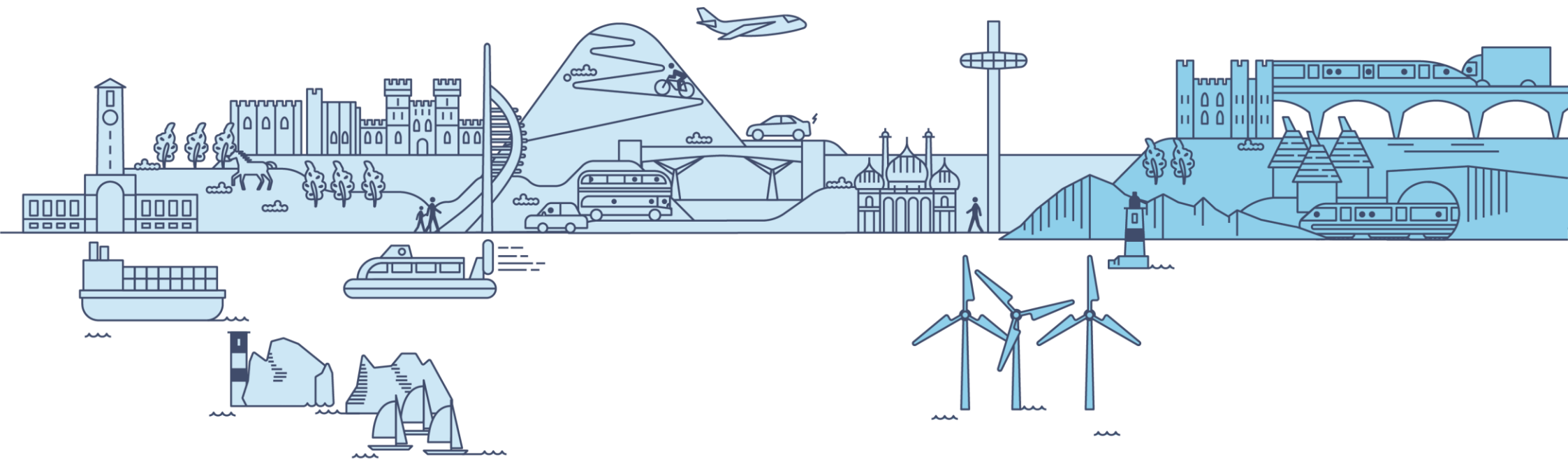


South East Radial Area Study Options Assessment Report

Version 1.1
March 2022

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Part 1

Introduction

Context

Transport for the South East (TfSE), in their role as the Sub National Transport Body for South East England, are delivering a programme of five Area Studies that will prioritise interventions that help deliver TfSE's vision for the South East. This is a key step towards developing a Strategic Investment Plan to secure funding for the South East's transport network.

Geographical Scope

The Area Studies focus on the key transport corridors that serve and connect the South East's Major Economic Hubs and international gateways. They also play an important national role in connecting the rest of the UK to some of the busiest ports in the country.

The areas are defined as follows:

- **Outer Orbital Area Study** – encompassing the strategic corridors that follow the coastline from the New Forest, in Hampshire, towards East Kent.
- **Inner Orbital Area Study** – encompassing the strategic cross-regional routes around the southern outskirts of London.
- **South East Radial Area Study** – encompassing the corridors that share the London-Gatwick corridor in the north and fan out in the south to connect much of the Sussex coastline to the capital.
- **South East Radial Area Study** – encompassing the transport corridors connecting the Channel Tunnel and Port of Dover to London, as well as serving Kent, Medway, and East Sussex.
- **South West Radial Area Study** – encompassing the strategic highways between London and the South West, as well as parts of the Great Western Railway and South Western Mainline. It also includes the strategically important cross-Solent links with the Isle of Wight.

Technical Scope

Each of the Area Studies investigate the issues, challenges and opportunities identified within TfSE's transport strategy in more detail. They also identify a shortlist of interventions to make life better for people, for businesses and, for the environment of the South East.

The outcome of these Area Studies will form the 'blueprint' for TfSE's Strategic Investment Plan. This will influence and help shape investment decisions by government and national bodies, such as Network Rail and National Highways, and local bodies, including Local Transport Authorities.

Process

This report provides a summary of the work undertaken in the third of the five stages underpinning the South East Radial Area Study (Stage C). **Figure 1.1** below shows the stages and steps that are being delivered for this study.

The South East Radial Area Study comprised five Stages, which in turn are formed of twelve steps.

The first stage, **Stage A (Mobilisation)**, was completed in Jun 2021. This stage helped define the leadership team, partners, Subject Matter Experts, methodology and a Delivery Plan for the technical programme.

This led onto **Stage B (Evidence Base)**, which undertook an in-depth review of the current and future issues and opportunities in the South East Radial Area. This covered a wide range of economic, social and environmental issues and opportunities.

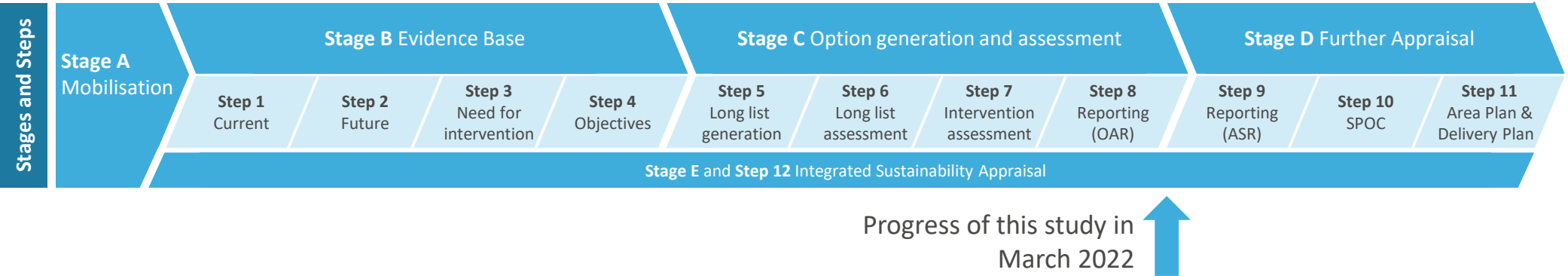
Stage B also identified corridor specific transport issues and defined the study’s Vision, Objectives, and Problem Statements.

At the time of writing, the Study has just completed **Stage C (Options Generation and Assessment)**, and this is the focus of this report.

Stage C will be followed by **Stage D (Further Appraisal)**, in which area and delivery plans for the identified options will be developed.

Stage E (Integrated Sustainability Appraisal), which runs concurrently with all stages, will seeks to ensure objectives, problem statements and interventions can be achieved through sustainable measures.

Figure 1.1: Overview of the South East Radial Area Study process



Structure of this Report

Purpose

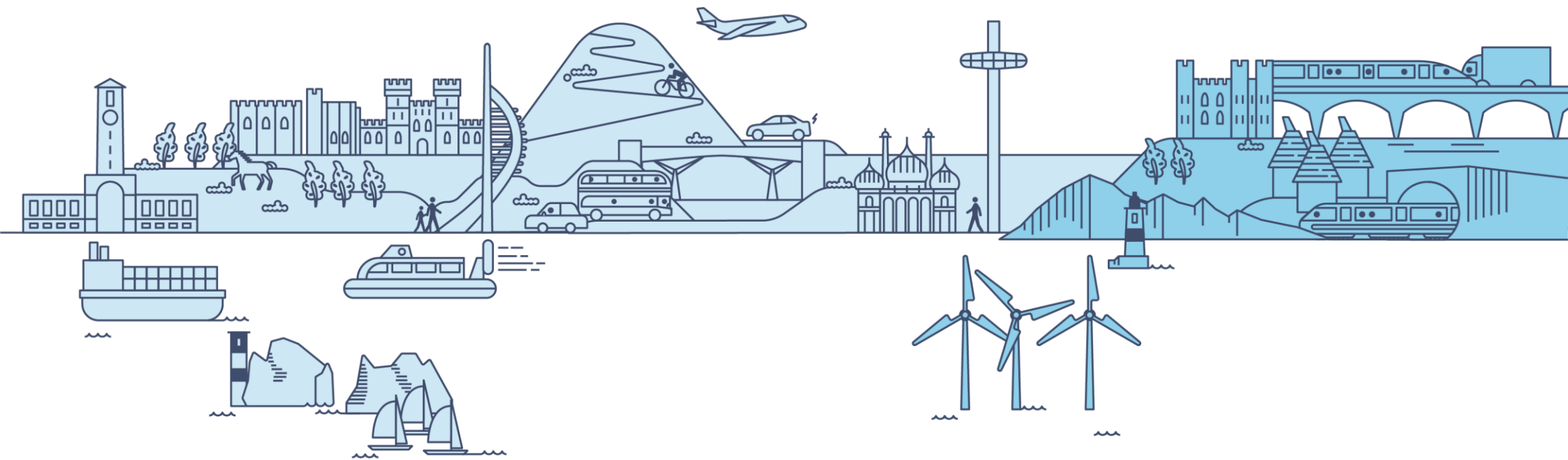
This report summarises the process the Project Team executed to:

- Develop a long list of interventions (and options within some interventions).
- Qualitatively assess each intervention against a set of strategic, economic, and delivery criteria.
- Use the qualitative assessment outlined above to develop coherent packages of interventions.
- Model these interventions using a land use transport model.
- Quantitatively assess the impact of these packages on transport and socioeconomic and environmental outcomes for the South Central Area.
- Understand trade offs and, working with key stakeholders, refine, justify, and agree a short list of packages to be taken forward for further appraisal in the next stage of this study.

Structure and Contents

The rest of this report is set out as follows:

- **Part 2** describes the background to this report and how it was developed
- **Part 3** describes the key issues and opportunities the South East Radial Area Study seeks to address. These are articulated as a vision and set of objectives the study should seek to achieve, as well as a set of Problem Statements the study should address.
- **Part 4** describes how the Project Team worked with TfSE and their stakeholders to develop a long list of interventions (and options within some interventions). It then describes how these interventions and options were assessed. In summary, each intervention was examined through three assessments. The first focussed on strategic and policy alignment, the second on economic impact (using DfT's EAST framework), and the third on deliverability.
- **Part 5** presents the results of the qualitative assessment described in Part 4. It then shows how the Project Team grouped the best performing interventions into coherent Packages for modelling.
- **Part 6** describes how the Project Team used a land use and transport model to model the transport and socioeconomic impacts of the Packages described in Part 5. This Part presents the results of this modelling exercise, comments on key findings, and discusses some of the trade offs highlighted by the modelling results.
- **Part 7** summarises the final short list of Packages to be taken forward for further appraisal in Part D and describes the next steps for this study. This will include a more detailed examination of the costs and benefits that could be generated by each Package.



Part 2

Background

The South East Radial Area

The South East Radial Area is England's Gateway to Mainland Europe, and Europe's Gateway to the British Isles. It is home to one of the largest counties in England (Kent) and one of the largest conurbations in the South East (Medway). It has hosted some of the key historical moments in the UK's past (the Battle of Hastings and Battle of Britain). It is well placed to leverage significant opportunities for growth and regeneration in the future.

Profile

The South East Radial Area is a diverse and dynamic part of South East England. Its transport network performs a key link between some of the UK's busiest international gateways and the rest of the country. It is home to some of the fastest growing communities in the UK, and some of its most historic towns.

However, there is a risk that some are being left behind as the area's transport network comes under increasing strain, and housing remains unaffordable in places.

Transport Networks

At first glance, the South East Radial Area is served by good transport networks.

The area is home to the UK's (currently) only High Speed Railway – HS1. It is also served by the South Eastern Main Line, Chatham Main Line, and several secondary and branch railways.

The area is served by two motorway corridors – the M2/A2 and M20/A20 – which both connect the Channel Ports to the M25. These two key corridors are joined together by several Strategic and Major roads. West Kent and East Sussex are also served by the A21 Strategic road.

The South East Radial Area is home to several International Gateways. These include the port of Dover, one of the world's busiest maritime passenger ports, the Channel Tunnel terminal at Folkestone, and several ports in North Kent and Medway.

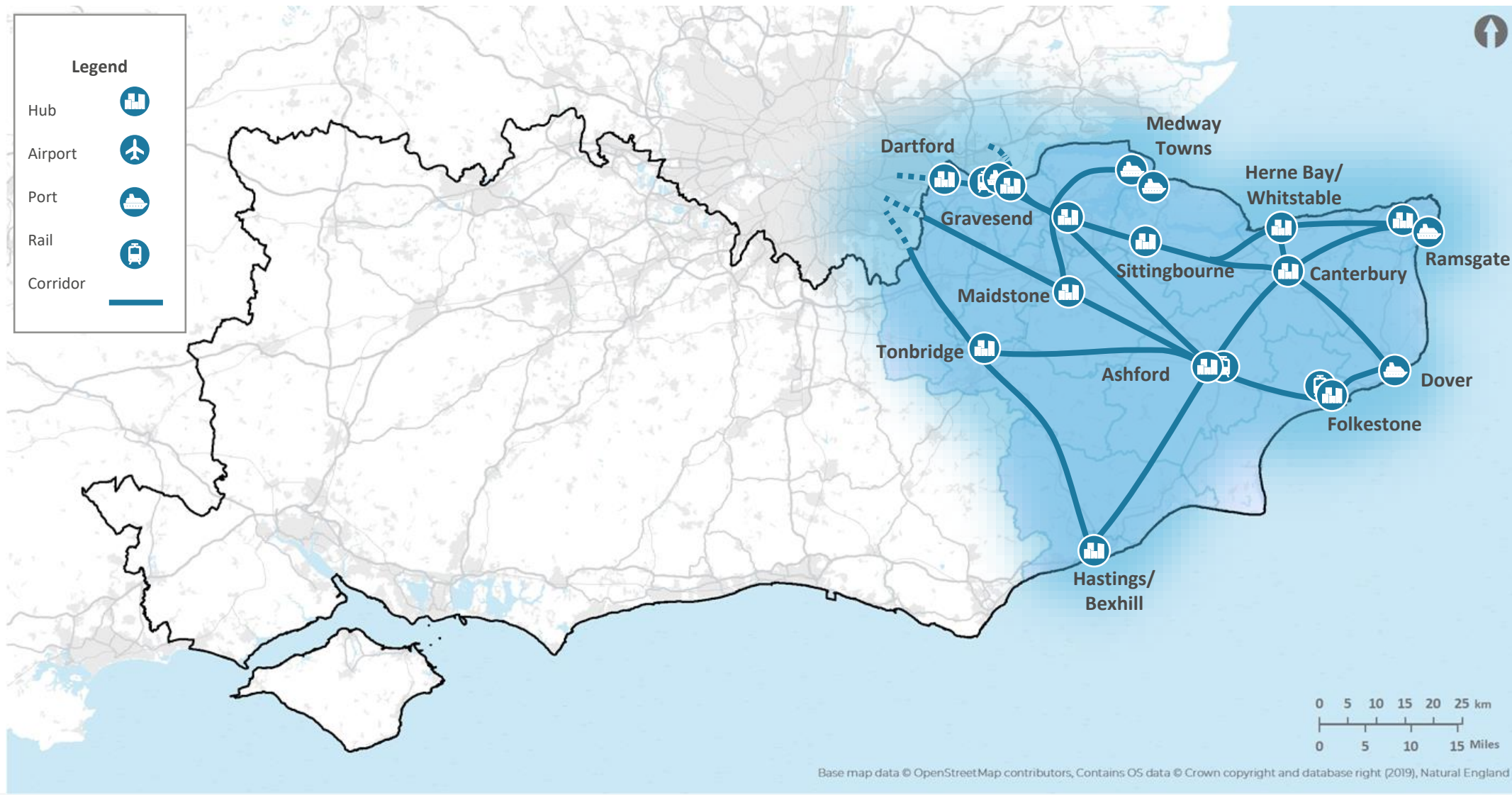
Key Challenges

While the South East area has many strengths, it also faces several challenges. These include:

- Low levels of economic and transport resilience the area is highly dependent on a relatively small number of industries, and is relatively dependent on two transport corridors;
- Pressure points the housing market is unaffordable to many and risks undermining the area's economic potential, while there are also pressure points at key bottlenecks on the transport system; and
- Spreading prosperity and connectivity communities that are “off the beaten track”, particularly on the coast, risk being left behind by the area's success.

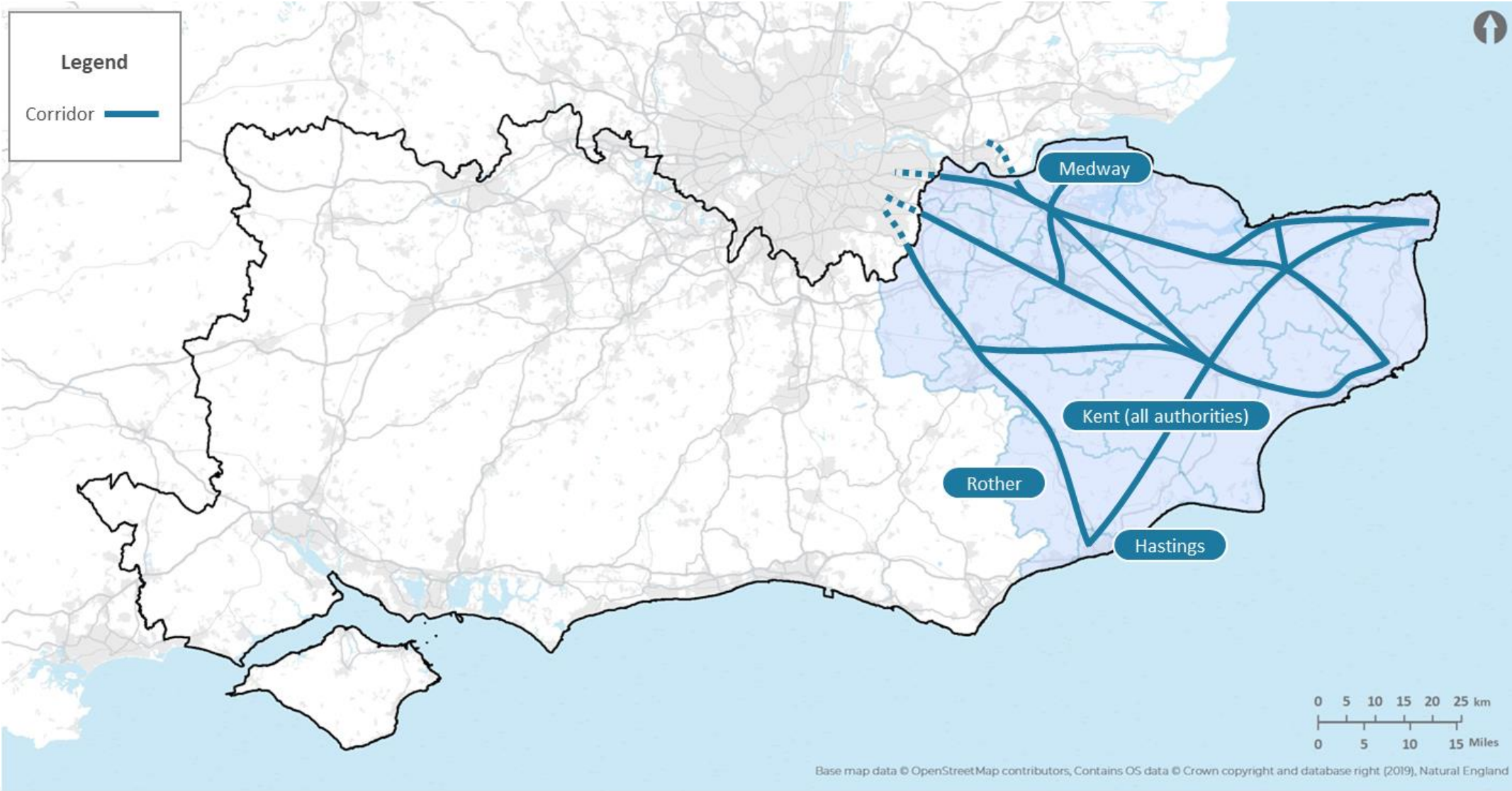
Major Economic Hubs and International Gateways

The South East Radial Area encompasses the strategic corridors between London, Hastings, and coastal Kent/Medway. The Major Economic Hubs include the largest settlements in this area, including the Medway Built Up Area (which is the third largest conurbation in the TfSE Area). The area includes some of the busiest international gateways in the UK – notably Dover and the Channel Tunnel.



