take the shape of identity and visibility comprises and heightened levels of fear while travelling[243].

Deprivation

In addition to the protected characteristics set out above, the assessment also considers levels of deprivation.

Research suggests that lower income households experience more financial burden when using public transport and are therefore more vulnerable to changes in costs[244]. Similarly, lower income households are less likely to have access to a car, therefore accessibility to public transport plays a significant role within the demand to reach key destinations for either work, education of healthcare[245].

For low-income households, public transport dependence is problematic – particularly when escorting children to a nursery or school[246], as time-consuming and expensive child escort trips may reduce their children's access to good schools and participation in after-school activities[247]. Additionally, access to employment may be further constrained by the costs of public transport. Low-income households often spend a relatively large proportion of their income on commuting costs (around 25% compared with the average of approximately 13%), with an associated trade-off between expected income and travel costs[248].

Improved local transport infrastructure will directly benefit those living without a car as their accessibility to education, employment and essential service is dependent upon these public transport links[249]. Research suggests a significant number of people on low incomes in rural areas (and some urban areas) are unable to meet their basic transport needs[250] and live feeling in social isolation[251].

EqIA Summary

Taking into account the relevant issues identified above, the impact assessment assesses the proposed transport policies for each objective from an equality perspective. Impacts on protected characteristic groups are identified as positive, negative or neutral.

The EQIA assessment summary is presented in Appendix H. **Error! Reference source not found.** below summarises the EqIA findings for each section of the Transport Strategy.

Table 7.10 EQIA Key Findings and Recommendations

Transport Strategy Section	Key Findings
Strategy Aims	The strategy aims to overcome some of the transport challenges experienced, while also delivering a fit for purpose, high quality, inclusive and sustainable transport network that will be able to accommodate future growth in the area. The strategy does not aim to restrict the movement of people, however it does advocate providing alternatives to travel where appropriate. Through its high-level approach and focus on inclusive growth, the Transport Strategy aim shows due regard to the needs of those with protected characteristics and those from deprived communities across all groups.
Decarbonisation to net zero	The decarbonization pathway sets out an overall aim of achieving net zero transport emissions by 2040. Goals one to four aim to achieve net zero emissions from the transport system in place at the earliest opportunity - focusing on supporting zero carbon growth, reducing demand for carbon intensive transport trips, shifting modes of transport and switching fuels. The strategy has been informed by a public survey to understand the needs of residents and visitors, putting people at the centre and promoting inclusivity. Consideration has been given to promotion of inclusive, safe and secure transport routes which provide sufficient space for prams and wheelchairs, and prioritize people walking and cycling over people driving, showing consideration to certain PCGs. Goals 3 and 4 could potentially have negative equality effects unless social groups who have more difficulty accessing active or passenger travel modes, or who may have more difficulty making accessing the EV market or making use of charging infrastructure, are catered for. Recommend that consideration is also given to inclusivity and accessibility of low carbon transport e.g. cost, availability and reliability of charging points. Specific consideration should be given to i) people with disabilities (including physical disabilities, intellectual disabilities, sensory disabilities and mental illnesses) ii) people with caring responsibilities who are more likely to be undertaking trip chaining journeys iii) groups who express greater levels of concern regarding personal safety when using active or passenger transport modes, including women, disabled people and black and ethnic minority (BAME) individuals and iv) shift workers and night workers.
Connecting growing towns and cities	The strategy calls for the need for a coordinated approach to deliver new infrastructure and services which encourages active travel, as well as measures to improve connectivity and traffic volumes in urbanized areas – showing consideration to all PCGs. The strategy also states the need to engage with stakeholders to understand how, why and when people are making journeys in different parts of the region, considering stakeholder needs. Further consideration could be given to accessible infrastructure and ensuring public transport infrastructure and facilities are made accessible for all users, including those with disabilities, people with caring responsibilities who are more likely to be undertaking trip chains, or groups who express greater concern for personal safety when using public transport or undertaking active travel (including ethnic minorities and women). Similarly, consideration could be given to how demand management measures will avoid disproportionate negative impacts on these groups. It is recommended that further consideration is also made to personal security along cycle routes, which would help increase safety perceptions for PCG's, particularly women.

Energising rural and coastal communities	The strategy recognises the importance of increasing access to key services and destinations in both rural and coastal communities – hence improving connectivity need of businesses and employees in key rural/coastal sectors. For example, efforts to better connect and improve thirteen ports (including two Freeports) and three international airports promotes sustainable economic growth and provides increased access to opportunities – resulting in universal benefits so long as the needs of PCGs are considered. Further consideration could be given to the impact of shifting modes of transport and measures to decarbonize rural trips on PCG's, as this may negatively impact those reliant on cars as a means for transportation. Further consideration could also be given to different needs of rural and coastal communities compared to urban communities, particularly for those with travel assistance needs such as people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities, and mental illness). This could include further engagement with community groups to explore how feelings of safety and accessibility can be cultivated within rural communities.
Unlocking international gateways	Whilst there is limited discussion of the impact of measures on the need of PCG's, the sustainable transport measures outlined in the strategy are a likely to benefit all PCG's as long as the needs of PCG's and those from lower income households are considered on a project by project basis. For example, increasing the use of alternative fuels, encouraging the shift to EV's and supporting net zero aviation, are likely to have positive health benefits on all PCG's due to improved air quality from decreased emissions. It is recommended that further commitment is made to improve accessibility of passenger rail services and transport connections for staff accessing ports and airport including the creation of airport surface access strategies for people with disabilities (including physical disabilities which limit mobility, intellectual disabilities, sensory disabilities and mental illness) at a project level.
Delivery Approach	The Transport Strategy delivery approach outlines that 'we have conscientiously considered the needs of people with protected characteristics under the Equality Act and those who suffer deprivation'. As such Transport East seeks to work with local experts, groups and organisations to understand the needs and experiences of users more fully and seek to make positive change as the strategy is delivered. Recommendations for taking this forward are included in the Sustainability Action Plan and Monitoring Strategy in Chapter 8.

Community Safety

Community Safety is considered as one of the ISA objectives and also considered further in the EqIA.

Overall the ISA identifies potential benefits for community safety with emphasis is placed on the role of safety and 'Eliminating Road Danger – the Vision Zero Approach' e.g., safe speeds, safe roads, safe vehicles and safe road users - benefiting all PCGs vulnerable to safety concerns, namely elderly populations, disabled persons and those from different ethnic groups.

The strategy recognises the need to engage with stakeholders to understand how, why and when people are making journeys in different parts of the region, considering the different circumstances of everyone. Further consideration could be given to the methods of engagement with PCGs and those from deprived communities.

Health Impact Assessment

Health and wellbeing is considered as one of the ISA objectives and is also considered further in the EqIA.

Overall the ISA identifies potential benefits for population health associated with active travel initiatives, reduced air pollution, potential for reduced traffic noise in towns and improvements to public realm and access to open spaces.

Habitats Regulations Assessment

Separate Habitats Regulations Assessments have been undertaken for the Transport Strategy and for the SIP.

The HRA undertaken on the Transport Strategy covers Stage One: Screening, and the whole strategy has been re-screened to reflect any changes that have occurred after public consultation. Further information on the legislative context and process can be found in the HRA.

No LSEs were identified for any aspects of the Transport Strategy (HRA Appendix B). There were no aspects of the Transport Strategy where LSEs were identified on any European site(s). To avoid double counting of effect, where projects are identified in both Strategy and SIP they were only assessed once, in the SIP HRA.

No Likely Significant Effects were identified from any aspect of the Transport East Transport Strategy. As such there is no requirement to undertake a Stage 2: Appropriate Assessment for the Transport Strategy.

Natural capital and ecosystem services assessment

The potential for impacts on natural capital and ecosystems services from the strategy are considered at a high level as part of the ISA objectives assessment. At this level there is not sufficient information to quantify potential losses or gain related to the strategy proposals. However, there is potential for natural capital loss from new development involving land take whether for construction or permanent development or involving encroachment on water bodies. These losses are considered further and recommendations are included in section 8 to undertake quantitative analysis including use of the Defra Biodiversity Metric 3.01 as a tool for comparing corridor options and identifying the potential requirement for delivering at least 10% biodiversity net gain. Recommendations include linking this requirement to providing wider environmental gain and using natural capital assessment as a tool through the proposed strategic connectivity studies and through decision making and options appraisal and design development process.

All development projects will need to apply the biodiversity mitigation hierarchy alongside the use of the biodiversity metric calculations, and prioritise avoiding and reducing impacts before considering compensation with on site and off site enhancements. In addition, losses of irreplaceable habitats cannot be included as part of net gain calculations. Consideration will need to be given to securing enhancements in the long term over at least 30 year periods. Providing biodiversity units to achieve net gain targets will need to be considered in option costings. The metric also does not replace requirements for designated sites, priority habitats and protected species.

Although biodiversity net gain will be required as part of planning consent for individual developments the Strategy and SIP provide an opportunity for developing a coordinated and coherent approach engaging with local stakeholders to ensure enhancements are meaningful and support regional and local biodiversity objectives. In particular opportunities could include contributing to landscape scale enhancements addressing habitat fragmentation and severance but might also include potential to improve wildlife value of verges and hedgerows along existing transport corridors or add to biodiversity in urban areas as part of urban sustainable transport schemes.

7.3 Cumulative effects

Table 7.11 sets out the intra-plan and inter-plan cumulative effects identified for the Transport Strategy against each ISA objective. In summary, key likely residual intra-plan and inter-plan cumulative effects are:

- Positive cumulative effects against the population, equalities and climate objectives resulting from support for reduced transport related carbon emissions and increased access and equity of access to economic opportunities
- Neutral/positive effects against the health, safety, air and noise objectives associated with support for reductions in transport related air pollutant and noise emissions, road collisions and increased

physical activity levels as a result of direct and indirect improvements to opportunities for active travel

- Mixed positive/negative effects against the biodiversity, water and natural capital objectives and neutral/negative effects against the landscape, heritage, soil/geology and material assets objectives. Potential positive effects against the biodiversity, water and natural capital objectives are associated with goals which support reductions in air pollutant emissions, and potential negative effects against the biodiversity, water, natural capital, landscape, heritage, soil/geology and material assets objectives would be associated with goals and measures requiring significant new infrastructure construction where there is potential for land take and severance.