Corridors and Local Planning Authorities

The South East Radial Area Study encompasses the strategic radial corridors between South London and the Kent and East Sussex coasts. The Local Transport Authorities in this area include East Sussex County Council, Kent County Council, and Medway Council. The Local Planning Authorities are Medway, all Districts and Boroughs in Kent, and Hastings and Rother in East Sussex.



Key Actors

Project Team

The South East Radial Area Study is led by a TfSE Project Management Office and is supported by a Technical Advisor Team.

The Technical Advisor Team is led by **Steer**, who led the development of the Evidence Base (Stage B of this project).

Steer is supported by:

- **Atkins**, who led the Options Stages of the project (Stage C); and
- **WSP**, who provide significant support to the Delivery (Stage D) and Integrated Sustainability Appraisal (Stage E) stages.

Most of the technical work and content delivered for Stage C was developed by Atkins and Steer. Atkins developed the Multi Criteria Assessment Framework (MCAF) that was used to qualitatively assess proposed interventions. Steer developed the transport and land use model that was used to quantitatively assess the Packages.

For the purposes of this report, TfSE's Project Management Office and the Steer/Atkins/WSP Technical Advisor Team are referred to as the 'Project Team'.

Stakeholders

On the mobilisation of this study, TfSE and the Technical Advisor team undertook a stakeholder mapping exercise for the South East Radial Area to categorise key organisations and individuals according to their interest and influence.

This exercise enabled TfSE to define four distinct tiers of stakeholder:

- **Tier 1 Stakeholders** have a direct interest and involvement in leading and supporting investment in the South East Radial Area Study. These stakeholders include Local Transport Authorities (County Councils and Unitary Authorities), National Highways, Network Rail, a representative from a Local Enterprise Partnership, and the South Downs National Park.
- **Tier 2 Stakeholders** potentially have a direct influence over the success of the Area Studies via their development process or contents of the studies. This group includes Local Planning Authorities (Districts and Boroughs) transport service providers, other statutory bodies (e.g. Homes England and Environmental/Heritage bodies), and special interest groups such as environmental groups.
- **Tier 3 Stakeholders** are those parties that may influence Tier 1 and 2 Stakeholders through their activities, including through the media/social media and public affairs. These include Town and Parish Councils, residents' groups, education and health providers, and representatives from youth councils.
- **Tier 4 Stakeholders** are any other stakeholders who have limited interest and/or influence in this work and will therefore not be directly engaged in the Area Study programme.

Stakeholder Engagement

Tier 1 Stakeholders

Most Tier 1 Stakeholders were invited to join the South East Radial Area Study Working Group and play a direct role in leading and shaping the study.

These stakeholders have helped TfSE develop the Vision, Objectives, and Problem Statements for the study.

These stakeholders provided significant input into the development of the long list of interventions that were assessed using the MCAF and have moderated the initial results from the MCAF long list assessment.

They also supported the strategic assessment of each intervention and advised on the extent to which each long listed intervention aligns with their organisation's priorities.

Tier 2 Stakeholders

Further (remaining) Tier 1 Stakeholders and all Tier 2 Stakeholders were invited to join the South East Radial Area Forum.

At the time of writing, this Forum had met twice and plans to meet one further time.

The first workshop focussed on identifying stakeholder aspirations for the studies and understanding their perceptions of the strengths, weaknesses, opportunities, and challenges of the area.

The second workshop focussed on validating/amending the Vision, Objectives, and Problem statements developed by the Area Study Working Group. It also provided these stakeholders with an opportunity to contribute to the long list of interventions.

A third workshop, which is expected to focus on validating packages and delivery, will be held in Stage D of the project.

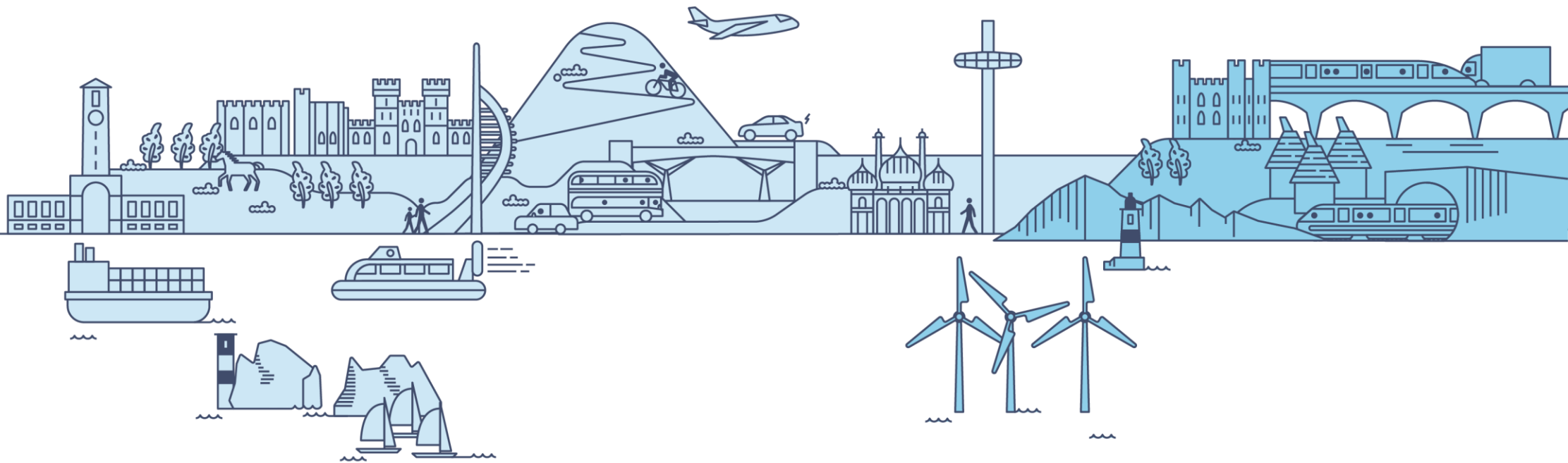
Other Stakeholders

Members of Parliament (MPs) have been further engaged through a bespoke process led by TfSE.

This process engaged MPs on a wider portfolio of topics, including the Area Studies. Any insights drawn from these discussions (e.g., whether an MP supports or does not support a particular intervention) was incorporated into the policy alignment scores.

Tier 3 and Tier 4 stakeholders were not directly engaged in this part of the study.

Any organisation that subscribes to TfSE's newsletter has received regular updates about the progress of each study. These stakeholders will also have an opportunity to engage with TfSE when the Draft Strategic Investment Plan is published for consultation.



Part 3

Vision, Objectives and Problem Statements

Background

Evidence Base

In the previous stage of this study (Stage B), the Project Team and Area Study Working Group developed a comprehensive Evidence Base for the South East Radial Area.

This included a presentation and analysis of the socioeconomic context of the South East Radial Area, its environment, and its transport networks.

It also explored projections for housing, population, and employment growth, and considered the implications for this growth on future demand for transport.

During this Stage, the Project Team worked closely with the Area Study Working Group and other stakeholders to understand the strengths, weaknesses, opportunities, and challenges facing the South Central Area.

The insights drawn from this exercise and the Evidence Base was used to create a shared **Vision and Objectives** for the South Central Area, which articulate the outcomes key stakeholders wish to see realised by 2050.

This exercise also helped the Project Team develop a set of **Problem Statements** for the South East Radial Area. These describe the challenges the area faces today that key stakeholders wish to see addressed.

The Vision and Objectives are important to this study as they formed the criteria against which all long listed interventions were qualitatively assessed in the Strategic Sift. Further detail about this process is provided in **Part 3** of this report.

The Problem Statements are also revisited in **Part 6**, where they are mapped to Packages to provide assurance they are being adequately addressed by this study.

The Vision and Objectives for the South East Radial Area Study are presented on **page 25 to 27**. This is followed by a summary of the Problem Statements on **page 28**.

A full list of the Problem Statements is provided in **Appendix A**.

Challenges and Opportunities

The following 6 pages describes the key current and future challenges highlighted in the Evidence Base.

This includes the following challenges:

- current carbon emissions and trajectories;
- the UK's exit from the EU Single Market and Customs Union;
- relatively high unemployment;
- relatively low earnings;
- variations in rail connectivity; and
- decline in bus use.

This also includes the following opportunities:

- the Thames Gateway initiative;
- the planned London Resort; and
- domestic tourism.

Challenges (1 of 7)

Current Carbon Emissions

In 2018, the South East Radial Area’s transport network emitted less carbon per capita than the South East overall. 3,746kTCO₂ were emitted by transport in 2018 in the South East Radial Area, making up 45% of total carbon emissions. This is in line with other sub-regions in the South East. **Figure 3.1** provides a breakdown of transport carbon emissions per capita for each area of the South East.

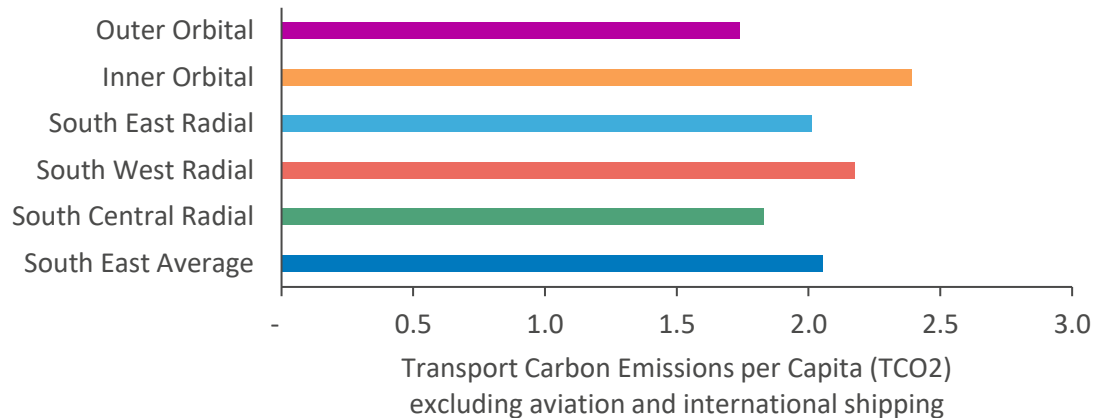
35% of transport emissions are classed as minor road carbon emissions. This is higher than the South East average (28%), indicating lower coverage of major roads across the corridor, and different levels of transport demand along these roads.

Current Carbon Trajectory

As **Figure 3.2** shows, reaching a net zero carbon transport network by 2050 (yet alone 2030) will be very challenging. Carbon emissions from transport in the South East are declining, but not at a rate fast enough to reach net zero by 2050 or 2030.

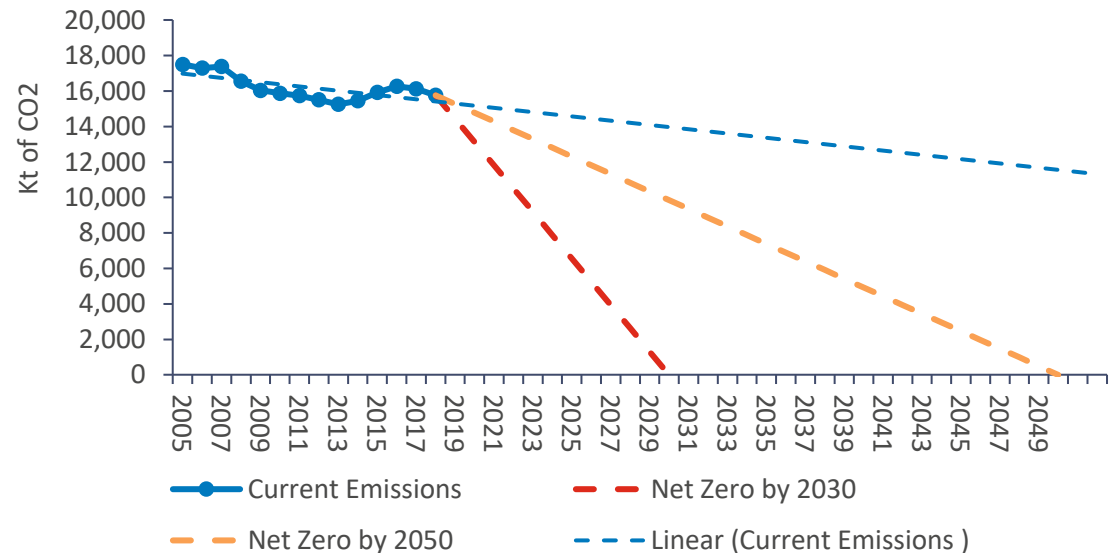
At the time of writing in March 2021, 17 of the 20 local authorities (upper and lower tier) in the South East Radial Area have declared Climate Emergencies and set targets to reach net-zero carbon emissions by 2050 (in some cases, much earlier).

Figure 3.1: Transport Carbon Emissions South East Area



Source: BEIS (2018)

Figure 3.2: Carbon Emissions Trajectory for the South East Area



Source: BEIS/DEFRA (2019)

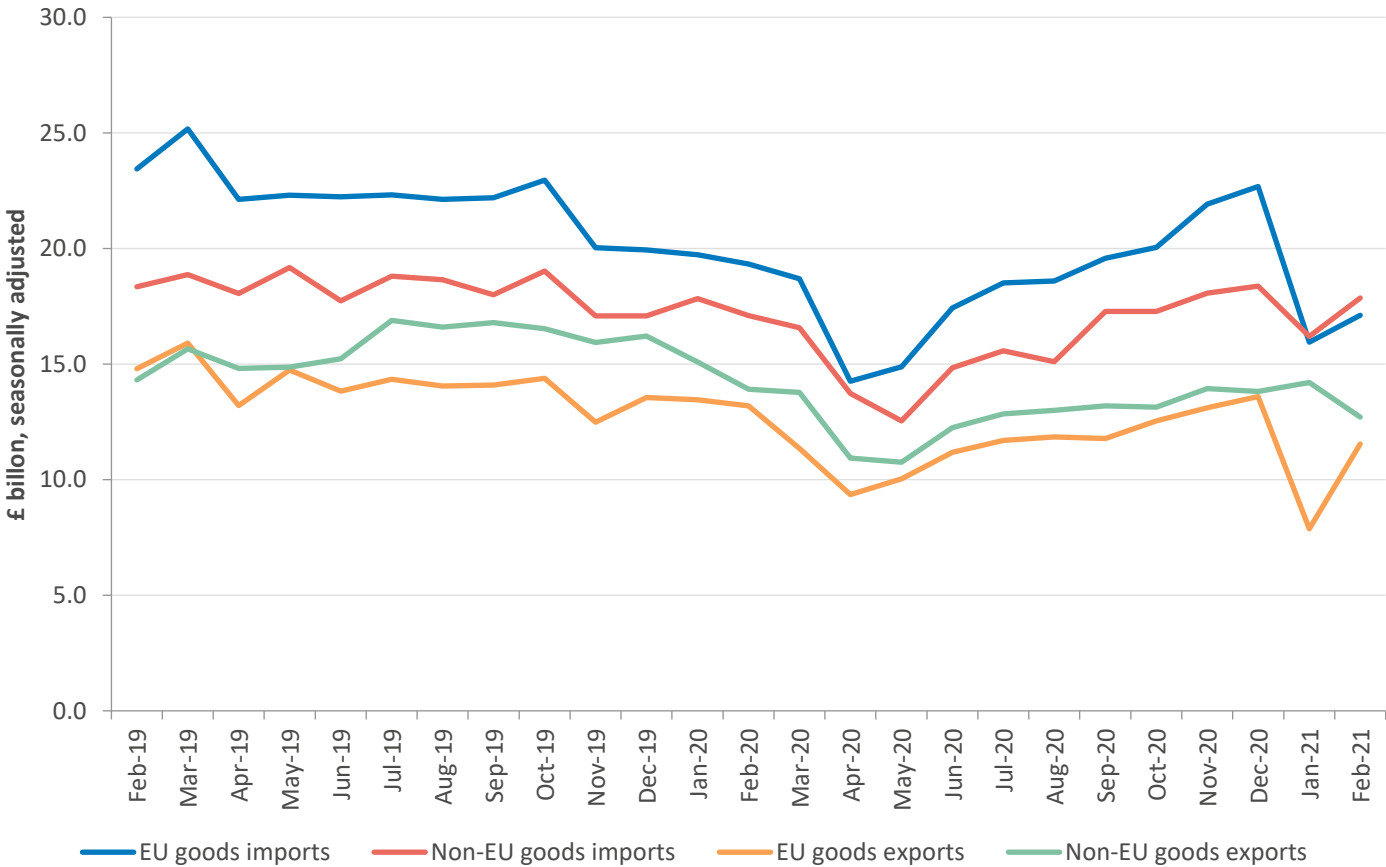
Challenges (2 of 7)

UK / EU Relationship

As the major international gateway for freight traffic to/from Europe, the strategic road and rail network in the South East Radial Area will be greatly impacted by the new UK/EU trade agreement.

It is too early to objectively assess the full impact of the new EU-UK Trade and Co-operation Agreement. The latest trade data (**Figure 3.3**) shows significant changes, but some of this may also be due to the COVID-19 pandemic. As seen in Figure 3.2, trade between September 2019 and September 2020 is down 12% and 16% for EU goods imports and exports, and down 4% and 21% for the equivalent non-EU trade flows. The figure also shows a significant dip from April 2020 compared to the relative stability of 2019, with gradual recovery towards the end of 2020. The Kent Access Permit scheme was put in place to reduce congestion at the port of Dover after the Brexit Transition Period ended on 1st January 2021. As of late April 2021, HGVs are no longer required to obtain a Kent Access Permit.

Figure 3.3: EU and non-EU imports and exports, 2019-21



While it is hard to say with certainty what might happen with EU-UK trade in the future, we can confidently say that the transport network serving the Channel Ports were already under pressure prior to January 2021 and needed regular interventions to manage disruption from non-Brexit related events.

With high levels of future housing growth forecast for the area, the added pressure of Brexit makes it all the more critical that more capacity, and better resilience, are planned for this part of the transportation network.

Challenges (3 of 7)

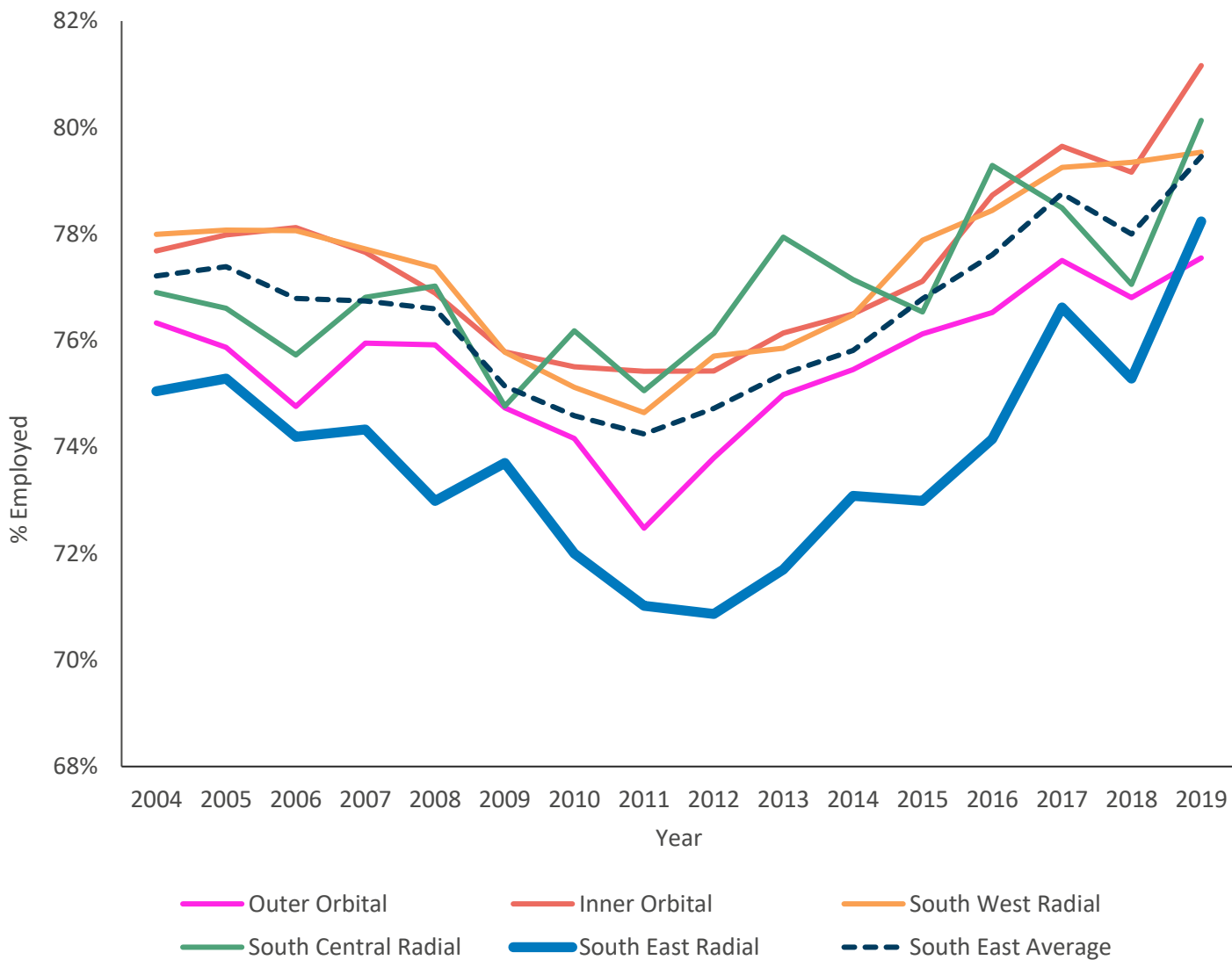
Employment

In 2019, 78% of the eligible workforce in the South East Radial Area was in employment. This is now in line with the South East (79%) and above the national average (76%).