Table 7.11 Intra-plan and inter-plan cumulative effects with Transport Strategy

ISA objective	Intra-plan cumulative effects	Inter-plan cumulative effects
Population	Cumulative positive effect – nine goals under the four strategic priority pathways assessed as having positive impacts associated with improved access to economic and social opportunities. ISA mitigation recommendations include consideration of how measures to support promote the use of alternatives to convention vehicles, such EVs, passenger transport and active travel, can ensure inclusivity for where for certain social groups including low income households, shift workers and night workers. With ISA mitigation in place, overall neutral/positive effect.	Cumulative positive effects associated with other plans and strategies which seek to improve access to economic and social opportunities in the TE region and within commutable distances of the TE region including: Transport Investment Strategy[11] Roads Investment Strategy: 2020-2025 (RIS2)[252] Bus Back Better: National Bus Strategy for England[22] Norfolk Local Transport Plan 4 Strategy 2021-2036[253], Suffolk Local Transport Plan 2011-2031 – Part 1 [254], Essex Local Transport Strategy: the Local Transport Plan for Essex[255], Southend-on-Sea Local Transport Plan 2012-2026[256], Thurrock Transport Strategy 2013-2026[257] New Anglia Local Enterprise Partnership (LEP) Economic Strategy for Norfolk and Suffolk[258], draft Local Industrial Strategy[259] and emerging Economic Recovery Renewal Plan[260]. South-East LEP Economic Recovery and Renewal Strategy[261] Regional transport strategies produced by neighbouring sub-national transport bodies (England's Economic Heartland transport strategy[262] and The Mayor's Transport Strategy 2018[263])
Equalities	Cumulative positive effect –ISA mitigation recommendations include consideration of how measures to support promote the use of alternatives to convention vehicles, passenger transport and active travel, can ensure inclusivity for groups who have move difficulty accessing passenger transport and active travel modes including people with disabilities (including physical disabilities, intellectual disabilities, sensory disabilities and mental illness, women and BAME individuals. With ISA mitigation in place, overall neutral/positive effect.	Positive cumulative effects associated with: improved access to transport for people with disabilities in combination with measures implemented under The Inclusive Transport Strategy: Achieving Equal Access for Disabled People[17] and with the regional transport strategies produced by neighbouring sub-national transport bodies (England's Economic Heartland transport strategy[264] and The Mayor's Transport Strategy 2018[265]) improved transport connectivity to rural and coastal areas, which will help support equality of access to economic opportunities in

ISA objective	Intra-plan cumulative effects	Inter-plan cumulative effects
		combination with Norfolk Local Transport Plan 4 Strategy 2021-2036[253] improved digital connectivity in rural and coastal areas, which will help support equality of access to economic opportunities in combination with Together for Norfolk[266], and the Economic Strategy for Norfolk and Suffolk[258]
Health	Cumulative neutral/positive effect – positive effects predominantly associated with reduced air pollutant emissions arising from support for modal shift towards sustainable transport modes and low or zero carbon fuels. An increase in physical activity levels which would be indirect impact of modal shift towards public transport and also direct impact of support for improvements to the RoW infrastructure.	Positive cumulative effects associated with reduced air pollutant emissions as described against the air objective below and with support for increased physical activity levels in conjunction with: Support for improvements to the Strategic Road Network (SRN) under RIS 2[252] Essex Joint Health and Wellbeing Strategy 2018-2022[267], Norfolk's Living Well: A public health strategy for Norfolk 2016-2020[268], Health and Wellbeing in Suffolk: Joint Health and Wellbeing Board Strategy Refresh 2019-2022[269] local (county) level walking and cycling plans strategies (potential for cumulative effects considered in further detail within the assessment for the SIP).
Safety	Cumulative neutral/positive effect – primarily associated with measures to reduce demand on the highway network or reduce congestion, and also with measures specifically targeting road safety improvements under connecting growing towns and cities pathway goal 3.	Positive cumulative effects in combination with other plans and strategies which aim to reduce road collisions and increase safety on public transport including: Support for increased road safety on the SRN under the RIS2[252] Draft Vision Zero Strategy Document[270] Measures to improve actual and perceived safety on the bus network under Bus Back Better: National Bus Strategy for England[22] Local transport plans as listed against the Population objective
Biodiversity Water Natural capital	Cumulative mixed positive/negative effect – goals including measures to promote modal shift from private transport to public transport and active travel, from road freight to rail freight or short sea shipping and promote the use of low or zero carbon fuels for private vehicle and HGVs, as well as within the rail sector and for air travel and air travel related goals. However, where new infrastructure construction is required and/or where modal shift towards short sea shipping is proposed under the connecting towns and cities pathway goal 6 unlocking	Overall cumulative effects would be mixed positive/negative. Positive cumulative effects associated with plans and strategies which seek to reduce transport related air pollutant emissions as set out against the Air ISA objective below. Potential negative cumulative effects with other plans and strategies which promote significant new infrastructure construction likely to necessitate land take or disturbance from terrestrial or aquatic habitats and/or from areas of flood plain: Transport Investment Strategy[11] Suffolk Rail Prospectus[271]

ISA objective	Intra-plan cumulative effects	Inter-plan cumulative effects
	international gateways goal 11, then negative impacts on the biodiversity, water environment and natural capital and ecosystems services objectives are anticipated associated with land take or disturbance to habitats and wildlife (including protected species).	Local transport plans as listed against the Safety ISA objective above Build Back Better: our plan for Growth[272], New Anglia LEP draft Local Industrial Strategy[259] and South-East LEP Economic Recovery and Renewal Strategy[260] National and county level waste and minerals plans and policy Regional water resource management plans Local plans Note: cumulative impacts between specific plans or projects will be assessed in relation to the interventions proposed in the SIP (see section **Error! Reference source not found.**).
Air	Cumulative neutral/positive effect – in the longer term strategy goals including measures to promote modal shift from private transport to public transport and active travel and from road freight to rail freight or short sea shipping and promote the use of low or zero carbon fuels for private vehicle and HGVs, as well as within the rail sector and for air travel and air travel related goals would all have a positive impact on these objectives. In the shorter term, goals promoting the construction of transport infrastructure to alleviate immediate issues of congestion or access are likely to have an initial negative impact against these objectives associated with induced demand and embodied carbon emissions, however over the lifetime of the strategy the net impact is anticipated to be positive. Goal 10 under the unlocking international gateways pathway is assessed as having potential for negative impacts on air quality and climate arising from support for road improvement projects that facilitate freight flows or which facilitate access to airports for private vehicles in particular. This may lead to induced demand and undermine other goals and measures which seek to support modal shift towards lower carbon alternatives.	Mixed positive/negative cumulative effects. Positive cumulative effects associated with: Plans and strategies which aim to reduce transport related carbon emissions as set out below against the climate objective. Clean Air Strategy 2019[15] Local air quality action plans Negative cumulative effects associated with embodied carbon emissions associated with new infrastructure construction under other national and regional level plans relating to other infrastructure sectors (e.g. energy, housing, water resource, communications, waste).
Climate		Positive cumulative impacts on climate mitigation associated with other plans and strategies which aim to reduce transport related carbon emissions at national level as well as within the TE region including: The Clean Growth Strategy[273] Decarbonising Transport: A Better, Greener Britain[274] Norfolk Climate Change Strategy[275] Suffolk Climate Emergency Plan[276] Net Zero: Making Essex Carbon Neutral[277] Regional level transport plans (England's Economic Heartland Transport Strategy: Connecting People, Transforming Journeys[264], Midland's Connect Strategy 2017[278], The Mayor's Transport Strategy 2018[265], Transport for the North Strategic Transport Plan[279], Transport Strategy for the South East[280] and the Western Gateway Strategic Transport Plan 2020-2025[281]

ISA objective	Intra-plan cumulative effects	Inter-plan cumulative effects
		Positive cumulative impacts on climate resilience of transport infrastructure in conjunction with: Norfolk's Transport Asset Management Plan 2020/21[282] Suffolk Climate Action Plan 2[283]
Noise/vibration	Cumulative neutral/positive effect - goals including measures to promote modal shift from private transport to public transport and active travel and from road freight to rail freight or short sea shipping and promote the use of low or zero carbon fuels for private vehicle and HGVs, as well as within the rail sector and for air travel and air travel related goals would all have a positive impact on this objective. Potential localised negative impacts have been identified for goal 2 under the decarbonisation pathway and goal 10 under the unlocking international gateways which are associated with changing traffic patterns resulting from construction of new highway or rail infrastructure and ro-ro freight hubs.	Cumulative positive effects on transport related noise and vibration emissions in conjunction with: Noise Policy Statement for England[284] Noise Action Plan: Roads[285] Noise Action Plan: Rail[286]
Landscape Heritage Soils/geology Material assets	Cumulative negative/neutral effect – effects on these objectives are largely assessed as neutral in the absence of ISA mitigation, except for goals where new infrastructure construction is required (which comprise five of the fourteen goals identified under the four strategic priority pathway) where effects are assessed as negative/neutral or uncertain due to the potential for new visual impacts, changes to landscape character and the setting of built heritage assets, land take from existing built or natural assets such as residential or commercial premises or productive agricultural land and disturbance of archaeological assets.	Potential negative cumulative effects with other plans and strategies which promote significant new infrastructure construction likely to necessitate land take or introduce new visual elements to landscapes and townscapes. Note: cumulative impacts between specific plans or projects will be assessed in relation to the interventions proposed in the SIP (see section **Error! Reference source not found.**).

Cumulative effects mitigation recommendations

In order to mitigate for the identified potential negative intra-plan and inter-plan cumulative effects against the physical environment ISA objectives (biodiversity, water, natural capital, landscape, heritage, soils and geology and material assets) cumulative effects described in **Error! Reference source not found.** it is proposed that Transport East would, in addition the mitigation already identified in **Error! Reference source not found.** through to **Error! Reference source not found.**, undertake the following actions:

- Facilitate delivery of biodiversity and wider environmental net gain within the region by engaging with Defra, Natural England and the designated authorities to inform the approach to natural capital assessment and delivery of Biodiversity and Environmental Net Gain approach which is

supportive of the Nature Recovery Network and local Nature Recovery Network Strategies and any local natural capital plans.
- Engage with the relevant Local Transport Authorities (LTAs) and Local Planning Authorities (LPAs) on an approach for considering landscape opportunities for the Transport Strategy linking with the biodiversity net gain delivery which can identify an integrated approach to the management of landscapes and townscapes and cultural heritage and linked to wider environment net gain providing for recreation and active travel.
- Liaise with Historic England to identify priority 'at risk' heritage assets within the Transport East region which have the potential to be affected by transport related development or are within proximity to SIP interventions to identify opportunities to provide support for their conservation or improving access or safeguarding.
- Work with the Department for Transport to monitor the following metrics which would inform future iterations of the Transport Strategy and SIP and enable corrective action to be undertaken where needed to avoid facilitating induced demand on the highway network.
- Number trips starting or ending at airports within the region which are undertaken by private vehicle
- Freight flows along key congested routes within the study area

In addition, the Sustainability Action Plan provided in **Error! Reference source not found.** includes m easures which will:

- Support the monitoring of carbon emissions associated with implementation of the Transport Strategy to monitor progress towards achievement of the long-term target of achieving net zero carbon from transport by 2040.
- Identify best practice measures, based on latest research and where appropriate targeted consultation, to support local transport authorities in ensuring equality of access is achieved for all interventions proposed within the SIP.