Figure 3.4 shows employment trends for each of the five areas. In 2017, 758,319 jobs were available in the South East Radial Area, 23% of all jobs in the wider South East. Historically, the employment rate in the South East Radial Area has been lower than the rest of the South East. Despite this, the area has closed the gap in recent years and is now in line with other areas in the South East.

In 2019, 89% of the eligible workforce was employed in Dartford. In contrast, areas along the coast such as Thanet and Swale only have 74% of those eligible in employment. Dartford has also experienced the largest increase in the number of persons employed in the past decade, with this rising by 32%, twice as high as the increase in overall population. Maidstone and Medway have also experienced a 23% increase in the number of persons employed in the same period.

Figure 3.4: Percentage of the eligible working population employed in the South East



Source: NOMIS Official Labour Market Statistics, Employed Workforce (2019)

Challenges (4 of 7)

Earnings

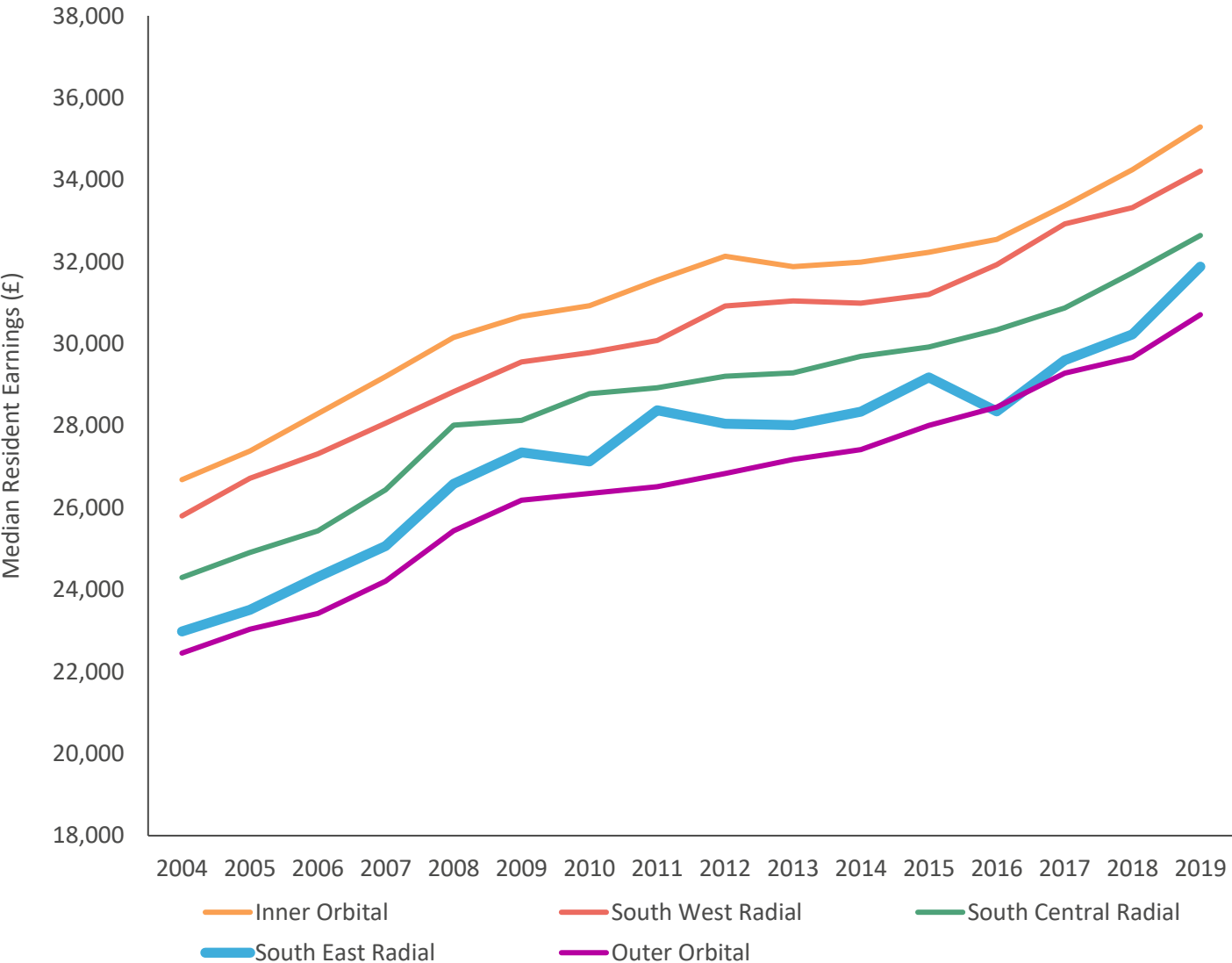
In 2019, the average resident in the South East Radial Area earned £31,879.

This is lower than the South East average, where the typical resident earns £33,110, however is still above the UK average.

Figure 3.5 shows the average earnings for residents from 2004 to 2019. Earnings growth in the South East Radial Area grew in line with the other areas in the South East Region. However, there are significant variations in earnings and earnings growth between the local authorities in the South East Radial Area.

The Sevenoaks, Tonbridge, Tunbridge Wells corridor is home to the highest earners in this area, with the average resident earning in excess of £36,000. In contrast, this area is also home to some of the lowest earners in the South East, with the average resident in Thanet earning under £26,000 and in Hastings earning under £25,000.

Figure 3.5: Average resident earnings over time in the South East Region



Source: NOMIS Official Labour Market Statistics, Resident Earnings (2019)

Challenges (5 of 7)

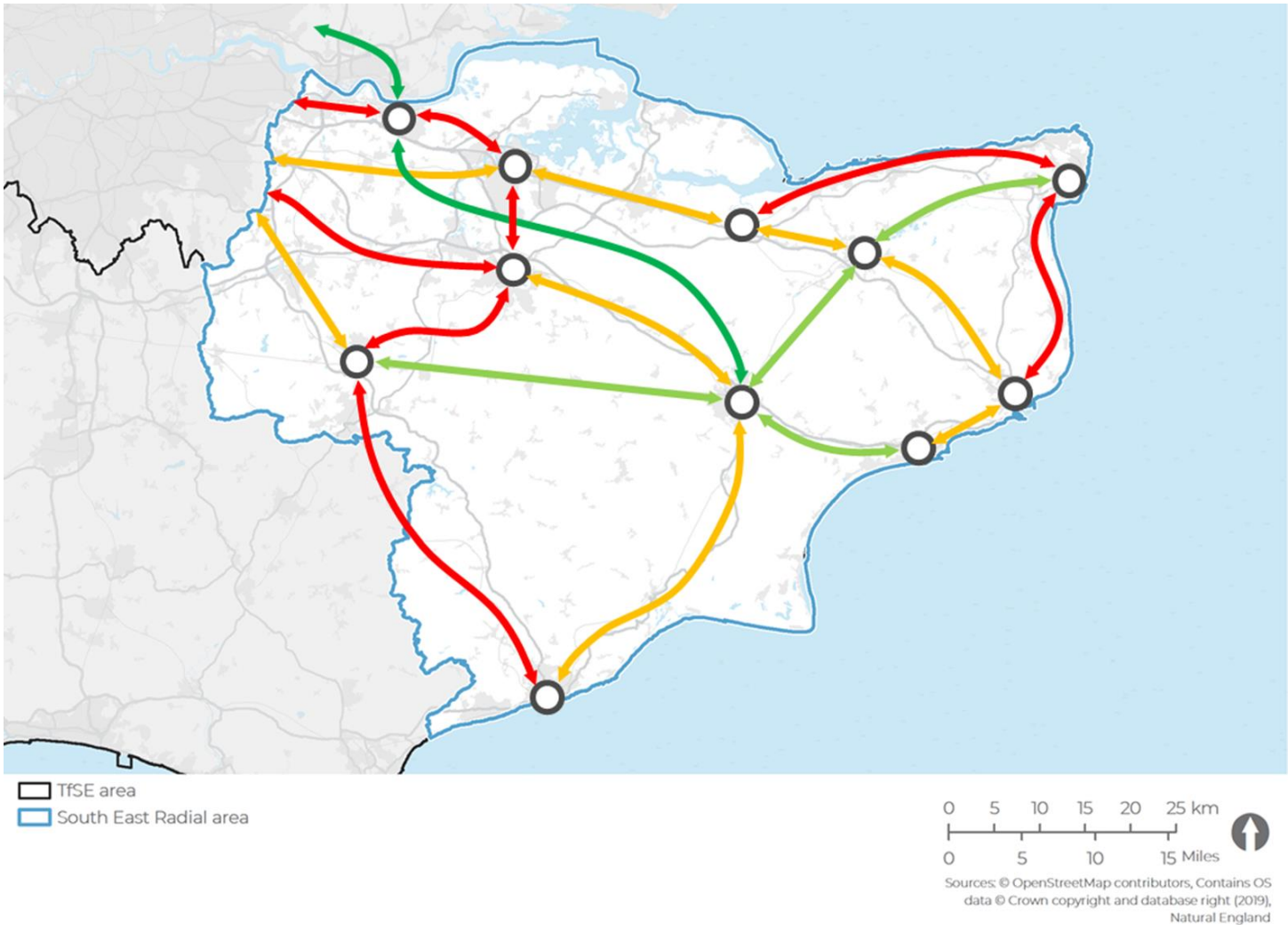
Rail Connectivity

The level of service provided on High Speed 1 is excellent, however, connectivity is poorer on several other railways in the area.

The average speed of passenger rail services on most of the “Classic” rail network in the South East is relatively slow, especially in North East Kent, East Sussex, and along the Medway Valley. In contrast, Ashford, Folkestone, and Canterbury are served by much faster passenger rail services.

Figure 3.6 presents the average speed of rail journeys along rail corridors in the South East Radial Area and highlights the disparity in connectivity between High Speed 1 and railways serving North Kent. This disparity means some coastal communities need to “work harder” to secure investment and prosperity.

Figure 3.6: Rail connectivity in the South Central Radial Area



Source: ONS House Price Existing Dwellings to Residence Based Earnings Ratio (2019)

Challenges (6 of 7)

Bus Patronage

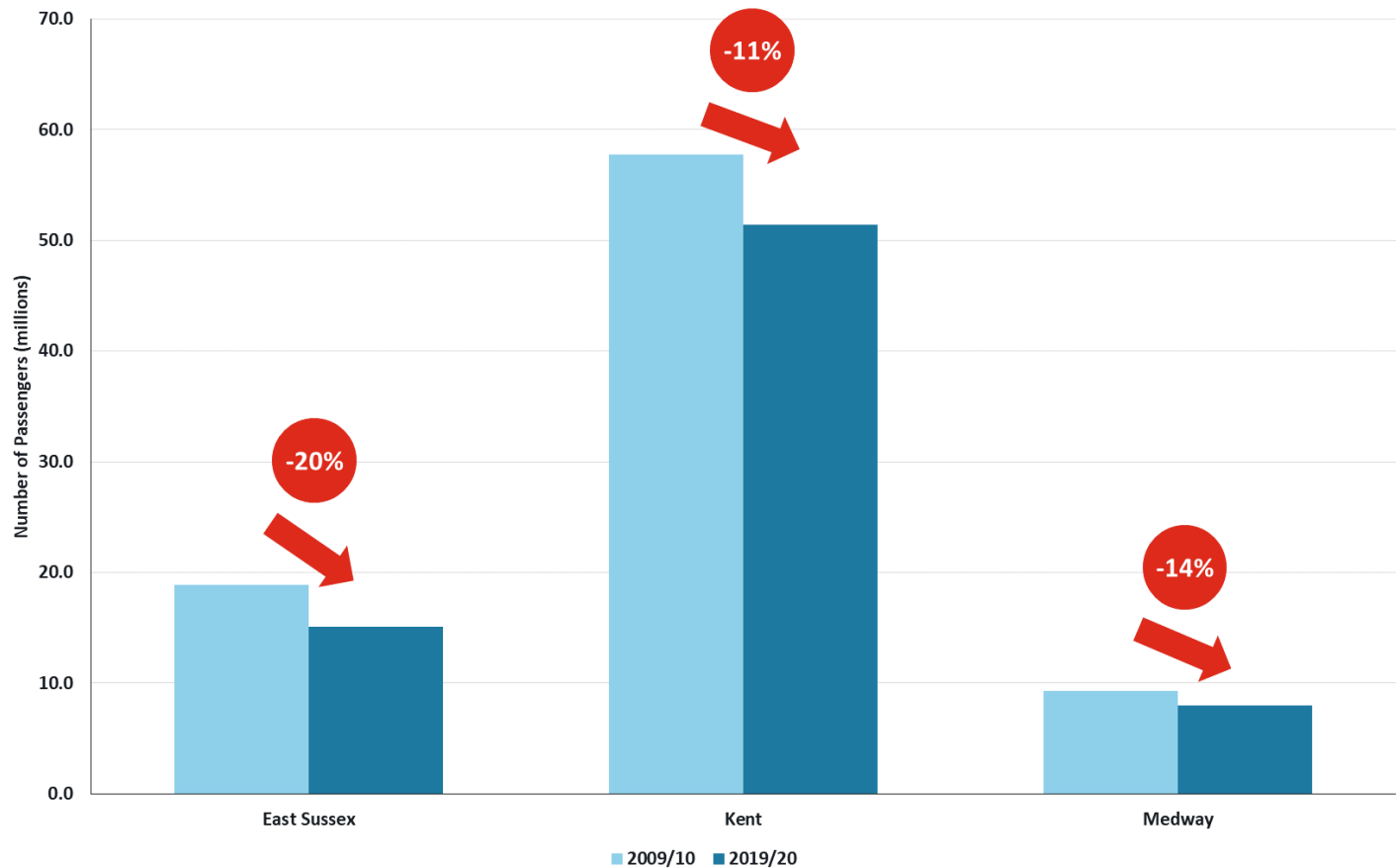
Bus use in the South East Radial Area has fallen in recent years – in some parts by a significant margin.

Figure 3.7 shows that bus use has declined in all three Local Transport Authorities in the area – particularly in East Sussex.

The drivers behind this decline are complex and are likely to be related to declining financial support, higher congestion, and competition from other modes of transport (including rail, which has grown over the same period)

A declining bus service makes it harder to make the case for investing in one of the more sustainable modes of transport.

Figure 3.7: Rail connectivity in the South Central Radial Area



Source: ONS House Price Existing Dwellings to Residence Based Earnings Ratio (2019)

Challenges (7 of 7)

Housing and Employment Growth

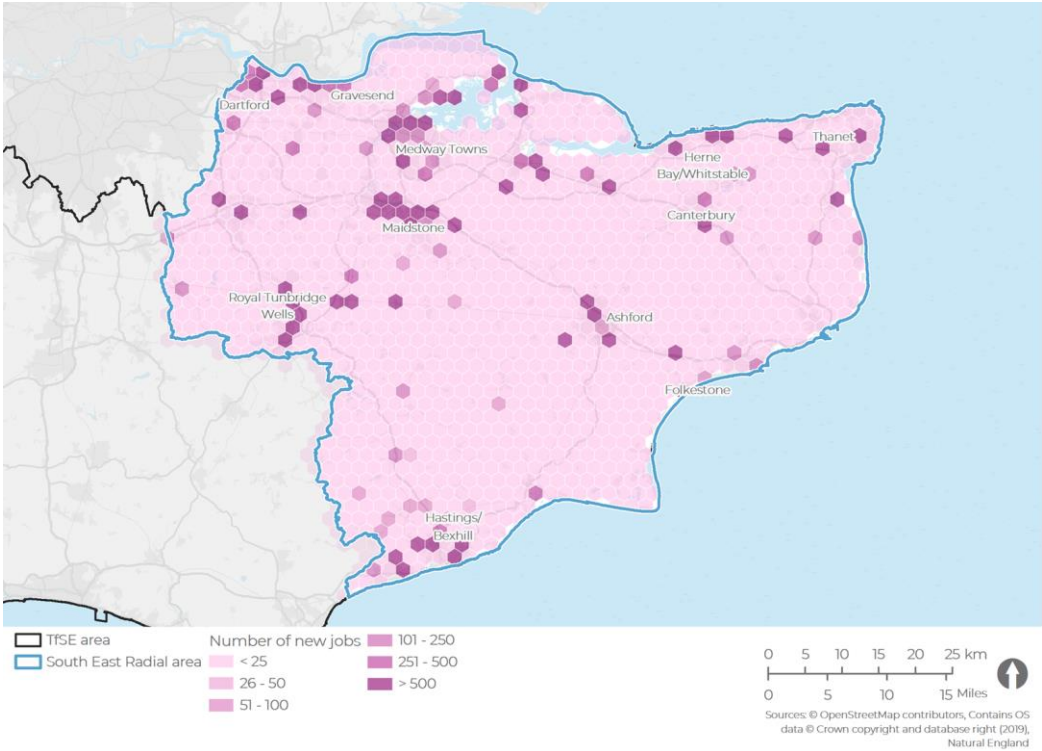
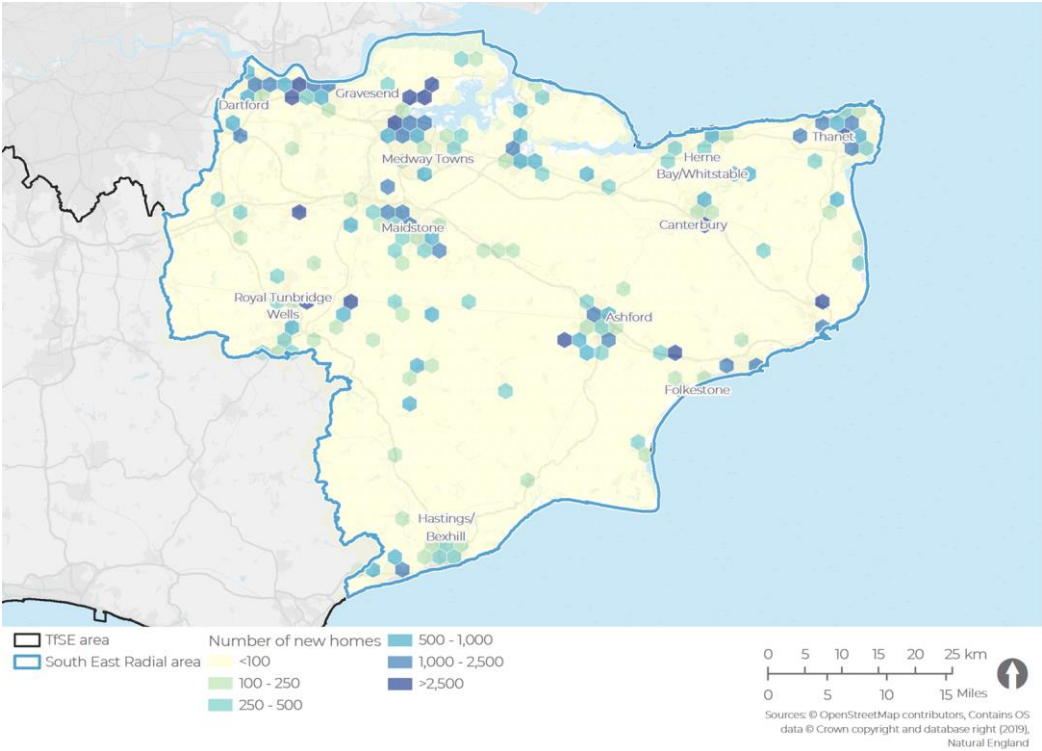
There is a risk that future development patterns will generate significant imbalance in housing and employment growth in the South East Radial Area.