8 Sustainable Action and Monitoring Plans

The SEA Regulations require the monitoring of a plan or strategy, so that significant effects can be identified, and any action required is undertaken. Monitoring Plans provide a means to demonstrate the sustainability of the adopted strategy using sustainability objectives, targets and indicators. They also permit the early identification of emerging significant effects to enable corrective actions to be taken during strategy implementation.

Error! Reference source not found. sets out a Sustainability Action Plan for the Transport Strategy w hich includes strategic level actions which will support delivery of the Monitoring Plan. This includes actions to work with partners across areas such as reporting on natural capital/ecosystem services, biodiversity net gain provision and carbon emissions accounting and including developing templates or proformas for collecting data and information on scheme proposals on a consistent basis so this can support regional analysis and reporting in the future.

Error! Reference source not found. presents the ISA Monitoring Plan for the draft Transport East T ransport Strategy and SIP. This covers the specific ISA objectives and proposals for measuring performance against these. Where monitoring identifies targets included in the ISA monitoring plan or Transport Strategy and SIP monitoring and evaluation plan that have not or will not be achieved, future Transport Strategy goals and SIP interventions will need to incorporate appropriate revisions.

Table 8.1 Sustainability Action Plan

ISA objective	ID	Action	Target	Responsible party
General (applicable to all or multiple ISA objectives)	SSA-GEN-1	Integrate ISA Sustainability Action Plan and ISA Monitoring Plan with Transport Strategy and SIP Monitoring and Evaluation Plan	Facilitate coherent single set of monitoring targets and indicators, and single reporting schedule	TE
	SSA-GEN-2	Engage with partners to develop templates/proformas for monitoring reporting, including schedule of data inputs and associated timescales where data to be provided by third parties and including a template for individual scheme reporting to collect and update information as scheme proposals are developed. (see Table 8.2). Templates to be digital/online to facilitate updating and access and data analysis/mapping. – this could also facilitate future digital and interactive reporting.	Facilitate ISA monitoring and reporting and input to future SIP and Strategy updates	TE in partnership with local authorities
	SSA-GEN-3	Reporting on funding % across the strategic priorities and strategic partners	Balance of funding reflecting Strategy priorities and achieving sustainability objectives	TE and LTAs
	SSA-GEN-5	Given limited information available in public domain regarding sustainability of shipping fuels and opportunities to minimise air and water pollution and disturbance to aquatic wildlife - engage with	Identify appropriate targets	TE in partnership with relevant organisations

ISA objective	ID	Action	Target	Responsible party
		government and partners to identify approaches.		
Population and Equalities	SSA-EQ-1	Work with partners to bring together existing knowledge on accessibility needs across groups and identify where additional consultation is required and ensure that schemes are identified and designed with requirements taken into account The EqIA identified that further consideration could be given to the methods of engagement with PCGs and those from deprived communities	Support inclusive modal shift, access to alternative fuel transport and active travel participation	TE in partnership with local authorities
	SSA-EQ-2	Develop methodology for tracking strategy monitoring objectives (also included in ISA monitoring plan) regarding elimination of transport deserts and % of people with access to services	Support reporting on access and provide evidence baseline for future iterations of the Strategy and SIP	TE
	SSA-EQ-3	Lack of information regarding reasonable alternatives to home EV charging for private vehicles where this is not physically possibly (i.e. for around 1/3 of UK dwellings), which will limit shift from conventionally fuelled vehicles. TE to work with partners to develop thinking and coordinated response around this issue.	Support transition from conventional fuels	TE in partnership with local authorities
Biodiversity Natural Capital	SSA -B -1	Engage with responsible authorities (likely to be Local Authorities) during development of Local Nature Recovery Strategies (LNRS) to identify how interventions supported by Transport East can contribute towards net gain targets on strategic scale	Identify a coordinated approach and opportunities for delivering biodiversity and environmental net gain on a strategic scale and contribute to local and national targets	TE in partnership with local authorities
	SSA-B-2	Engage with partners and authorities to develop a coordinated reporting approach for Nature capital, Biodiversity and Environmental Net Gain for interventions proposed under the Transport Strategy and SIP including establishing a consistent baseline.		
Landscape Heritage Water	SSA-GEN-4	Engage with local authorities on principles for an integrated approach to the protection and management of landscapes and townscapes (including built heritage assets and	Support a coordinated approach to explore potentially synergies for addressing impacts and opportunities between,	TE in partnership with local authorities