Figure 3.8 below shows the housing and employment growth planned for this area.

The area is expected to accommodate significant housing growth, particularly in North West Kent, Ashford, Thanet, and the Hastings area. The pattern of development and the apparent imbalance of housing growth versus job growth (the latter is expected to be more concentrated in Mid and North Kent).

This is likely to drive higher demand for highway capacity. This in turn is expected to place pressure on parts of the highway network that already experience regular congestion. There is a risk that many of the congestion, safety, and air quality issues highlighted in the previous page could worsen if not action is not taken to mitigate these impacts.

Figure 3.8: Housing allocations and employment growth forecasts in the South Central Radial Area



Opportunities (1 of 2)

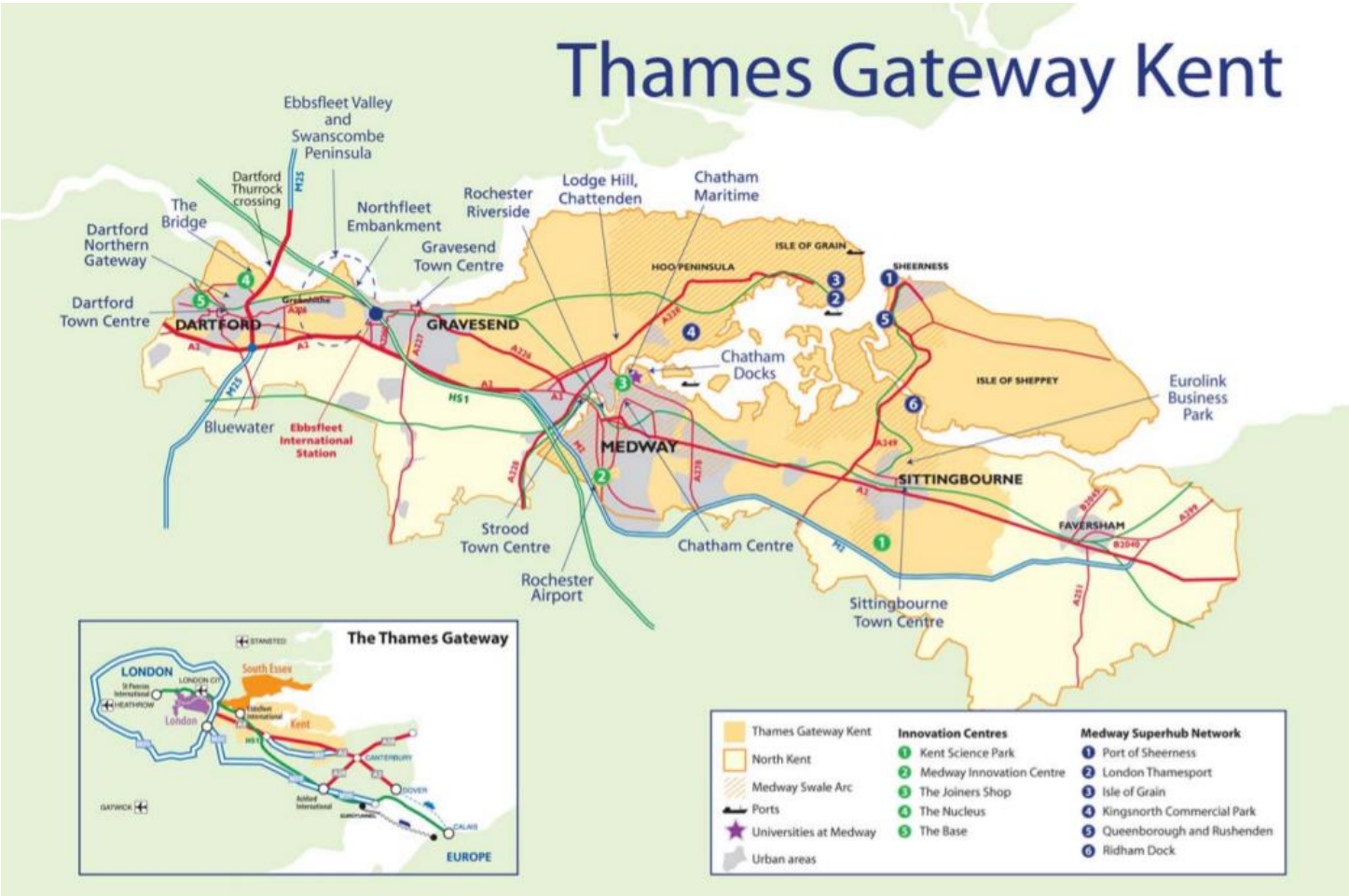
Thames Gateway

The South East Radial Area includes the part of the Thames Gateway and has been identified as an ideal location for high growth, investment, and regeneration.

The Kent Thames Gateway Partnership – which includes authorities representing the areas shown in **Figure 3.9** – has identified several locations in North Kent that can accommodate high growth in employment and housing. This investment will need to be supported by sustainable, multi-modal transport infrastructure.

The Thames Gateway programme has helped to deliver significant investment in infrastructure in the wider Thames Gateway area to date. Looking further ahead, the Kent Thames Gateway Partnership is supportive of extending Crossrail to North Kent and delivering the Lower Thames Crossing.

Figure 3.9: Thames Gateway growth opportunities



Source: Thames Gateway Kent Partnership
<http://www.tgkp.org/content/documents/TGKP%20Growth%20Plan%20May%20202014%20Final.pdf>

Opportunities (2 of 2)

Tourism

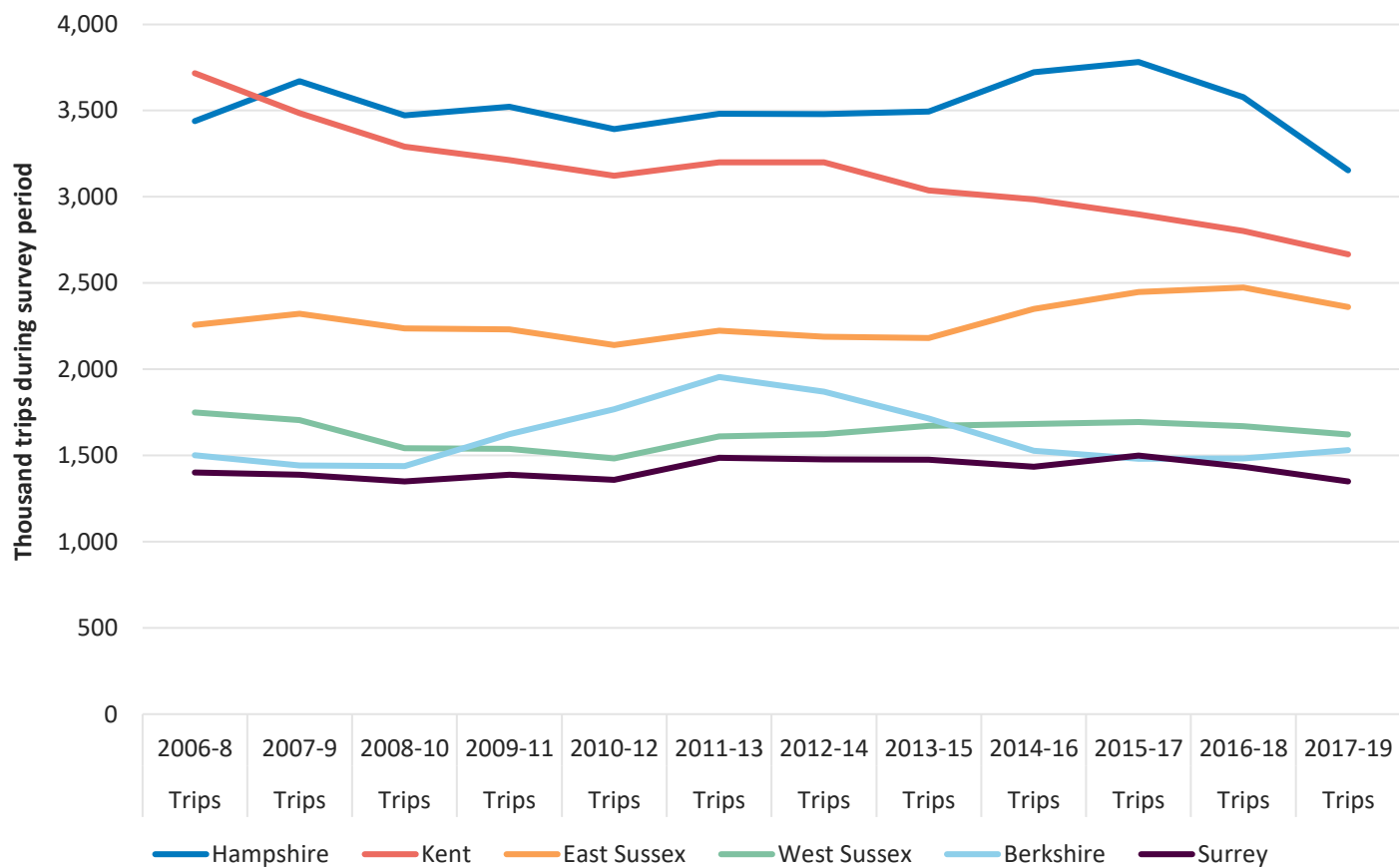
Kent (and Medway) used to be the most popular tourism destinations in the South East – but these areas have seen a gradual decline.

Survey data from Visit Britain (see **Figure 3.11**) suggests that Kent (which, for the purposes of this survey, also includes Medway) has experienced a decline of around 28% in domestic tourism trips over the last decade. East Sussex, on the other hand, has seen a modest growth in trips over the same period (5%).

The South East Radial Area boasts many tourism attractions including the Downs and Weald AONB, several historic cities, some of the UK’s largest retail destinations, and multiple other visitor attractions (e.g. Port Lympne, Diggerland, Turner Contemporary, 1066 Battle of Hastings site, etc.).

The COVID-19 pandemic has generated a boom in domestic tourism – could Kent, Medway and East Sussex benefit from this opportunity and grow a more sustainable tourism offer for domestic and international visitors?

Figure 3.10: Total domestic tourism trips by ceremonial county



Source: Visit Britain <https://www.visitbritain.org/destination-specific-research>

Vision

TfSE's Transport Strategy for the South East sets out an ambitious vision for a sustainable, high performing, net-zero carbon transport system. We have applied this vision to the South East Radial Area to develop a vision statement for this area.

TfSE Vision Statement

By 2050, the South East of England will be a leading global region for net-zero carbon, sustainable economic growth where integrated transport, digital and energy networks have delivered a step change in connectivity and environmental quality.

A high-quality, reliable, safe and accessible transport network will offer seamless door-to-door journeys enabling our businesses to compete and trade more effectively in the global marketplace and giving our residents and visitors the highest quality of life.

South East Vision Statement

The South East Radial Area will develop a sustainable, prosperous, balanced economy to provide opportunities for its residents, businesses, and visitors to thrive.

The area's economy will be more resilient to the economic shocks and will leverage the innovation and talents of the South East Radial Area's people to develop successful businesses.

The South East Radial Area's role as the gateway to Europe will continue to evolve and prosper as the EU and UK adapt to a new trade relationship.

The transport networks supporting the South East Radial Area will be reliable, resilient, well connected, and accessible. They will be aggressively de-carbonised to deliver a net-zero carbon economy by 2050. They will significantly reduce the impact of delays to channel crossing movements on the local economy, communities, and environment.

The communities of the South East Radial Area will be planned provide affordable housing for all and will be designed to promote sustainable travel outcomes.

Objectives (1 of 2)

A high performing, multi-modal transport system will ensure this study helps deliver the following six objectives:

Economy	Society	Natural and Historic Environment
<p>The South East Radial Area’s transport systems will boost prosperity for all and reduce the disparity in socioeconomic outcomes. It will do so in a sustainable manner, and not at “any cost” to society and the environment. It will achieve this by:</p> <ul style="list-style-type: none">• Boosting productivity through better skills matching, knowledge sharing and agglomeration;• Improving transport network efficiency, reliability, and resilience;• Ensuring digital and energy networks can meet future transport (and wider socioeconomic) needs;• Reducing costs for businesses; and• Attracting investment in high growth, high value opportunities.	<p>The South East Radial Area’s transport systems will enable better and more equitable socioeconomic outcomes by:</p> <ul style="list-style-type: none">• Supporting better place-making and creating new sustainable communities;• Enabling residents to easily access employment, affordable housing and services – particularly for those who do not have access to a car;• Increasing the affordability and availability of convenient, high quality, active travel and public transport options;• Ensuring that transport interventions are suitable for all users including the elderly and individuals of reduced mobility and other additional needs;• Mitigating adverse impacts of transport on human health and welfare; and• Enabling deprived communities to attract investment and achieve more equitable socioeconomic outcomes.	<p>The South East Radial Area’s transport systems will protect and enhance the natural and historic environment by:</p> <ul style="list-style-type: none">• Adopting the principles of environmental net gain;• Avoiding interventions that significantly and permanently undermine protected environments, in particular landscape, biodiversity, historic and ecological designations;• Reducing the impact of transport operations on ecosystem services; and• Improving and managing public and active transport access to natural, protected, and historic environments.

Objectives (2 of 2)

A high performing, multi-modal transport system will ensure this study helps deliver the following six objectives:

Climate Change

The South East Radial Area's transport systems will move to net zero carbon and minimise disruption from climate change by:

- Reducing the need to travel;
- Enabling and growing active travel;
- Shifting passenger and freight travel from fossil fuel to non carbon emission energy;
- Improving transport network energy efficiency; and
- Improving transport network resilience to climate events such as flooding, high temperatures, drought and storm events.

Regeneration

The South East Radial Area's transport networks will promote the economic regeneration of the area, particularly in the more deprived parts of the area, by:

- Supporting sustainable economic development by providing multi-modal transport access to employment, services, and housing developments;
- Increasing access to employment, education, and training opportunities to a wider segment of the area's population;
- Addressing market failures where current transport and/or access arrangements are holding back regeneration opportunities; and
- Supporting growth in domestic tourism by providing sustainable access to the area's natural, historic, cultural, sporting, leisure, and recreational attractions.

International Gateways

The South East Radial Area's transport networks will continue to serve as the gateway to Europe for the wider UK in a "post Brexit" economy by:

- Strengthening the resilience of transport corridors serving the busiest international gateways in the area;
- Responding to new developments in the trading relationship between the UK and the European Union;
- Improving access to international gateways through sustainable modes, including electric rail freight; and
- Improving access between the area's international gateways and the rest of the UK.

Problem Statements

Global Issues

1. Transport is not de-carbonising fast enough.
2. Climate change threatens the resilience of the transport network.
3. Freight is heavily reliant on the highway network, especially for first-mile-last-mile deliveries.
4. There is a recognised need for housing and communities – but it needs to be sustainable.
5. The mobility benefits of new technologies are not accessible to everybody.

Economy and Society

6. The area is “cut off” from the rest of the UK by London and the River Thames.
7. The economic influence of London dominates the area.
8. Industry is relatively weak and economic productivity is below average.
9. Poor connectivity is holding back coastal and island communities.
10. Rural communities are being left behind in digital, active, and public transport connectivity.

International Gateways and Highways

11. Dover is highly constrained by its small footprint and access.
12. The Channel Ports (Dover/Folkestone) are too reliant on one highway corridor.
13. Too many disruptive events at ports result in widespread disruption on the highway network.

Placemaking

14. There are significant highway congestion, safety, and air quality issues in multiple places.

Railways

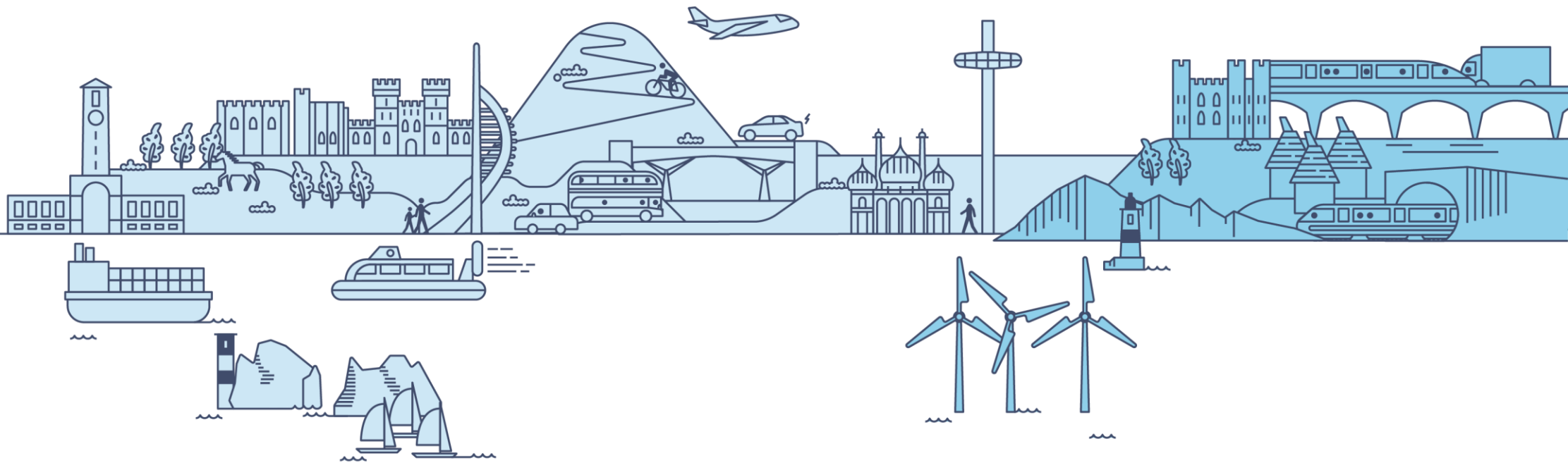
15. Too many rail services are too slow.
16. There are significant resilience challenges on parts of the rail network.
17. There are capability and capacity challenges on parts of the rail network.

Public Transport

18. The quality of mass transit services is variable and bus patronage is relatively low.
19. Public transport integration is weak – both physically and in terms of the ‘customer journey’.
20. For many people, public transport fares are too high and too complicated.
21. Too many public transport services and networks are not accessible to all users.

Active Travel

22. Cycle participation is relatively low, particularly in North Kent
23. Cycling infrastructure is variable and generally poorer than other parts of the South East.



Part 4

Long List Generation and Assessment

Overview

Overview of Stage C

One of the key purposes of this report is to summarise the activities that were undertaken to deliver Stage C of the South East Radial Area Study.

Stage C comprised the following activities:

- Long List Generation
- Typology Assignment
- Long List Assessment
 - Strategic Assessment
 - Economic Assessment
 - Deliverability Assessment
- Package Development (**Part 5**)
- Package Modelling (**Part 6**)

In this Part of this report (**Part 4**) we describe how we approached and delivered the Long List Generation, Typology Assignment, and Long List Assessment activities listed above.

In **Part 5** we outline how the results of the Long List Assessment were used to develop Packages, and in **Part 6** we describe how these packages were modelled.

Early Assessment and Sifting Tool

Our approach to delivering this Stage of the South East Radial Area Study was developed in line with DfT's WebTAG guidance and Early Assessment and Sifting Tool (EAST).

WebTAG describe EAST as follows:

"EAST is designed to be consistent with Transport Business Case principles. It is a decision support tool that summarises and presents options in a clear and consistent format. It is used to assess and compare all types of transport options, packages, strategies and plans across all modes and geographies and is intended to provide decision makers with relevant, high level information to help them form an early view of how options perform against key criteria relative to each other."

While this is by nature a high-level approach, the Project Team is confident it represents the right level of proportionality for the nature (and number) of interventions under consideration.

Multi Criteria Analytical Framework

A Multi-Criteria Analytical Framework (MCAF) spreadsheet was developed and used as an early assessment and sifting tool for this study.

The MCAF was based on the EAST and designed to help TfSE develop viable packages of interventions (groups of interventions based around a geographical area and/or transport mode), that could be tested through modelling for performance assessment.

The MCAF was used to sift out options that perform well on either a strategic, economic or deliverability assessment.

While only high-level information for each intervention is available at this early stage of option identification and assessment, the analysis formed a view on the performance of interventions based on best available data and evidence.

The MCAF tool developed for this study has also been fully quality assured and will be used to support the four other studies in the TfSE Area Studies Programme.

Long List Generation and Typology Categorisation

Long List Generation

An initial Long List of interventions and options was developed from a wide range of sources.

Suggested interventions were drawn from input from the Project Team, desk research, interviews with Tier 1 stakeholders, and a workshop with Tier 2 stakeholders.

Interventions were only excluded from the Long List if they:

- did not primarily address movements relevant to the South Central Area;
- were not considered to be at sufficient scale to have regional significance (i.e., a specific, small-scale cycle intervention);
- were already under construction; and/or
- did not pass a basic 'common sense' feasibility test (i.e., if they were based on an unproven technology).

In total, 210 interventions and options were included in the Long List. These covered a wide range of topics including active travel, demand management infrastructure, highway improvements, rail interventions, port access infrastructure and policies.

Typology Assignment

Given the long list of interventions and the evidence available, interventions and options were grouped into typologies.

This approach was adopted to provide a more efficient and transparent scoring and review process. The typology categories – which generally reflect modal and/or infrastructure categories are as follows:

- Active Travel
- Cable Car
- Demand Management
- Enhanced bus services
- Ferry operations
- Freight
- Highways (online infrastructure)
- Highways (offline infrastructure)
- Integrated Public Transport
- Bus Rapid Transit
- Light Rail Transit
- Rail infrastructure (new)
- Rail infrastructure (existing)
- Rail infrastructure (operations)
- Smart Motorways
- Strategic Mobility Hubs

Long List Assessment

With the long list complete, a qualitative assessment of the proposed interventions was undertaken.

A Multi-Criteria Assessment Framework (MCAF) was developed to provide a qualitative assessment of the strategic fit, economic viability, and deliverability of the interventions included in the Long List. The goal was to use the MCAF to sift out interventions that do not perform and to organise and compare options to help develop coherent Packages of interventions.

The MCAF included three discrete sifts:

- A **Strategic Assessment** that considered the alignment of each intervention with the Objectives of the study, as well as with wider public policy;
- An **Economic Assessment**, based on DfT's EAST framework; and
- A **Deliverability Assessment**, also based on DfT's EAST framework.

The following pages describe each assessment in more detail.

Strategic Assessment (1 of 3)

Strategic Assessment Typology Scores

The Strategic Case Assessment tests the extent to which each intervention fits with this study's Vision and Objectives.

Government business case guidance sets out the need for strategic cases to demonstrate how spending proposals fit in relation to national, regional and local policies, strategies and plans.

Each typology was assigned scores ranging from 1 to 5, where 1 represents a low fit with this study's Objectives, and 5 shows a high fit. **Table 4.1** shows the results of this scoring for each typology.

The score in the strategic assessment forms the base score for each typology. These are later adjusted to reflect the situational context of each intervention (see following page).

The Regeneration and International Gateway objectives are particularly sensitive to the location of any given intervention. For this reason, typology scores for these objectives are relatively low (with correspondingly higher adjustments – see the following page).

Table 4.1: Typology Strategic Assessment

Typology	Objectives					
	Climate	Regen.	Ports	Econ.	Soc.	Env.
Active Travel	4	1	1	3	4	5
Cable Car	2	2	1	2	2	2
Demand Management	3	1	1	3	3	3
Enhanced bus services	3	1	1	3	3	3
Ferry Operations	2	1	1	3	3	3
Freight	2	1	2	4	2	3
Highway infrastructure (online)	2	1	1	2	2	2
Highway infrastructure (offline)	2	1	1	2	2	2
Integrated Public Transport	3	1	1	3	4	4
Bus Rapid Transit	3	1	1	3	3	3
Light Rail Transit	3	1	1	3	3	3
Railway infrastructure (new)	3	1	1	3	3	3
Railway infrastructure (existing)	3	1	1	3	3	3
Railway infrastructure (operations)	3	1	1	3	3	3
Smart Motorways	2	1	1	3	2	2
Strategic Mobility Hubs	3	1	1	3	2	3

Strategic Assessment Adjustments

In addition to assigning a ‘base score’ based on typologies, further modifications to some interventions’ scores were also made to reflect their characteristics and context.

While many interventions share similarities (and typologies), there are some important differences between them. For example, a new highway in or close to protected areas should receive a lower score for ‘Environment’ than a new highway in a brownfield site.

To reflect these distances, the Project Team modified some scores by applying adjustment factors. These are listed in **Table 4.2** to the right. The ‘Adjustment factors’ have been developed to enable the typology assessment process to differentiate interventions from each other taking into consideration their impact upon the immediate surrounding environment. The adjustment factors either ‘add’ or ‘remove’ a point from the base score. This enables for an accurate representation of the intervention on the surrounding area.

Table 4.2: Strategic Assessment Adjustment Factors

Adjustments applied if the intervention Delivers any of the impacts listed below	Objectives					
	Climate	Regen.	Ports	Econ.	Soc.	Env.
Permanently undermines protected areas						-2
Temporarily undermines protected area						-2
Enhances access to international gateways			+4	+2		
Reduces access to international gateways				+2	+2	
Enhances placemaking	+2	+2				+2
Undermines placemaking				-2	-2	
Supports housing development		+2		+2	+2	
Supports regeneration		+2		+2	+2	
Delivers other climate change benefits	+2					

Worked Example

A ‘generic’ **Strategic Mobility Hub** intervention would initially be assigned the following:

Typology	Objectives					
	Climate	Regen.	Ports	Econ.	Soc.	Env.
Strategic Mobility Hubs (Typology Score)	3	1	1	3	2	3

However, if the Strategic Mobility Hub supports housing development, its score would be:

Typology	Objectives					
	Climate	Regen.	Ports	Econ.	Soc.	Env.
Strategic Mobility Hubs (Adjusted Score)	3	3	1	5	4	3

Strategic Assessment (3 of 3)

Alignment with Public Policy

A key component of the Strategic Assessment is to understand the extent to which each proposed intervention aligns with existing public policy.

Each intervention was assessed by the Project Team and members of the Outer Orbital Working Group for the alignment with national, local, and TfSE policy objectives.

Scoring was based on a scale of 1 to 5, with 5 representing high policy alignment and 1 representing low policy alignment. Lowest scoring interventions were typically those that contradicted policy objectives.

Table 4.3. to the right shows an excerpt of the results for the Solent Core Rail Package.

National policy alignment scores reflect policies, strategies, and interventions promoted by national government, National Highways, and Network Rail. They also reflect alignment with National Policy Statements. Where MPs were known to hold strong views on an intervention, then this was also reflected in the score.

Local policy alignment scores reflect policies, strategies and interventions promoted by Local Transport Authorities, Local Planning Authorities, Local Enterprise Partnerships, national parks, and other protected landscapes. In some cases, there were differing views between these bodies. In these instances, we agreed an ‘average’ score to reflect these different perspectives. These scores were reviewed and agreed by these organisations (via the Working Group).

Regional policy alignment scoring was developed by TfSE Officials with support from the advisor team. They were informed by the vision, objectives, and priorities set out in the “Transport Strategy for the South East” document that was formally adopted by TfSE in autumn 2020.

In some cases there were significant differences between national, regional, and local policy alignment.

Table 4.3: Excerpt of Policy Alignment Scores

Example interventions (Isle of Grain Passenger Rail Service)	Policy Alignment		
	National	Local	Regional
New passenger service on Ilse of Grain	✓✓✓	✓✓✓✓	✓✓✓
Chord for Medway services	✓✓	✓✓✓	✓✓
Fixed link to Sheppey	✓	✓	✓
Fixed link to Thurrock	✓	✓	✓
BRT Alternative	✓✓	✓✓	✓✓

Economic Assessment (1 of 3)

Economic Assessment

The Economic Assessment aims to identify the nature and scale of the economic, environmental, and social impacts of each typology and intervention.

Typically, an EAST Economic Assessment uses a three-point Red-Amber-Green (RAG) score system. This approach was adopted in line with DfT’s EAST guidance and reflects the high-level nature of scheme level evidence available at this stage of the study.

To align the EAST scoring system with the scale adopted for the Strategic Assessment, the RAG scores are recorded as follows:

- **Red:** poor alignment = 1
- **Amber:** moderate alignment = 3
- **Green:** good alignment = 5

The RAG scores provide a clear visual guide to the potential impact of typologies and interventions as can be seen in the tables in the following pages.

Economic Assessment Typology Scores

As with the Strategic Assessment process, the Economic Assessment involved assigning scores to criteria based on the typology of each intervention.

These criteria are as follows:

- **Economic Growth** – including connectivity, reliability, resilience of the network, facilitates the delivery of housing and provides good value for money in terms of social aspects.
- **Carbon** – including number of carbon units lost, efficiency (fuel consumption reduction), and impact upon embedded carbon;
- **Local Environment** – including impacts upon Air Quality, Noise, Natural Environment and Streetscape
- **Wellbeing and Social Impacts** – including impacts upon severance, physical activity, injuries, access, security and affordability.

Table 4.4. (overleaf) summarises the results of this assessment.

Economic Assessment (2 of 3)

Table 4.4: Typology Economic Assessment

Typology	Economic Growth					Carbon			Local Environment				Health and Wellbeing					
	Connectivity	Reliability	Resilience	Housing	Value for Money	Activity	Efficiency	Embedded Carbon	Air quality	Noise	Natural env.	Street scape	Severance	Physical activity	Injuries	Access	SDIs	Security
Active Travel	3	3	3	3	5	5	5	5	5	5	5	5	5	5	3	5	5	3
Cable Car	3	3	1	1	3	3	3	3	5	3	3	3	5	3	3	5	5	5
Demand Management	5	5	3	5	5	3	3	3	3	3	3	3	5	3	3	5	5	1
Enhanced bus services	5	5	3	3	5	3	3	3	3	3	3	3	5	5	3	5	5	3
Ferry Operations	3	1	3	3	3	1	1	3	3	3	3	3	5	3	3	5	3	3
Freight	5	3	5	1	3	5	3	3	3	3	3	3	3	1	5	3	3	1
Highway infrastructure (online)	3	5	3	3	5	1	3	3	3	1	3	3	3	1	3	1	1	1
Highway infrastructure (offline)	3	5	3	3	5	1	3	3	3	1	3	3	3	3	3	3	3	3
Integrated Public Transport	5	3	5	3	5	5	5	5	5	3	5	5	5	5	3	5	5	5
Bus Rapid Transit	5	3	3	3	5	5	5	3	5	3	5	5	5	5	3	5	3	5
Light Rail Transit	5	5	5	5	3	5	3	1	5	3	5	5	5	3	3	5	5	5
Railway infrastructure (new)	5	5	5	5	5	5	3	1	5	3	3	3	3	3	3	5	5	5
Railway infrastructure (existing)	3	3	3	3	5	3	3	1	3	3	3	3	3	3	3	3	5	3
Railway infrastructure (operations)	3	3	3	3	5	5	5	3	3	3	3	3	3	3	3	3	3	3
Smart Motorways	5	3	3	3	3	3	3	3	3	3	3	3	5	1	3	3	3	3
Strategic Mobility Hubs	5	5	5	5	5	3	3	3	5	5	5	5	5	5	3	5	5	5

Economic Assessment (3 of 3)

Economic Assessment Adjustments

As with the Strategic Assessment, some ‘base scores’ for some interventions were adjusted to reflect their context.

The same adjustment factors were used as within the strategic sift. However, in order to receive an adjustment, a more significant step-change was required in some places.

For example: to receive an adjustment for ‘enhancing access to an international gateway’ the intervention needs to deliver ‘step-change’ in the quality of access provided. On the other hand, a new highway link that cuts through a national park would permanently undermine a protected area and receive a negative adjustment factor.

A summary of the adjustment factors applied in the Economic Assessment is provided in **Table 4.5** below. As the ‘base scores’ jump from 1 to 3 to 5, the adjustments applied also increase and/or decrease by the same magnitude. This is why some adjustments presented below are either +2 or -2.

Figure 4.5: Economic Assessment Adjustment Factors

Typology	Economic Growth					Carbon			Local Environment				Health and Wellbeing					
	Connectivity	Reliability	Resilience	Housing	Value for Money	Activity	Efficiency	Embedded Carbon	Air quality	Noise	Natural env.	Street scape	Severance	Physical activity	Injuries	Access	SDIs	Security
Permanently undermines protected areas											-1							
Temporarily undermines protected area											-1							
Enhances access to international gateways	+1				+1													
Reduces access to international gateways	+1				+1	+1							+1			+1	+1	
Enhances placemaking												+1	+1	+1	+1	+1	+1	
Undermines placemaking												-1	-1	-1	-1	-1	-1	
Supports housing development				+2														
Supports regeneration				+1														
Delivers other climate change benefits						+2	+2											

Deliverability Assessment (1 of 3)

Deliverability Typology Scores

The Deliverability Assessment aims to identify the key attributes that affects the likelihood of an intervention being developed, funded, and delivered.

The criteria used for this assessment is also based on DfT's EAST framework.

Evidence to inform this assessment was drawn from a variety of sources, including existing comparable schemes, national/regional/local scheme information, Subject Matter Expert opinion, and publicly available information.

Most of the interventions and options included in the long list were at an early stage of development and therefore lacked detailed evidence such as cost estimates. To manage this evidence gap, the Project Team undertook a benchmarking exercise a compared proposed interventions to recently delivered 'similar' schemes. This exercise drew on the expertise of Project Team's Subject Matter Experts.

The Deliverability Assessment scores assigned to the typologies is provided in **Table 4.6** to the right.

Figure 4.6: Typology Deliverability Assessment

Typology	Objectives						
	Capital Cost	Value for Money	Affordability	Timescale	Technical Risk	Acceptability	Evidence Base
Active Travel	5	5	5	5	5	5	4
Cable Car	3	4	3	3	3	3	4
Demand Management	5	3	4	3	4	4	4
Enhanced bus services	4	3	4	3	4	4	4
Ferry Operations	4	3	3	5	4	3	3
Freight	3	4	2	3	2	4	3
Highway infrastructure (online)	3	3	4	4	4	3	3
Highway infrastructure (offline)	3	3	4	3	4	3	3
Integrated Public Transport	5	4	4	3	4	4	3
Bus Rapid Transit	3	3	4	3	3	4	3
Light Rail Transit	3	2	3	2	2	4	3
Railway infrastructure (new)	2	2	3	2	2	4	2
Railway infrastructure (existing)	2	2	3	3	2	4	3
Railway infrastructure (operations)	3	4	4	4	4	5	3
Smart Motorways	3	4	4	5	3	4	3
Strategic Mobility Hubs	3	4	4	3	4	4	3

Deliverability Assessment (2 of 3)

Approach to Deliverability Assessment

The scoring system required a different approach for each criteria, as the range of criteria is relatively diverse.

Capital Costs

Capital costs were based on infrastructure bands as follows:

- £0 – 20m = 5;
- £20m – £50m = 4;
- £50m - £250m = 3;
- £250m - £1bn = 2;
- > £1bn = 1.

Value for Money

Value for Money assessments were broadly based on the scale of funding each intervention is expected to need. For example, Nationally Significant Infrastructure Projects were generally assigned lower scores than interventions requiring less public funding.

Affordability

Affordability was assessed against the likelihood that funding can be provided. It considered the attractiveness of project to delivery partners to provide funding, and whether there is a need for additional funds from non-government sources.

Timescales

Timescale bands covered short term (considered those that would be delivered within five years), medium term (delivered within five to fifteen years) ,and long-term (greater than fifteen years beyond the Local Plan end date) in line with Local Plan needs.

As such, these operate on a three-point score system of

- Long term = 1;
- Medium term = 3; and
- Short term = 5.

Technical Complexity

Technical complexity was based on benchmarking against comparable schemes. 'Riskier' projects were assigned lower scores than less risky projects.

Acceptability

For the base typology scores, it was assumed that those interventions with smaller budgets are more likely to be developed, funded, and supported by both the general public and politicians than those of a much greater scale of impact.

Evidence Base

Finally, the Project Team reviewed the evidence base informing the development of each proposed intervention. Those interventions that can cite projects that have been successfully delivered in the UK were awarded higher scores than those supported by 'thinner' evidence bases.

Deliverability Assessment (3 of 3)

Deliverability Adjustments

A different set of criteria were also used to adjust Deliverability Typology Assessments base scores.

Adjustment factors for the deliverability case have been centered around 'high' versus 'low' assessment. They focussed on whether the typology would initially have a higher or lower adjustment (i.e., capital cost, affordability, timescale) than the base-score assigned. For example, a rail tunnel option would cost higher than a standard rail option.

A summary of the deliverability assessment adjustments is provided in **Table 4.7**.

Adjustments to the Acceptability criteria input score are closely linked with the policy alignment scoring derived in the Strategic Assessment. The base score for this criteria is aligned within how well it performs in policy alignment. It is then adjusted for whether it performs positively or negatively against support from stakeholders, the public and/or politicians.

Table 4.7: Deliverability Assessment Adjustments

Typology	Objectives						
	Capital Cost	Value for Money	Affordability	Timescale	Technical Risk	Acceptability	Evidence Base
Capital cost: High Cost	-1						
Capital cost: Low Cost	+1						
Expected Value for Money: High Value for Money		+1					
Expected Value for Money: Low Value for Money		-1					
Affordability: High affordability			+1				
Affordability: Low affordability			-1				
Timescale: Short Timescale				+1			
Timescale: Long Timescale				-1			
Technical complexity/Risk: High Complexity/Risk					-1		
Technical complexity/Risk: Low Complexity/Risk					+1		
Acceptability: High Acceptability						+1	
Acceptability: Low Acceptability						-1	
Evidence: Good Evidence							+1
Evidence: Low Evidence							-1

Assurance and Moderation

Technical Assurance

The results of each Assessment were reviewed by Technical Experts, TfSE, and key stakeholders at multiple points.

A Technical review of the assessment process was undertaken by the Project Team at several stages of the assessment. This ensured that the assessors were both adhering to the principles outlined within EAST and the Transport Appraisal Process. After assessment has been completed for each sift (strategic, economic, deliverability, the MCAF spreadsheet was audited and reviewed to ensure it was computing and recording results accurately.

The technical review also became an opportunity to discuss any issues in process or decision making and to justify and explain outcomes for interventions where there may have been debate. This information is entered into the MCAF comments log.

Following on from the internal technical assessment, the MCAF was then sent for review and moderation with stakeholders and TfSE.

Stakeholder Moderation

All Assessment Results were reviewed by TfSE and shared with South East Radial Area Study Working Group.

The Working Group did not propose any major changes to typologies or adjustments. Some members identified local issues that enabled the advisor team to 'boost' certain interventions. For example: it emerged that some highway interventions also included active travel elements and/or supported local housing developments, which enabled these interventions to be awarded higher scores for some criteria.

The Working Group proposed some changes to the Strategic Assessment scores – particularly with respect to policy alignment. This is to be expected, as the draft scores were based on published documents, whereas Working Group Members were able to provide insight on emerging policy.

A high-level summary of the results of the MCAF Economic and Delivery Assessments were also presented to the South Central Area Study Working Group. No significant changes were proposed at this stage.