ISA objective	ID	Action	Target	Responsible party
Soils/geology		historic landscapes), flood risk and habitat, development, maintenance and management. This would be an opportunity to consider links to biodiversity net gain, environmental gain, recreation and active travel in relation to the initiatives from the Transport Strategy and SIP	landscapes and townscapes, heritage assets, biodiversity, carbon sequestration, and flood risk over the TE region	
Climate	SSA-C-1	Develop common methodology across local authority partners for regular assessment of cumulative carbon emissions associated with interventions implemented under the Transport Strategy, building on baseline assessment in the ESC Phase 1 study. Include a review of lifecycle analysis covering vehicle manufacture carbon footprint differences between EV and conventional vehicles with recommendations on how this could be appropriately considered in future carbon analysis.	Monitor progress towards carbon net zero in 2040 through the 3-5 yearly updates to the SIP and Strategy	TE in partnership with local authorities
	SSA-C-2	Encourage scheme sponsors to require CEEQUAL assessment (or similar), with view to obtaining Very Good or Excellent rating – as a systematic way to include best practice sustainability approaches in design.	Planning consented Schemes supported by Transport Strategy and included in SIP to obtain CEEQUAL or Very Good or Excellent rating (or similar)	TE with partners

Biodiversity and nature recovery

In relation to SSAB -1 and -2, Figure 8.1 shows Natural England's habitat network areas for the region. These identify areas where there is potential to enhance or connect habitats. This is based on national level mapping information but can be used along with engagement with relevant local stakeholders including for example Natural England, the Broads Authority, local councils and wildlife Trusts, to identify additional regional and local opportunities and priorities. The Environment Act requires that Local Nature Recovery Strategies are to be developed in the future and these will be important sources of information on where enhancement actions should be targeted. Impacts on biodiversity and natural capital will need to be assessed further (along with other potential impacts) as part of the Connectivity studies for the six strategic corridors but also opportunities for contribution to valuable enhancement as part of a coherent approach working with other partners to provide meaningful and long term benefits.

In line with the 2021 Environmental Act aims, strategic approaches to meeting biodiversity net gain requirements should also consider potential for wider environmental gain including linking biodiversity enhancement with ecosystem service provision such as carbon sequestration, water retention

reducing flood risk and recreation amenity provision.

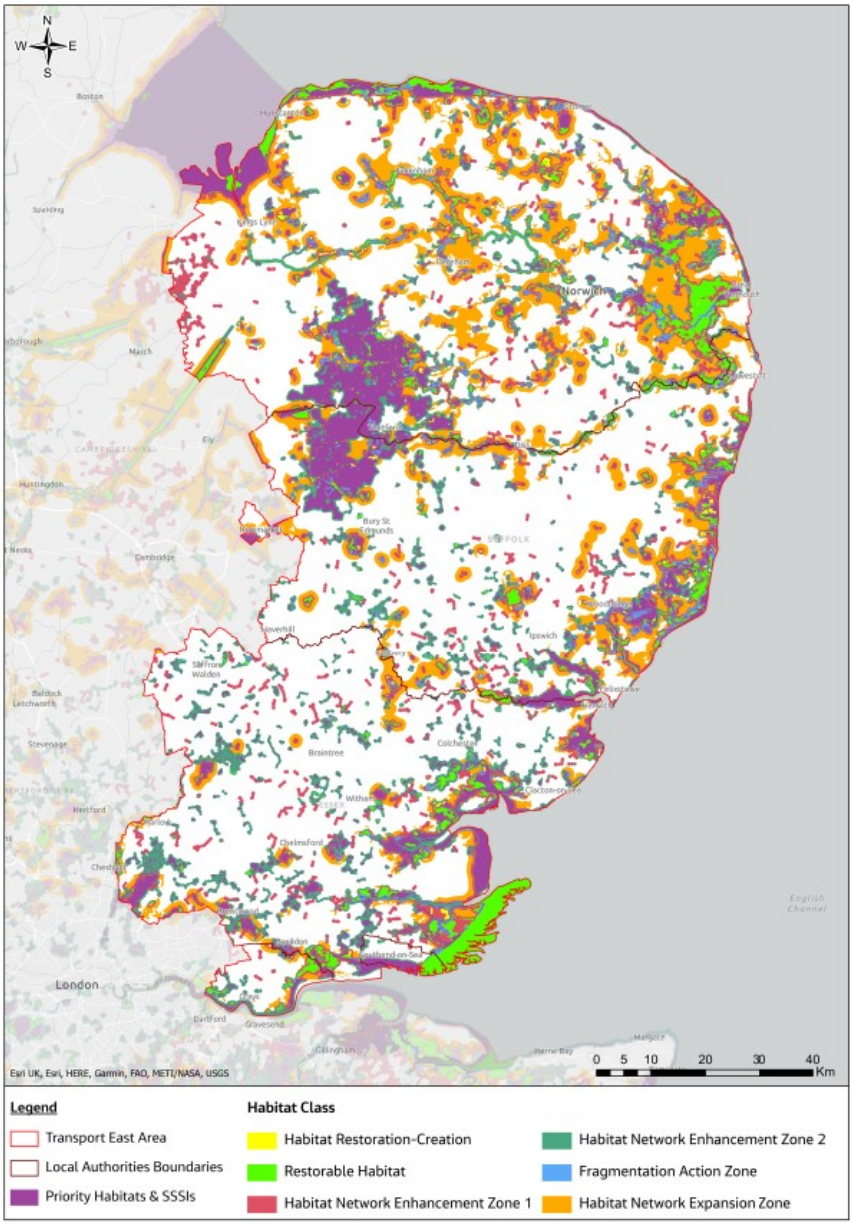

Figure 8.1 Habitat Network Map

Inclusion and Equality

The high-level nature of the Transport Strategy precludes the identification of specific impacts on some protected characteristic groups and instead the Strategy has an objective to deliver inclusive growth which addresses the needs of all transport users. The extent of impacts on particular groups may only come to the fore during Strategy implementation stage as detailed schemes and interventions start to emerge.