Park or Proceed Decision

Once the full outputs from the MCAF had been calculated, a final 'park' or 'proceed' manual assessment was undertaken.

In general, interventions were parked if they receive score of 3/5 or less for:

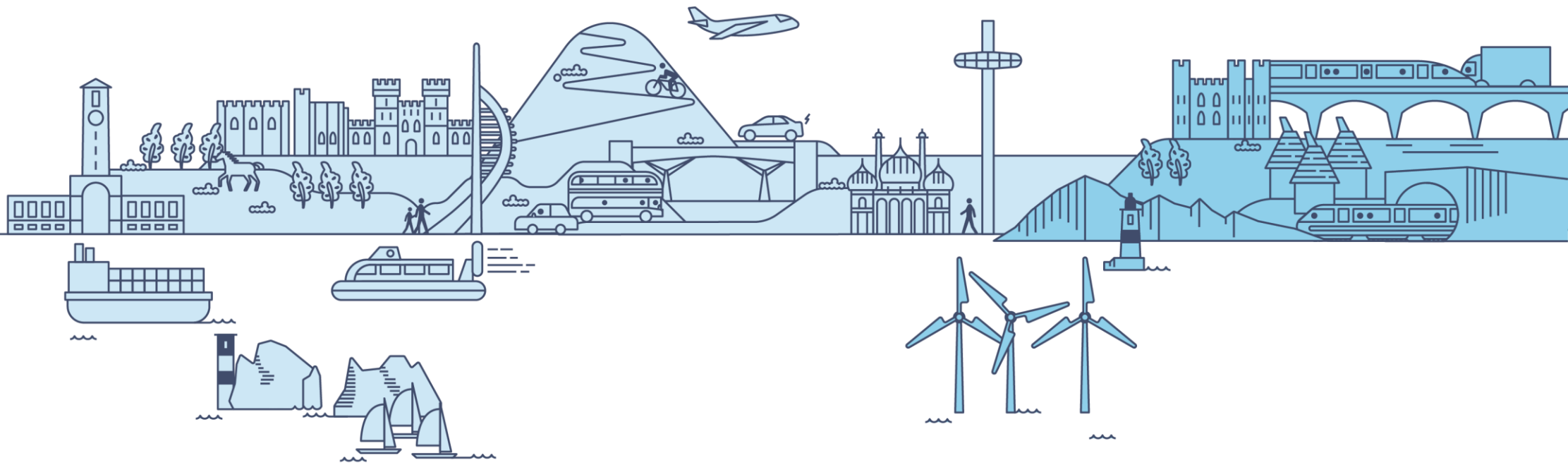
- **Policy alignment** (any score)
- **Strategic Sift** (average score)
- **Economic Sift** (average score)

Interventions with a **Delivery Sift** average score of 2/5 were also ruled out.

For interventions that had multiple options, where one option clearly outperformed the others, the best scoring intervention was set as 'proceed' and all others as 'park'.

Interventions that had multiple options with similar (high) scores were marked as 'proceed (consider all/remaining options)'.

At this stage, some interventions were transferred to other Area Studies or determined to be Global Policy interventions – interventions that will be assessed across the whole South East area.



Part 5

Package Development

Combined Approach to Package Development

A Top Down and Bottom Up View

TfSE has worked with key stakeholders and technical advisors to develop a set of coherent Packages that, together, are designed to deliver TfSE's vision and objectives for the South East Radial Area.

These Packages have been developed through workshops, discussions, and careful analysis of results of the assessment of the long list of interventions described earlier.

The Packages combine an overarching vision for the South East Radial Area with the results of the Multi Criteria Analytical Framework.

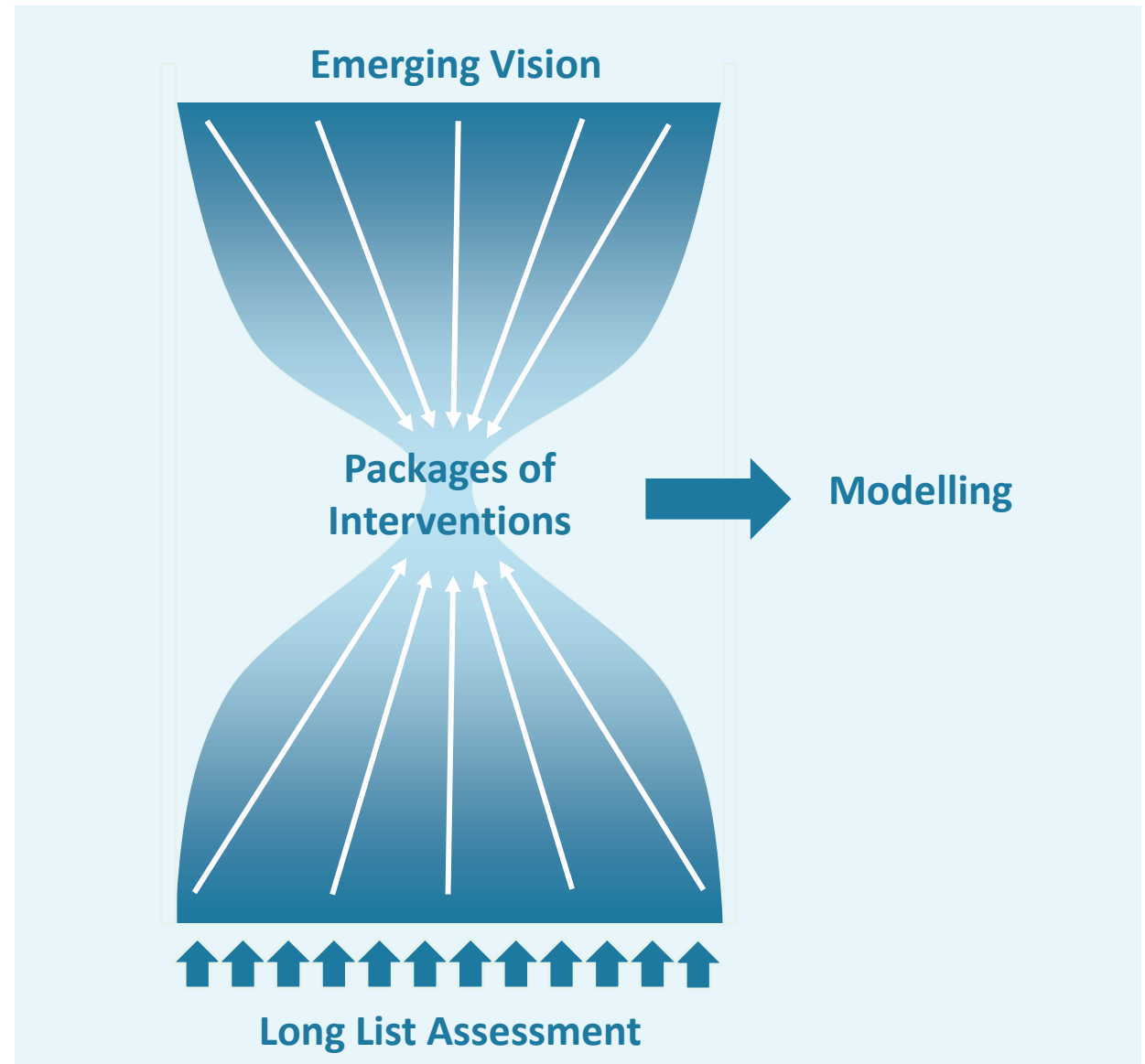
In essence, this reflects both a 'top down' i.e., vision led approach and a 'bottom up' i.e., individual intervention assessment approach.

A diagram in **Figure 5.1** to the right illustrates the essence of this combined approach.

In this Part (**Part 5**), we present both the Vision and Long List Assessment results.

In the following Part (**Part 6**), we present the results of the modelling of the Packages in our land use and transport model.

Figure 5.1: Approach to Package development



Vision for the South East Radial Area Study

Our vision is to deliver a **better connected, more resilient, better integrated, and more sustainable transport system** for the South East. This will reduce the isolation of the most deprived communities in our area and contribute to the government’s “Levelling Up” agenda by unlocking opportunities for growth and regeneration. It will strengthen the key corridors that serves some of the UK’s busiest international gateways and provide viable sustainable travel options for all.

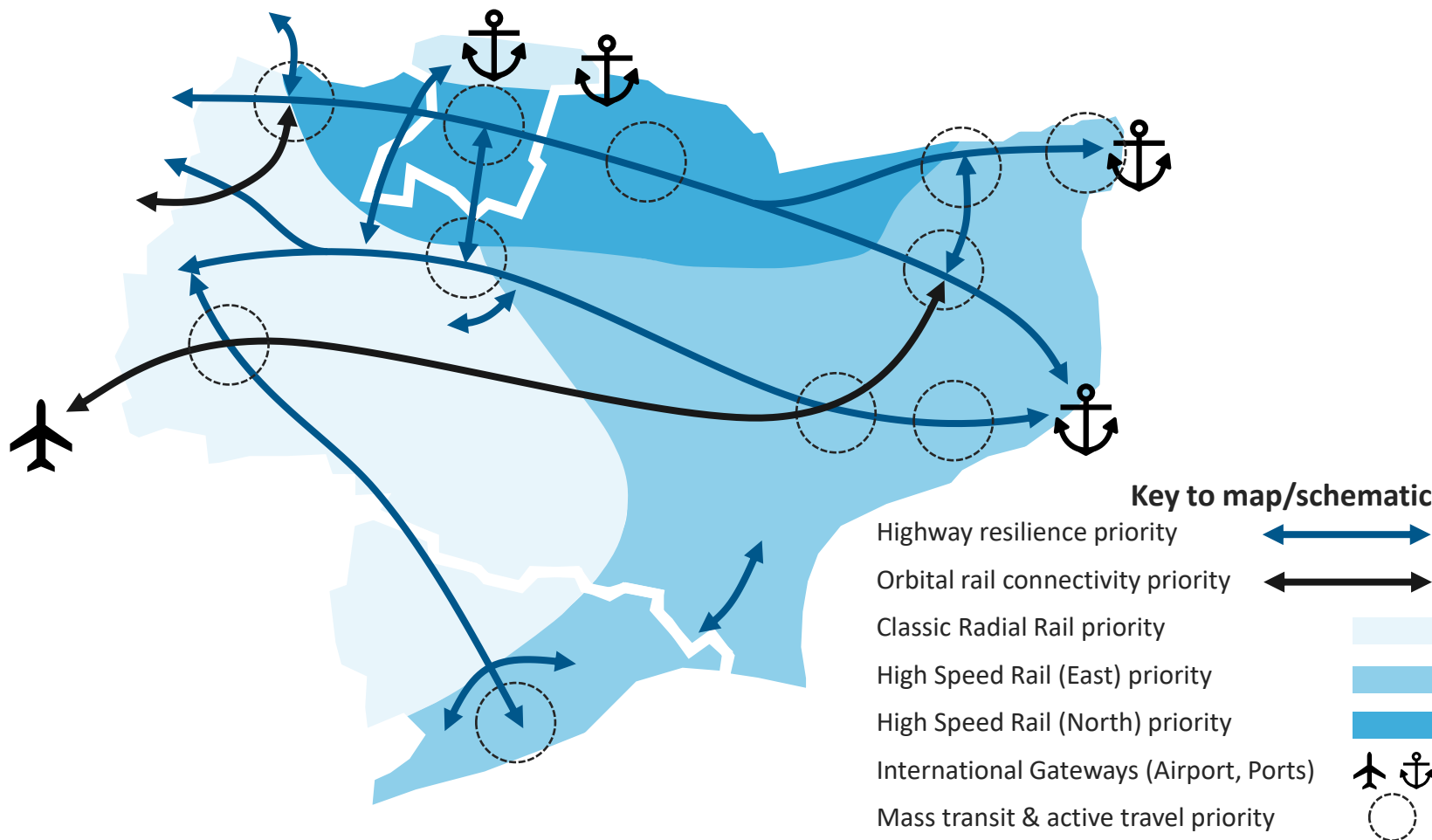
Figure 5.2 to the right sets out the priorities for the South East Radial Area.

These key elements include:

- Coastal Connectivity
- Growth and Regeneration
- Integration
- Resilience
- Sustainable Travel
- Carbon Reduction

Tables 5.1 – 5.9 in the following pages describe the composition of the Packages that have been developed to deliver the vision for the South East Radial Area. They present the results of the MCAF assessment and list the interventions recommended for further appraisal.

Figure 5.2: Key elements supporting the South East Radial Area Study vision





Classic Rail Package (1 of 2)

The Classic Rail Package addresses capacity constraints on the Classic (i.e. non High Speed) rail network in the South East.

A summary of the key interventions included in this package is provided in **Table 5.1** to the right and in **Table 5.2** in the following page.

Several interventions – including those that perform well in this assessment – are designed to deliver benefits on the Classic Network that could also be delivered through interventions on the High Speed Network (e.g. North Kent Line speeds).

Key to ticks

✓✓✓✓	Very high alignment (Scores above 4.4)
✓✓✓	High alignment (Scores between 3.5 – 4.4)
✓✓	Medium alignment (Scores between 2.5 – 3.4)
✓	Low alignment (Scores between 1.5 – 2.4)
✗	Works against objective (Scores less than 1.5)

Table 5.1: Classic Rail Network Interventions and Options Assessment Results (1 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
Orpington – Tonbridge	Capacity enhancements	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓	Proceed
Chislehurst Junction	Capacity enhancements	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
London Services Metroisation		✓✓	✓✓	✓✓	✓✓✓	✓✓	✓✓	Proceed
Line speed improvements (may require power enhancements in places)	Gravesend – Strood	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
	Faversham – Margate	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Proceed
	Dover – Ramsgate	✓	✓	✓	✓	✓✓	✓✓	Park
	Victoria – Bromley South	✓✓	✓✓	✓✓	✓	✓✓	✓✓	Park
	Tunbridge Wells – Hastings	✓	✓	✓	✓	✓✓	✓✓	Park
	Canterbury – Ramsgate	✓✓	✓✓	✓✓	✓✓✓	✓✓	✓✓	Proceed
Service enhancements	Thameslink (Maidstone)	✓✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
	Thameslink (Ashford)	✓	✓	✓	✓✓	✓✓	✓✓✓	Park
	Thameslink (Tunbridge Wells)	✓	✓	✓	✓	✓✓	✓✓✓	Park
	Gatwick – Ashford service	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	Proceed
	London Bridge (North Kent)	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
Isle of Grain Passenger Rail Services	New passenger service	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Chord for Medway services	✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Fixed link to Sheppey	✓	✓	✓	✓✓	✓✓✓	✓	Park
	Fixed link to Thurrock	✓	✓	✓	✓✓	✓✓✓	✓	Park
	BRT Alternative/Complement	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓	Proceed
Crossrail extension	Abbey Wood – Gravesend	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed (Consider all options)
	Abbey Wood – Dartford	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	
	Enhance current service	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	
Remodel/relocate Dartford		✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
Bakerloo Line Extension	Elephant & Castle – Lewisham	✓✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Lewisham – Hayes	✓✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed



Classic Rail Package (2 of 2)

The interventions to be taken forward are provided in the box below.

Interventions that could be delivered by the High Speed Network are discussed in the following two pages.

Package 1a: Classic Rail

- St Pancras Terminal Capacity
- Victoria Terminal Capacity
- Chislehurst – Tonbridge Capacity
- North Kent Line Speeds
- Chatham Main Line Speeds
- London Metroisation
- Maidstone Thameslink Services
- North Kent London Bridge Services
- Gatwick Airport Services
- Grain Branch Passenger Services
- Crossrail to Ebbsfleet
- Ebbsfleet interchange
- Ebbsfleet Southern Rail Access
- Dartford Remodelling/Relocation
- Bakerloo Line Extension
- Integrated Maidstone Stations
- Strood Interchange
- Canterbury Interchange
- Otterpool Park Access

Table 5.2: Classic Rail Network Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
London Terminals	London Bridge	✓✓	✓	✓	✓✓	✓✓	✓✓	Park
	St Pancras International	✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	Victoria	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	New Terminal	✓	✓	✓	✓✓	✓✓✓	✓	Park
Docklands Light Railway Extension	Beckton – Thamesmead	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	For TfL
	Beckton – Belvedere	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	
London Overground Extension	Barking – Abbey Wood	✓	✓	✓✓	✓✓✓	✓✓✓	✓	
Maidstone Parkway (Hollingbourne)	Classic Network	✓	✓	✓	✓✓	✓✓✓	✓✓	Park
	High Speed 1	✓	✓	✓	✓✓✓	✓✓✓	✓✓	
Otterpool Park/Westenhanger	Classic Network	✓✓	✓✓✓	✓✓	✓✓	✓✓✓	✓✓	Proceed
	High Speed 1	✓	✓	✓	✓✓✓	✓✓✓	✓✓	Park
Integrated Maidstone Stations	Improve walkway/streetscape	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	Proceed
Canterbury Interchange	Canterbury East/West chord	✓✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	New interchange	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
Medway Valley Line	Cuxton Chord	✓	✓	✓	✓✓	✓✓✓	✓✓	Park
	Cuxton Interchange	✓✓	✓	✓✓	✓✓	✓✓✓	✓✓	Park
	Strood Interchange	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Convert to LRT	✓	✓	✓	✓✓✓	✓✓	✓✓	Park
Isle of Sheppey	Re-instate former railway	✓	✓	✓	✓✓✓	✓✓✓	✓	Park
	BRT alternative to the above	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓	Proceed
Faversham – Ashford link	Enables direct services	✓	✓	✓	✓	✓✓✓	✓✓	Park
Crab and Winkle Line	Re-instate railway	✓	✓	✓	✓	✓✓✓	✓✓	Park
	BRT alternative to the above	✓✓✓	✓✓✓	✓✓✓	✓	✓✓✓	✓✓	Park
Headcorn – Tenterden	Re-instate former railway	✓	✓	✓	✓	✓✓✓	✓✓	Park
Canterbury – Folkestone	Re-instate former railway	✓	✓	✓	✓	✓✓✓	✓✓	Park



High Speed Rail Packages

This Package includes some of the more radical interventions in the Long List for this study.

They are based around expanding the domestic high speed service to deliver transformational improvements in journey times to Kent, Medway, and East Sussex. There are two sub-packages, which have been modelled separately (one for East Kent/East Sussex, and one for North Kent/Medway).

A summary of the key interventions included in this package is provided in **Table 5.3** to the right.

Package 1b: High Speed (East)

- Dollands Moor Connection
- HS1 Services to Eastbourne
- Non London HS1 Services
- More International Services

Package 1c: High Speed (North)

- North Kent High Speed Service Connectivity Enhancements
- Non London HS1 Services (e.g. serving Stansted/WCML)

Table 5.3: High Speed Rail Network Interventions and Options Assessment Results

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
East Kent Connectivity	Dollands Moor connection	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	HS1 Services to Eastbourne	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
North Kent Connectivity	Medway HS1 Link (Shorne – Strood – Gillingham)	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓	Proceed (Consider all options)
	New Rochester Bridge and faster North Kent Line	✓✓	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	
	Maidstone – Sittingbourne HS1 Link and Parkway Stations	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓	
	New railway from Upstreet to Birchington for HS1 services	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
New HS1 Services	Ashford – London Victoria	✓	✓	✓✓	✓✓	✓✓	✓✓	Park
	Ashford – Fenchurch Street	✓	✓	✓✓	✓✓	✓✓	✓✓	Park
	Ashford – West Coast Main Line	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Proceed (Consider all options)
	Ashford – Stansted Airport	✓✓	✓✓	✓✓	✓✓	✓✓	✓	
Other HS1 Services	Additional calls (Ebbsfleet)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	Proceed
	Additional calls (Ashford)	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
	Extend international services	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
Ebbsfleet Interchange (Classic Rail Package)	Connection to Northfleet	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Connection to Swanscombe	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
Ebbsfleet Southern Rail Link Classic Rail Package)	Ebbsfleet – Bromley (HS1)	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Northfleet – Bromley (Classic)	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	BRT Alternative/Complement	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	Proceed

Packages and Options Assessment Results (4 of 9)



Mass Transit Package (1 of 2)

All mass transit options – shown in Table 5.4 to the right – perform well in the Multi Criteria Assessment Framework.

Table 5.4 to the right list options for mass transit systems in the North Kent and Medway area. It also includes options for developing/enhancing Strategic Mobility Hubs as well as introducing/enhancing ferry and river services.

Table 5.4: Mass Transit Interventions and Options Assessment Results (1 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
Fastrack Expansion	Swanscombe Peninsula	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Proceed (Consider all options)
	Ebbsfleet – Gravesend via Northfleet	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	
	Ebbsfleet – Medway	✓✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	
	Ebbsfleet – Swanley	✓✓✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	Park
	Ebbsfleet – Longfield/Meopham	✓✓✓	✓	✓✓	✓✓	✓✓✓	✓✓✓	Park
Medway Mass Transit	BRT (Medway only)	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	BRT (plus Maidstone)	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	BRT (plus Maidstone, A229 bus Lane)	✓✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Park
	LRT (Medway only)	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓	Park
	LRT (include Maidstone)	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓	Park
	New crossing (Medway City Estate)	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓✓	✓✓	Proceed
	Water Taxi/Ferries	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	Proceed
Strategic Mobility Hubs	Cable Car	✗	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Maidstone	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓	Support Concept (No specific sites yet identified)
	Dover	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	
	Sittingbourne	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	
	Sevenoaks	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	
	Folkestone	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	
	Ashford	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	
	Royal Tunbridge Wells/Tonbridge	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓	
Ferries and river services	Canterbury/Whitstable/Herne Bay	✓✓	✓	✓✓	✓✓	✓✓✓✓	✓✓✓	Proceed (Consider all options)
	Sheerness – Hoo Peninsula	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	
	Sheerness – Chatham/Strood	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	
	Harty – Whitstable	✓✓	✓✓	✓✓	✓	✓✓	✓✓✓	
	Harty – Oare	✓✓	✓✓	✓✓	✓	✓✓	✓✓✓	
	Improve Ebbsfleet – Tilbury crossing	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	

Key to ticks

✓✓✓✓	Very high alignment (Scores above 4.4)
✓✓✓	High alignment (Scores between 3.5 – 4.4)
✓✓	Medium alignment (Scores between 2.5 – 3.4)
✓	Low alignment (Scores between 1.5 – 2.4)
✗	Works against objective (Scores less than 1.5)



Mass Transit Package (2 of 2)

Mass transit options have been considered for each Major Economic Hub in Kent, Medway, and Hastings/Bexhill.

As shown in **Table 5.5** to the right, Bus Rapid Transit performs better than Light Rail Transit in the Multi-Criteria Assessment Framework.

This study is generally supportive of Demand Responsive Transit, and improvements in the integration and simplicity of fares in the South East.

Package 2: Mass Transit

- FastTrack Expansion
- Medway Bus Rapid Transit
- New Medway Bus River Crossing
- General Bus Enhancements
- Strategic Mobility Hubs
- Demand Responsive Transit
- Reinstate/Improve Thames, Medway and Swale Ferries
- Integrated Fares and Ticketing

Table 5.5: Mass Transit Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
Kent Mass Transit	Maidstone Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Maidstone Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Dover Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Dover Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Dover Cable Car	✗	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Sittingbourne Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Sittingbourne Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Sevenoaks Bus	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	Sevenoaks Tram	✓	✓	✓✓	✓✓	✓✓✓	✓✓	Park
	Thanet Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Thanet Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Folkestone Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Folkestone Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Ashford Bus	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	Ashford Tram	✓	✓	✓✓	✓✓	✓✓✓	✓✓	Park
	Royal Tunbridge Wells/Tonbridge Bus	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	Royal Tunbridge Wells/Tonbridge Tram	✓	✓	✓✓	✓✓	✓✓✓	✓✓	Park
	Thames Gateway/Gravesham Bus	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Proceed
	Thames Gateway/Gravesham Tram	✓	✓	✓✓	✓✓✓	✓✓✓	✓✓	Park
	Canterbury/Whitstable/Herne Bay Bus	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	Canterbury/Whitstable/Herne Bay Tram	✓	✓	✓✓	✓✓	✓✓✓	✓✓	Park
	Rural/interurban bus improvements	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	Proceed
	Improved Rural Demand Responsive Bus/Taxi Services	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	Proceed
	Integrated and simpler fares, ticketing, marketing	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓✓✓✓	Proceed



Active Travel Package

This study supports all active travel options in the Long List.

Each Local Transport Authority in the area is developing plans to improve urban cycling infrastructure, which is likely to generate significant benefits.

The interventions supported by this study include several National Cycle Network proposed routes that will connect several Major Economic Hubs in Kent and East Sussex to each other.

This study has also assessed (and is generally supportive of) measures to improvement placemaking in built up areas, especially where these can promote walking and cycling activities.

Table 5.4: Mass Transit Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
Medway Active Travel	Urban interventions	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	Proceed
	Chatham – Medway City Estate crossing	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	✓✓✓	Proceed
Kent Active Travel	Urban interventions	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	Proceed
	Regional cycle network	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
	NCN Faversham – Canterbury	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
	NCN Tonbridge – Maidstone	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
	NCN Sevenoaks – Sittingbourne	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
	NCN Bromley – Royal Tunbridge Wells	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
East Sussex Active Travel	Urban interventions	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓	Proceed
	Regional cycle network	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
	NCN Royal Tunbridge Wells – Hastings	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	Proceed
Canterbury placemaking/demand management		✓✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	Proceed
Medway placemaking/demand management		✓✓✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Park
Maidstone placemaking/demand management		✓✓✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Park
Dover placemaking/demand management		✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Part of Operation Stack

Package 3: Active Travel

- Urban Active Travel
- NCN Improvements
- Placemaking (e.g. Canterbury)



Highways Packages (1 of 2)

This study has assessed proposals to enhance the capacity and resilience of the Strategic and Major Road Networks.

Many of the interventions considered aim to improve the resilience of the M2/A2, M20/A20, and A21 corridors. The focus is more on junction improvements (which are hard to model in SEELUM) and Operation Brock/Stack (which is even harder to model). However, there are some highway capacity enhancements that can be included in this package – notably on the A21 corridor.

The Highways Package includes the Lower Thames Crossing, which is one of the largest (if not the largest) interventions included in the Long List for this study. This intervention effectively doubles capacity between Thurrock and North Kent and reduces highway journey times between Thurrock and Medway/North Kent. Due to the scale of this intervention, it is modelled separately to other highways interventions.

Table 5.4: Mass Transit Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
Lower Thames Crossing	Highway scheme as proposed	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
	Lower capacity version	✓	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Park
	Including local access	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Park
	BRT/LRT alternatives/complements	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Park
	A2 bus lane (post LTC delivery)	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓	Park
M2 Junction 3	Junction improvements	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
M2 Junction 4 – 7	Smart Motorway	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed (Consider all options)
	Additional Lane	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	
M2 Junction 7	Junction improvements	✓✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
A2 Canterbury	Junction improvements	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
A2 Lydden – Dover	Complete Dualling	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed (Consider all options)
	As above with Grade Separation	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	
M20/A20 Resilience Interventions	Digital Operation Stack	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
	Digital Operation Brock	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
	M20 Smart Motorway (Junctions 3 - 5)	✓✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
	Lorry Park(s)	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
	A20 improvements (Stack/Brock)	✓✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
M20 Junction 6		✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
M25 Junction 1a	Additional overbridge	✓✓	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
M25 Junction 5	Enable all movements	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓	Proceed



Highways Packages (2 of 2)

In general, only a limited number of highways interventions are supported.

Highways interventions that support regeneration, housing growth, freight, and access to international gateways perform relatively well in the Multi-Criteria Assessment Framework.

Package 4: Highways

- Lower Thames Crossing
- M2/M20 Blue Bell Hill Junctions
- M2 J4 – 7 Capacity
- M2 J7 Brenley Corner
- A2 Canterbury Junctions
- M20/A20 Resilience (Brock/Stack)
- Better HGV Facilities/Lorry Parks
- M25 Junctions 1a and 5
- A21 Kipping's Cross – Lamberhurst
- A21 Flimwell Relief Road
- A21 Hurst Green Relief Road
- A21 – Hastings Distributor Road
- A28 Birchington-on-Sea
- Herne – Canterbury Relief Road
- A228 Dualling
- A259 Realignment (East of Rye)

Table 5.4: Mass Transit Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
A21 Pembury – Hastings	Safety Package (RIS2)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	Proceed
	Dual whole remaining section	✓✓	✓✓✓	✓✓✓	✓	✓✓	✓	Park
	Dual Kippings Cross – Lamberhurst	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	Bypasses at Flimwell/Hurst Green	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	Links to Hastings distributor roads	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed
A28 Birchington-on-Sea	MRN Scheme	✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
Herne Bypass	Relief Road	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
Maidstone Relief Road	Relief Road (Leeds - Langley)	✓✓	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	Proceed
Longfield Access	Online improvements	✓	✓	✓	✓	✓✓	✓✓	Park
A228 Medway Valley	Dualling	✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
A28 Canterbury	Relief Road	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
A28 Ashford – Tenterden	Online improvements	✓	✓	✓	✓	✓✓	✓✓	Park
A228 Hoo Peninsula	Dualling	✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
Strood Riverside Highway	All purpose highway	✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	BRT highway	✓✓	✓✓	✓✓✓✓	✓✓✓	✓✓	✓✓	Proceed
A256 Dover – Ramsgate	Complete dualling	✓	✓	✓	✓✓	✓✓	✓✓	Park
A259 Upgrade	Brenzett – Rye	✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	Proceed
	Rye Bypass	✓	✓	✓	✓	✓✓	✓✓	Park
	Rye - Hastings	✓	✓	✓	✓	✓✓	✓✓	Park



Freight Interventions

This study has considered several interventions that target the freight sector and/or improve access to international gateways (ports and airports).

Due to the scale of these interventions, they have not been modelled in SEELUM. However, many perform well in our Multi-Criteria Assessment Framework, and are therefore supported by this project.

Table 5.4: Mass Transit Interventions and Options Assessment Results (2 of 2)

Intervention	Option	Policy Alignment Scores			Average Assessment Scores			Park or Proceed?
		National	Local	Regional	Strategic	Economic	Delivery	
New Freight Terminal(s)/ Consolidation Centres		✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Support in principle
Freight Gauge Clearance	London – Dover (various routes)	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
	North Downs Line Corridor	✓✓	✓	✓	✓✓	✓✓	✓✓	Park
Adapt passenger services to support freight supply chains		✓✓	✓	✓✓✓	✓	✓✓	✓✓✓	Park
New Freight Thames Crossing	Gravesend area – Thurrock area	✓	✓	✓✓	✓✓	✓✓	✓✓	Park
	As above with London bypass	✓	✓	✓✓	✓✓✓	✓✓	✓✓	Park
Diversification of freight at Dover (reduces reliance on Ro-Ro)		✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	Proceed
Inland waterway freight movements (River Medway)		✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	Proceed

Package 1a: Classic Rail (Freight)

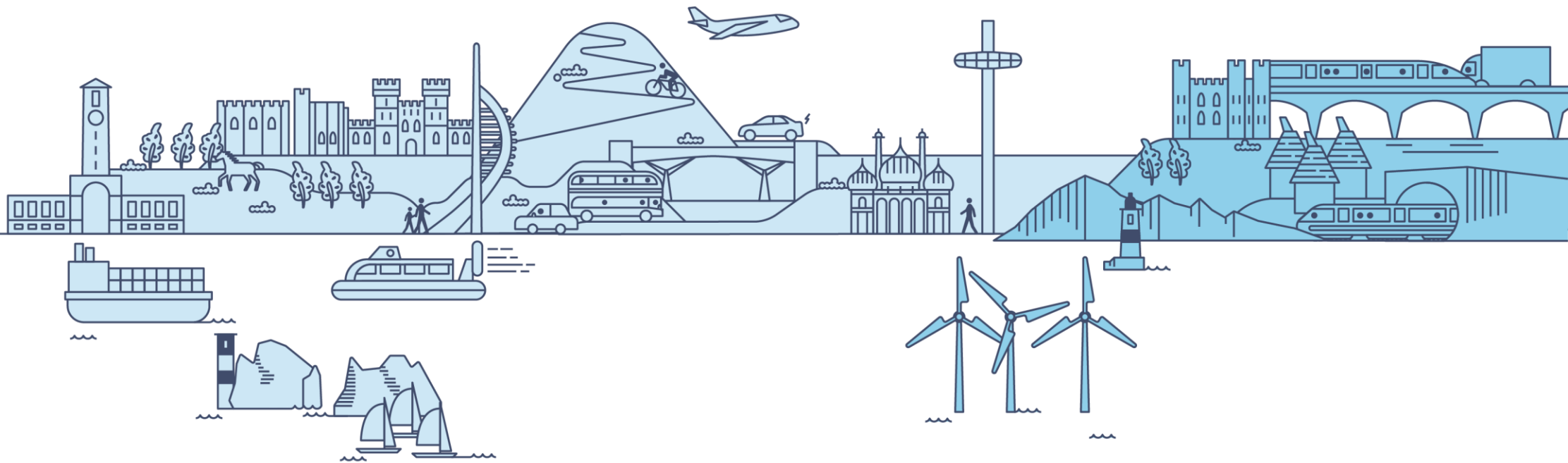
- London – Dover freight gauge

Package 2: Mass Transit (and Rivers)

- Inland Waterway Freight

Package 4: Highways

- Reduced reliance on Ro-Ro freight



Part 6

Package Modelling

Introduction to SEELUM (1 of 3)

Introducing SEELUM

In 2018, Transport for the South East commissioned Steer to develop a model to test the impact of the scenarios developed in support of the development of a Transport Strategy for the South East.

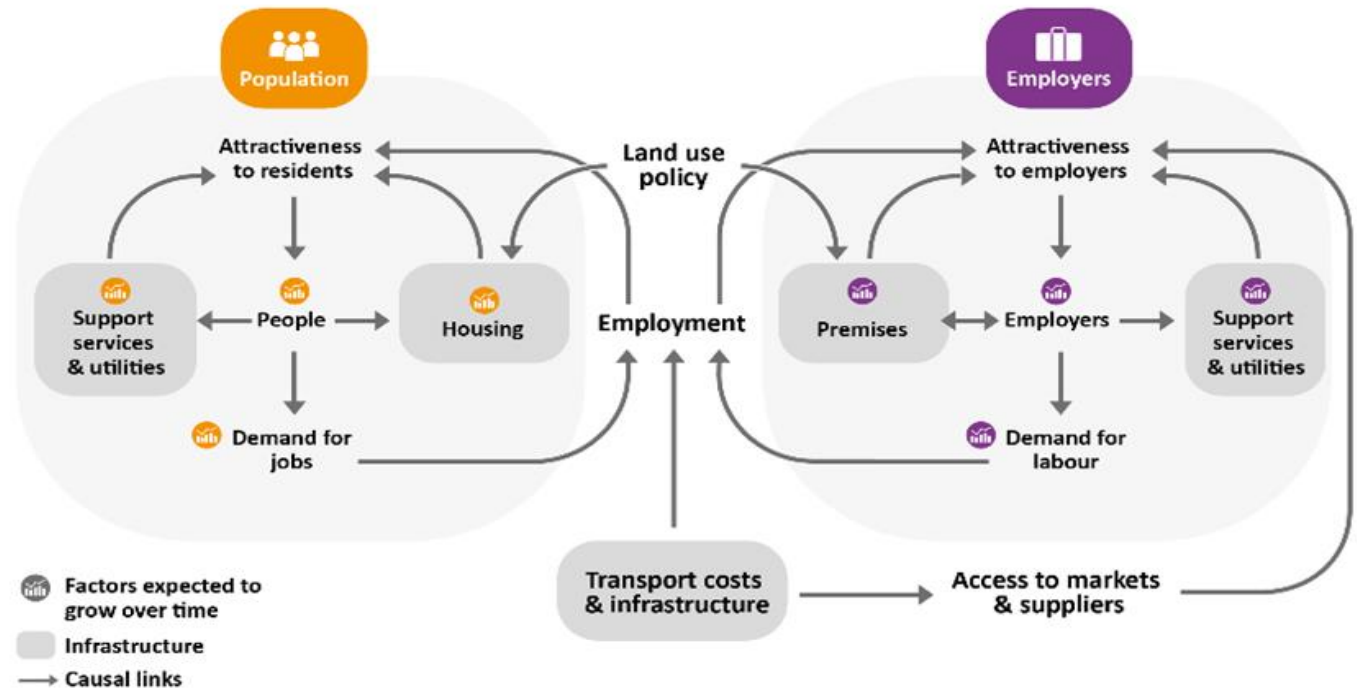
This model, known as the South East Economy and Land Use Model (SEELUM), is a transport and land use model that simulates the interaction of transport, people, employers and land-use over periods of time.

A high-level view of SEELUM is provided in Figure 6.1 to the right.

Due to the geographical scope and inter-modal nature of the Area Studies, the Project Team has agreed that SEELUM should be used to model the impacts of the Packages developed for this study on transport and socioeconomic outcomes over a 30-year period.

A map showing the zones included in the SEELUM model is provided in Figure 6.2 overleaf.

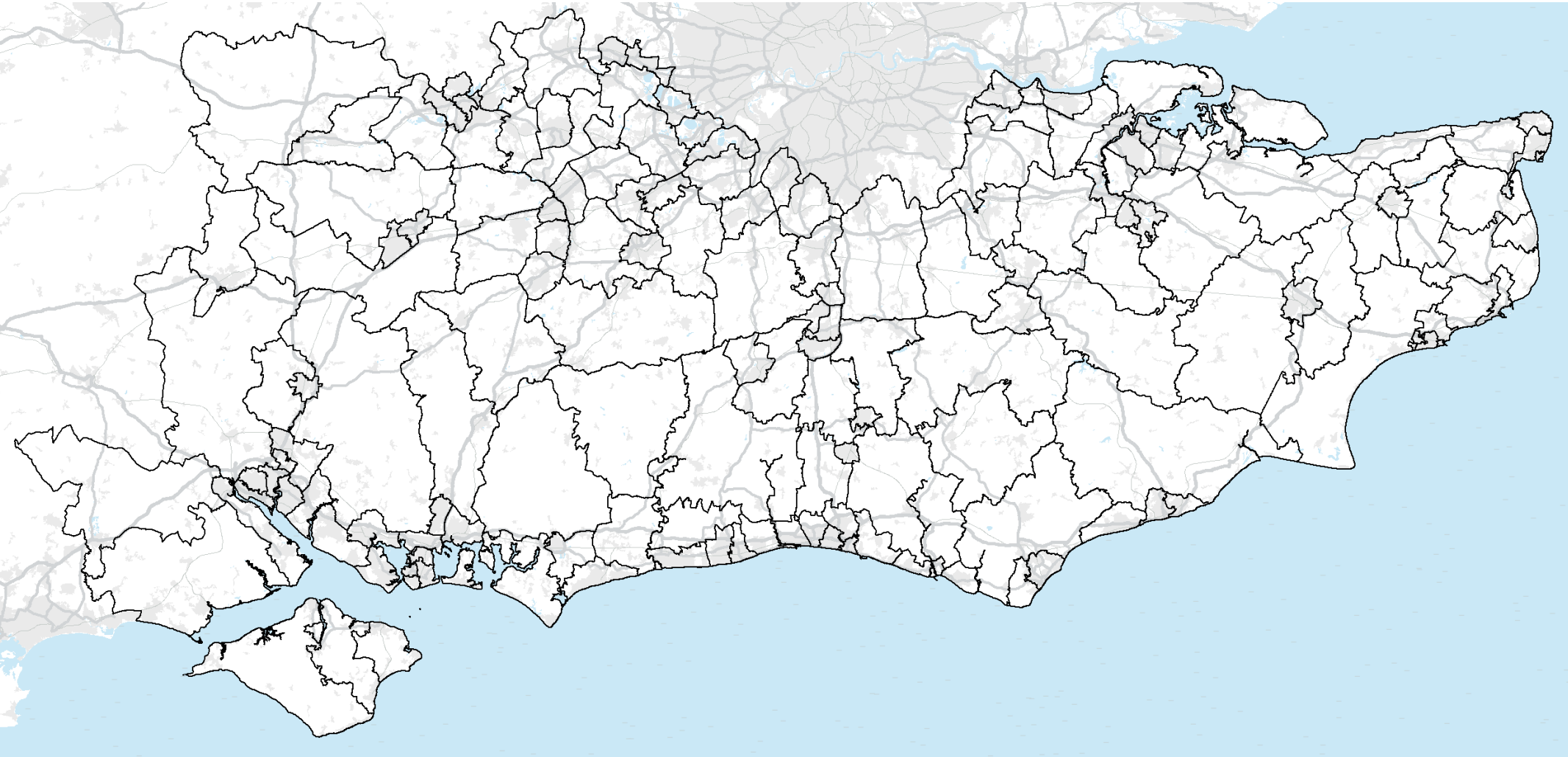
Figure 6.1: SEELUM



SEELUM produces detailed reports on:

- changes in land-use in each zone (i.e., housing units and employment premises);
- changes in households, population and the workforce in each zone;
- changes in employment (jobs filled) in each zone and the unemployment rates;
- changes on CO₂ emissions from transport activity;
- travel patterns, volumes and mode shares; and
- time savings benefits for appraisal and impacts on productivity and agglomeration.