Table 8.2 Draft monitoring plan

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
People	P1	Reduction in percentage of areas classified as a 'transport desert'	Percentage of areas classified as transport desert	DfT data on access to public transport services for example - over 500m away from hourly bus or train service mapped using TRACC	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE	TE reporting through updates to SIP and Strategy and reporting in business plan on overall progress
	P2	Improved access to services, education, training and facilities in rural and coastal areas	Engage with partners to agree appropriate baseline and indicators	Sources of data to be agreed with partners – considering DfT data for journey times to services, education, health, employment (to be confirmed)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required))	To be agreed with TE partners	TE
Equalities	E1	Maintain or increase accessibility of public transport for people all Protected Characteristic Groups (PCGs)	Annual average number of public transport trips taken, and journey length of trips taken by public transport - identify a way to measure PCG trips	DfT National Transport Survey disability and accessibility statistics	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	To be agreed with TE partners	TE
	E2	Improve accessibility to public Transport in transport deserts	Bus service proximity and frequency in areas classed as transport deserts	DfT data on access to public transport services for example - over 500m away from hourly bus or train service mapped using TRACC	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
	E3	Accessible and affordable access to EVs for low income households and people with disabilities	New EV vehicle registrations as a proportion of new vehicle registrations by IMD income deprivation decile	DfT Vehicle Licensing Statistics Charging point location mapping	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required))	To be agreed with TE partners	TE
	E4	Increase proportion of active travel journeys undertaken by older and younger people, women and people with disabilities	Number/proportion of walking and cycling journeys undertaken by people aged under 16, over 65, women and people with a disability	DfT National Transport Survey disability and accessibility statistics DfT National Transport Survey: mode by age and gender statistics	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	To be agreed with TE partners	TE
Health	H1	Significant increased rates of active travel	Annual average number of trips undertaken by walking and cycling	DfT National Transport Survey: mode by region statistics Use of data sources like Strava Metro and travel surveys as supplementary evidence.	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	To be agreed with TE partners	TE
	H2		Percentage of adults walking for travel at least three days per week	Public Health England (PHE) physical activity webtool	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	To be agreed with TE partners	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
			Percentage of adults cycling for travel at least three days per week Percentage of children walking for travel at least 3 days per week Percentage of children cycling for travel at least 3 days per week				
Safety	S1	Reduction in transport crime	Crime incident rates: In rail stations or on trains In bus stations or on buses	British Transport Police rail crime dataset Bus crime statistics (source to be confirmed with police /bus operators) Incident records from rail and bus operators	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required))	British Transport Police Police Rail and bus operators	TE
	S2	Zero KSIs by 2050 – regional ambition	Number of KSI road traffic collisions	Department for Transport (DfT) road accidents and safety datasets	Annually/Dependent on Transport Strategy and SIP update schedule (TBC)	DfT	TE
	S3	Reduction in road traffic collisions and incident rates, including within vulnerable groups	Number and rate of road collisions causing personal injury Number and rate of road collisions involving vulnerable group	Department for Transport (DfT) road accidents and safety datasets Vulnerable groups to be agreed with each LTA	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required))	DfT and LTAs	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
Biodiversity	B1	Minimum 10% biodiversity net gain across all planning consent schemes supported by TE	Biodiversity net gain associated with TE supported schemes	Defra biodiversity metric 3.0 (or updated version) calculation output prepared as part of project level environmental assessment (see SSA-GEN 2) Also high level assessment of SIP with scheme GIS information	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local transport authorities NR and national Highways LPAs	TE
				Area of land/ total units to be created where offsite habitats are allocated/ funded or implemented to meet net gain obligations (See SSA- Bio 3)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE, assisted by local transport authorities/ LPAs	TE
	B2	No loss of irreplaceable habitat or loss of condition or area of protected sites	Area of loss or degradation of irreplaceable or protected sites recorded by type	Scheme GIS Information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local transport authorities National Highways (Scheme sponsors)	TE
	B3	Increase in active travel routes created using part of green infrastructure network such as new	Added length/area of green infrastructure network across the TE region	Engage with local authorities to establish baseline data and develop Scheme GIS Information and project information templates	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local authorities/ local transport authorities	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
		footpaths, cycle ways		completed by responsible authority/sponsor (see SSA-GEN 2) County level green infrastructure mapping			
	B4	Decrease in nitrogen deposition within European sites or SSSIs with sensitive habitats (Linked with air quality objectives)	No of schemes predicting improvement or reduction in levels of nitrogen deposition for sensitive sites based on qualitative assessment or air quality modelling for proposed schemes.	Scheme GIS Information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local transport authorities	TE
Water	W1	Decrease in number of WFD watercourses in TE area where 'Transport drainage' is a Reason for Not Achieving Good (RNAG)	WFD waterbody environment Agency RNAG datasets Engage with partners to identify data sources for regional analysis	Environment Agency (EA)	TBC Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Environment Agency	TE
	W2	No net increase in flood risk vulnerability to transport network or communities	Loss of floodplain from SIP schemes Change to strategic transport network considered vulnerable to flood events	Project information templates completed by responsible authority/sponsor (see SSA-GEN 2)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local transport authorities/local authorities	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
Air	A1	Reduction in concentrations of transport related air pollutants monitored by EHOs within the TE region	NO_x, $PM_{2.5}$, PM_{10}, SO_x and CO from Automatic Urban and Rural Network monitoring (AURN) and from EHOs	Defra UK Air Information Resource datasets and Local EHO data	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Defra	TE
	A2	Reduce to zero the number of AQMAs where transport is identified as the primary source of pollutant emissions	Number of AQMAs where transport emissions identified as primary source of pollutant emissions	Defra UK Air Information Resource datasets Local authority Air Quality Annual Status Reports	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local authorities	TE
	A3	Net improvement to air quality	Indicator to be agreed for example - number (approx.) of people benefiting from improved air quality vs affected by reduced air quality	Engage with partners to develop a methodology to capture impacts of transport related schemes Project level environmental assessments - scheme GIS information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local transport authorities NR National Highways	TE
Noise	N1	Reduction in population exposed to road and rail noise emissions	Population exposed to noise levels above SOAEL	Defra Noise Exposure data	Update schedule for Transport Strategy - 5 years and SIP- 2	Defra	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
				Project level information on noise impacts (see SSA-GEN 2)	years (or sooner if required)		
	N2	Reduction in number of road and rail NIAs	Number of NIAs within Transport East region	Defra strategic noise mapping	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Local authorities	TBC
Climate	C1	Reduce carbon emissions from transport to net zero by 2040	Predicted carbon emissions for the SIP implementation	Transport East's developing trajectory assessment which will inform methodology for monitoring - a carbon analysis toolkit is to be developed and this will include developing a carbon budget for the region	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required). Monitoring frequency to be determined following development of carbon toolkit.	TE	TE
	C2	Proportion of the transport network/fuels in the TE region to be powered offshore wind and renewables	Proportion of public EV chargers powered by renewable sources	Establish data sources for regional renewable energy level Establish methodology for estimating EV charging use	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE	TE
	C3	Modal shift of containerised freight from road to rail	Proportion of containerised freight transported by rail	Current & future number of containers on rail	Update schedule for Transport Strategy - 5 years and SIP- 2	TE	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
					years (or sooner if required)		
	C4	Increase patronage on public transport	Numbers using public transport by type	DfT data on public Transport use.	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE	TE
	C5	Reduction construction carbon including embodied carbon emissions associated with infrastructure construction for SIP interventions	Commitment to use PAS 2080 for infrastructure carbon management (or equivalent schemes) This does not cover vehicle lifecycle analysis	Scheme information on approach to be taken for carbon management - project information templates completed by responsible authority/sponsor (see SSA-GEN 2)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TE
Landscape	L1	No significant adverse effects on statutory and non-statutory landscape designations	Number of schemes within protected or valuable landscape areas	Indicators to be developed based on agreement with partners Scheme GIS information and project information templates completed by responsible authority/sponsor (see SSA-Gen 2 and SSA-Gen 4) Regional mapping of proposed schemes against baseline information	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TBC

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
Heritage	H1	No significant adverse effects on cultural heritage assets	Significant effects on designated and undesignated heritage assets	Indicator to be developed and agreed with partners Scheme GIS information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2 and SSA-Gen 4)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TE
Soils/geology	SG1	No loss of peat and wetland soils and high value agricultural land.	Area of best and most versatile (BMV) agricultural land lost Area of wetland soils lost	Scheme GIS information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2) Regional mapping of proposed schemes against baseline information.	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TE
Material assets	M1	Existing road, rail and active travel infrastructure reused or recycled	Commitment to apply waste hierarchy and to PAS 2080 for reducing infrastructure carbon	Project information templates completed by responsible authority/sponsor	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TE

ISA objective	ID	Target	Indicator	Source	Frequency of data analysis/reporting	Responsibility	
						Information collation	Reporting
				(see SSA-GEN 2)			
	M2	Use of brownfield land over greenfield land where	Land take from brownfield land and greenfield for interventions proposed the strategy (Indicator to be confirmed)	Scheme GIS information and project information templates completed by responsible authority/sponsor (see SSA-GEN 2) (Also Regional Mapping - from natural capital land use analysis)	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	TE and partners	TE
Natural capital	NC1	Environmental net gain	Natural Capital loss/gain compared to baseline information Ecosystem services loss/gain compared to baseline information	(see SSA-GEN 2 and B1 and 2) Analysis at regional level based on information on schemes and regional mapping. There are a range of methodologies[287] and tools available and being used so a consistent approach would need be agreed.	Update schedule for Transport Strategy - 5 years and SIP- 2 years (or sooner if required)	Develop approach with partners Local transport authorities/ Local planning authorities	TE

9 Next steps

9.1 Consultation and next steps

The ISA report has been updated following an 8 week consultation (ending 30th January 2022) and takes account of comments on the ISA report of the draft Strategy and SIP and also amendments made as part of finalising to the Strategy and SIP. The ISA has been split into two volumes: Transport Strategy ISA Volume 1 (this document) and the SIP ISA Volume 2 to support planned regular updates to the SIP.

An ISA Post Adoption Statement has been prepared to summarise how the ISA and consultation process has influenced the finalisation of the strategy and this statement. The Habitats Regulations Assessments covering screening and appropriate assessment stages for the both the Transport Strategy and the SIP as separate reports have also been updated. These reports are published with the final Transport East Transport Strategy and SIP.

The final Transport Strategy and SIP, ISA reports and HRA reports are all provided at the following link: www.transporteast.org.uk/strategy/transport-strategy/

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