Figure 6.2: SEELUM Zones



Introduction to SEELUM (3 of 3)

SEELUM's Capabilities and Functions

SEELUM tests how investment in transport, coupled with changes to land-use policy, affects transport outcomes and the economic performance of the South East.

It does this by simulating how changes in patterns of connectivity and access affect how attractive different locations are for employers and/or households to locate in, how they respond to these changes, and what transport patterns arise from these changes. For example, if travel costs rise in a particular area (say, due to highway congestion), depending on the other options available, people may change their mode of travel, change where they live, or change where they work. In the extreme, if there are no other viable options to access work, people can become unemployed. Similarly, businesses can relocate to an area if transport costs reduce, increasing their accessibility to the workforce.

SEELUM simulates how land use evolves over time. It considers how developers provide new housing, the inward and outward migration of households, and the start-up and closure of businesses.

SEELUM includes (relatively high-level) internal network models of highways and rail networks. These are used to model the impacts of congestion and crowding on journey times. These connect places together and influence their relative advantages as places to live or work.

SEELUM also models the carbon emissions of the highway and railway networks. This is based on the Defra's Emissions Factors Toolkit (provided by DfT). Highway emissions are calculated as a function of the vehicle kilometres (km) and an emissions rate per km based on road type. Average emission rates, differing by road type (rural, urban and motorway) are calculated using vehicle emissions rates and fleet mix assumptions derived from the Emissions Factor Toolkit. These assumptions are applied to vehicle kilometres travelled per road type, as calculated by the model to forecast highway emissions. Railway emissions are calculated by a function of kilometres travelled, vehicles in service, the consumption rate per vehicle km, and the greenhouse gas emissions per unit of fuel used.

Modelling Packages in SEELUM

To model each Package in SEELUM, adjustments were made to:

- Generalised Journey Times (GJTs) within and between each zone (by mode); and
- Characteristics of links on the highway and railway network (notably capacity).

For example, to model an improvement in bus frequencies between Chichester and Bognor Regis, GJTs were reduced for bus between each town's respective SEELUM zone. To model an improvement to the Chichester Bypass, the capacity of the highway link in SEELUM that models this part of the highway network was increased.

The Packages were modelled in SEELUM from a base year of 2018 and run for 32 years to 2050. The results are presented as a comparison to a Business as Usual Scenario (BaU), which is based on the Department for Transport's National Trip End Model (NTEM) that also projects employment and population growth to 2050.

The following pages describe the results of this modelling exercise.

Approach to Modelling Packages in SEELUM (1 of 4)

1a: Classic Rail Package

This Package adds capacity to the classic rail network in the South East Area. It includes interventions that add capacity through additional services (e.g. Crossrail to Ebbsfleet, Thameslink to Maidstone) as well as interventions that materially increase track and platform capacity (e.g. through capacity released by the Bakerloo Line extension).

The initiatives included in this package, and our approach to modelling their effects, are summarised in **Table 6.1** to the right.

Table 6.1: SEELUM Modelling Adjustments (Package 1a)

Interventions	Impact and Benefits	Modelling Adjustments
Crossrail to Ebbsfleet	This increases capacity between Abbey Wood and Ebbsfleet. The consultation website suggests an additional 8 trains per hour (tph) would serve this corridor, representing a doubling of services (and therefore capacity).	Link adjustments <ul style="list-style-type: none"> 50% increase in capacity between London – Dartford.
Bakerloo Line Extension	This removes the existing London Charing Cross – Hayes service from the classic network and reallocates this service to London Underground. This represents a reduction of 4tph on the South Eastern Main Line.	Link adjustments <ul style="list-style-type: none"> 25% increase in capacity between London – Sevenoaks.
South East London “metroisation”	This intervention assumes the timetable is rationalised to enable frequency increases on metro services between London and Gravesend are increased from 4-8tph to 8-12tph. There would be more modest increase in capacity to Sevenoaks.	Link adjustments <ul style="list-style-type: none"> 50% increase in capacity between London – Dartford. 25% increase in capacity between London – Sevenoaks.
Line speed improvements	Several interventions aim to improve maximum line speeds from c.60mph to c.90mph. This will not translate into a 50% increase in speeds due to acceleration and deceleration. However, a reduction of 20% in journey times should be achievable.	Link adjustments <ul style="list-style-type: none"> 20% reduction in “link time” between: <ul style="list-style-type: none"> Dartford – Chatham Chatham – Ramsgate Tonbridge – HastingS
Improved interchanges	This Package includes an interchange station at Canterbury and an improved interchange at Maidstone. In the Outer Orbital area studies, these were modelled by reducing interchange penalties on Generalised Journey Times at these stations.	GJT adjustments <ul style="list-style-type: none"> 5 minute reduction in rail GJTs between Canterbury/Maidstone and all other zones in SEELUM.
Hoo Peninsula	This intervention involves introducing a passenger rail service on the Grain Branch, allowing direct access to the rail network at Sharnal Street. This would reduce the GJT for some (but not all) journeys in the Hoo Peninsula.	GJT adjustments <ul style="list-style-type: none"> 5 minute reduction in rail GJTs between the Hoo Peninsula and all other zones in SEELUM.
Ebbsfleet Southern Rail Access	This intervention would link Ebbsfleet directly to Bromley, supporting orbital and local rail journeys. This would be based on using the Classic Rail Network rather than expanding the high speed rail network.	GJT adjustments <ul style="list-style-type: none"> 20 minute reduction in rail GJTs between Dartford/Gravesham – Bromley.

Package 1a

Approach to Modelling Packages in SEELUM (1 of 4)

1b and 1c: High Speed Packages

This Package includes some of the more radical interventions in the Long List for this study. They are based around expanding the domestic high speed service to deliver transformational improvements in journey times to Kent, Medway, and East Sussex. There are two packages, which are modelled separately.

The initiatives included in these packages, and our approach to modelling their effects, are summarised in **Table 6.2** to the right.

Table 6.1: SEELUM Modelling Adjustments (Packages 1b and 1c)

	Interventions	Impact and Benefits	Modelling Adjustments
Package 1b	High Speed East Kent/Sussex	This package would deliver direct High Speed services from London to Eastbourne via Ashford and Hastings, reducing journey times from Hastings/Bexhill to London by 20 minutes. It would also deliver faster journey times to Dover using a connection to HS1 at Dollands Moor, and an increase in the frequency of HS1 services to Ashford from 2 to 4tph.	Link adjustments <ul style="list-style-type: none"> 20% reduction in “link times” between: <ul style="list-style-type: none"> Ashford – Hastings 100% increase in capacity between: <ul style="list-style-type: none"> Ashford – Hastings Ashford – London GJT adjustments <ul style="list-style-type: none"> 25 minute reduction in rail GJTs between Bexhill/Hastings and London/East/Midlands/ North/Scotland. 5 minute reduction in rail GJTs between Folkestone/Dover – London/East Mids/North/Scotland.
Package 1c	High Speed North Kent/Medway	Several options for delivering significant improvements in connectivity to North Kent have been considered for this study. The precise configuration of these options is not yet defined. However, we can provide estimates for GJT reductions based on the “Medway City Line” proposal. This are set out to the right. This intervention would include a revamped interchange at Strood, which would reduce interchange penalties between the Medway Valley, North Kent, and Chatham Main Lines. Additionally, the higher level of frequency in services on HS1 would open up opportunities for direct services from North Kent and East Kent to the Midlands and Stansted Airport. Public websites suggest this would save 15-30 minutes on journeys between West Coast Main Line destinations and Stratford International. We have assumed one of the Dover – London and one of the Faversham – London services would be diverted for this purpose.	Link adjustments <ul style="list-style-type: none"> 50% increase in capacity b/w London – Chatham GJT adjustments <ul style="list-style-type: none"> Rail GJT reductions between for journeys to/from London/Ebbsfleet/North/East/Midlands/Scotland: <ul style="list-style-type: none"> Strood: 7½ mins (speed) and 7½ mins (frequency) Hoo Peninsula: 12½ mins (speed) and 7½ mins (freq.) Rochester: 5 mins (speed) Chatham: 5 mins (speed) Gillingham: 15 mins (speed) and 2½ mins (frequency) Rainham: 15 mins (speed) and 2½ mins (frequency) Sittingbourne: 15 mins (speed) and 2½ mins (freq.) Faversham: 15 mins (speed) and 2½ mins (frequency) Whitstable/H. Bay: 15 mins (speed) and 7½ mins (freq.) Sheerness: 25 mins (speed) (speed) and 5 mins (freq.) Margate: 2½ mins (speed) and 2½ mins (frequency) Canterbury: 5 mins (frequency) Rail GJT reductions between Ashford/Folkestone and: <ul style="list-style-type: none"> Strood: 7½ mins (speed) Hoo Peninsula: 12½ mins (speed) Rochester: 5 mins (speed) Chatham: 5 mins (speed) Gillingham: 15 mins (speed) Rainham: 15 mins (speed) Sittingbourne: 15 mins (speed) Faversham: 15 mins (speed) Sheerness: 25 mins (speed) 10 minute GJT reduction between Strood – Rainham. 20 minute GJT reductions b/w Hoo Peninsula – Rainham. 5 min reduction in GJTs b/w Strood and all other zones. 15 minute reduction in rail GJTs between HS1 stations and the North/East/Midlands.

Approach to Modelling Packages in SEELUM (3 of 4)

2: Mass Transit

This Package delivers improvements to all bus services in Kent, Medway, and East Sussex. The scope for improvements and expansion are particularly strong in the Kent Thameside and Medway areas, where high levels of growth and regeneration are expected.

The initiatives included in this package, and our approach to modelling their effects, are summarised in **Table 6.3** to the right.

3: Active Travel

This Package assumes there would be a general uplift in the quality of walking and cycling infrastructure, particularly in urban areas.

The initiatives included in this package are also shown to in the table to the right.

Table 6.3: SEELUM Modelling Adjustments (Packages 2 and 3)

	Interventions	Impact and Benefits	Modelling Adjustments
Package 2	North Kent and Medway Mass Transit	This intervention delivers a step change in mass transit connectivity in the Medway Area, which would be based on a BRT system. This system could extend beyond Medway's borders to meet the Fastway service at Gravesend. This intervention includes a new bus link between Chatham Waterside and the Medway City Estate, which would reduce journeys between Chatham and this high density employment area from c. 25 minutes to c. 5 minutes. This also includes a new multimodal Strategic Mobility Hub at Cuxton and a BRT in Dover.	GJT adjustments <ul style="list-style-type: none"> 20% reduction in bus GJTs between and within all zones in Medway (and surrounding areas in North Kent) and Dover Town. 50% reduction in bus GJTs between Chatham and the Medway City Estate. 10% reduction in bus GJTs everywhere else in Kent and East Sussex. 5 minute reduction in all bus GJTs between Cuxton/Canterbury and all other zones.
	Interurban and rural bus services	This intervention assumes all other conventional bus services in the South East Radial area experience general improvements in journey times, frequencies, and service quality. The assumed reduction in GJTs mirrors those derived for the Outer Orbital Area Study. This includes a Strategic Mobility Hub at Canterbury.	Please note <ul style="list-style-type: none"> Hastings and Bexhill mass transit improvements are modelled in the Outer Orbital Area Study. Improvements between Maidstone and Medway are modelled in the Inner Orbital Area Study.
Package 3	Bike sharing schemes	Bike Sharing interventions reduce generalised journey times of active travel and public transport – one study suggests savings of <u>10% per trip</u> are achievable. We have assumed that bike sharing schemes will eventually be available in all built up areas (thanks to emerging new mobility services). Thanet Please note that cycling interventions for Hastings/Bexhill are modelled in the Outer Orbital Area Study.	GJT adjustments <ul style="list-style-type: none"> 10% reduction in active travel GJTs within zones served by bike share schemes: <ul style="list-style-type: none"> Ashford Canterbury Dartford Folkestone Gravesend Herne Bay/Whitstable Maidstone Medway Royal Tunbridge Wells/Tonbridge Sittingbourne
	Cycling infrastructure	A study on the effect of London's Cycle Superhighways found that journey times by bike were reduced by <u>11%</u> . We have assumed the Built Up Areas will benefit from this type of cycling infrastructure. We are also including improved infrastructure between several Major Economic Hubs in Kent.	GJT adjustments <ul style="list-style-type: none"> 10% reduction in active travel GTJs within Built Up Areas and between: <ul style="list-style-type: none"> Gravesend – Medway – Sittingbourne Faversham – Canterbury Tonbridge – Maidstone Sevenoaks – Maidstone – Sittingbourne

Approach to Modelling Packages in SEELUM (4 of 4)

4: Highways

This packages includes several interventions that aim to improve the resilience of the M2/A2 and M20/A20 corridors, improve the connectivity of Coastal East Sussex (via the M21 corridor), and relief congestion in city and town centres – often to enable housing growth and/or improve public transport and active travel facilities in urban areas.

The initiatives included in this package, and our approach to modelling their effects, are summarised in **Table 6.4** to the right.

It was not possible to model all interventions in SEELUM due to their geographic scale. These include:

- A28 Birchington Relief Road;
- Hastings Distributor roads;
- Herne Bypass;
- Canterbury/Fordwich Relief Road; and
- Maidstone Relief Road.

The Lower Thames Crossing has been modelled separately to reflect the fact this intervention partially sits outside the South East (see footnote in following page).

Table 6.4: SEELUM Modelling Adjustments (Package 4)

	Interventions	Impact and Benefits	Modelling Adjustments
Package 4a	A2 Canterbury – Dover	This would upgrade the current highway from UAP1 Single (9.0m) to UAP1 Dual 2 (7.30m) between Lydden and Dover, which represents a capacity increase of 94%. This would apply to approximately 25% of the SEELUM highway link between Canterbury and Dover, yielding an overall increase of 24%.	Link adjustments <ul style="list-style-type: none"> • 24% increase in capacity between Canterbury and Dover
	Junction and resilience improvements	We have included a notional 5% increase in capacity on the M2/A2 and M20/A20 between Dover and the M25 to reflect a range of interventions on this corridor.	Link adjustments <ul style="list-style-type: none"> • 5% increase in capacity between Dover and the M25 (both via the M2/A2 and the M20/A20).
	A21 Pembury – Hastings	It is envisaged a package of interventions would deliver a fully dualled solution from the M25 to Lamberhurst, and a high quality (partially offline) single carriageway solution from Lamberhurst to Hastings.	Link adjustments <ul style="list-style-type: none"> • 47% increase in highway capacity between Pembury – Lamberhurst. • 8% increase in highway capacity between Lamberhurst – Hastings.
Package 4b	A228 Medway Valley	This intervention was modelled in the Inner Orbital Area Study. It is also included here. It would upgrade the current highway from UAP1 Single (9.0m) to UAP1 Dual 2 (7.30m) between New Hythe and Strood, which represents a capacity increase of 94%. This would apply to approximately 50% of the SEELUM highway link between New Hythe and Strood, yielding an overall increase of 24%.	Link adjustments <ul style="list-style-type: none"> • 24% increase in capacity between New Hythe and Strood.
	Lower Thames Crossing	National Highways have undertaken detailed modelling to support the development of this intervention This modelling suggests the highway network links in SEELUM that connect Kent to Essex and Dartford to Strood will accommodate a: <ul style="list-style-type: none"> • 43% increase in AM peak hour traffic • 28% increase in inter-peak hour traffic • 37% increase in PM peak hour traffic • 21% reduction in demand in the “peak hours” To reflect this in SEELUM, we have modelled the Lower Thames Crossing as providing a 43% increase in capacity for the links in the model that are relieved by the new crossing.	Link adjustments <ul style="list-style-type: none"> • 43% increase in capacity at the Dartford Crossing and between the Dartford Crossing and Strood.

Modelling Results Overview (1 of 2)

A summary of the transport and socioeconomic outcomes generated by SEELUM for each of the Packages (and a combined Package) is provided in **Table 6.5.** below. A more detailed commentary on these results is provided in following pages.

Table 6.5: Modelling Results

Packages	1a	1b	1c	2	3	4a	4b	All
	Classic Rail	High Speed Rail (East)	High Speed Rail (North)	Mass Transit	Active Travel	Highways	Lower Thames Crossing	All Packages
Transport Outcomes								
Δ Car Trips	1,114	925	727	(50,971)	(48,351)	9,573	87,335	353
Δ Rail Trips	16,535	15,679	37,115	(1,357)	(355)	(1,107)	(2,839)	63,671
Δ Bus Trips	(84)	(47)	(589)	86,325	(6,180)	(1,013)	(2,626)	75,786
Δ Active Trips	689	851	(1,466)	(30,262)	56,204	(1,762)	(5,980)	18,274
Δ Total Trips	18,255	17,409	35,787	3,736	1,318	5,691	75,889	158,084
Socioeconomic Outcomes								
Δ Population	6,151	5,802	11,668	1,552	431	1,199	1,586*	28,389*
Δ Employment	1,516	1,409	2,436	401	253	966	1,393*	8,375*
Δ GVA (£m)	112	102	181	37	11	72	85*	600*
Δ Carbon (Initial)	(27)	(25)	(44)	(41)	(31)	55	75*	(38)*
Δ Carbon (2050)	(13)	(12)	(15)	(31)	(14)	57	80*	51*

*Trips are presented as trips per typical weekday
Carbon is presented as thousand metric tonnes of carbon dioxide equivalents (KMTCD)*

** These results present 40% of the socioeconomic results for the Lower Thames Crossing, as approximately 60% of this intervention lies outside South East England. Trips are not pro-rated, however.*

These outputs show results from running interventions from 2018 to 2050. In the Strategic Programme Outline Case we will show results for these packages modelled to timelines tied to their delivery.

Modelling Results Overview (2 of 2)

Maps showing the spatial impact of Package 1b (East and North Kent) are provided in Figure 6.9 on page 70.

Package 1a: Classic Rail

The High Speed Rail (East) Package delivers a significant boost for employment and economic growth (represented by GVA).

This package boosts rail demand by over 16,000 return rail trips each weekday. By 2050, it is estimated that this package could unlock GVA growth in excess of £100m per annum, while minimising growth in car trips and carbon emissions.

Package 1b: High Speed Rail (East)

The High Speed Rail (East) Package also delivers a significant boost for GVA, particularly less prosperous areas in coastal Kent and East Sussex.

The scale of impact of this package on transport and socioeconomic outcomes is around the same scale as Package 1a, but the impacts are concentrated in the coastal Kent and East Sussex Districts. This suggests this package aligns strongly with the government's "Levelling Up" agenda.

Package 1c: High Speed Rail (North)

The High Speed Rail (North) Package also delivers significant economic growth – especially for less prosperous areas in North Kent and Medway.

The scale of impact on rail trips, rail mode share, and GVA growth are approximately double those generated by the High Speed East package. This suggests there are grounds to consider ambitious interventions for rail in North Kent and Medway.

Package 2: Mass Transit

The Mass Transit Package delivers transformational growth in bus journeys – as well as significant mode shift.

This Package would grow bus's mode share in the South East Radial Area from 7% to 8.3%. It would also remove over 50,000 car journeys from the roads each weekday.

This Package also provides a boost to GVA (we estimate £37m per annum).

This Package makes a significant contribution towards achieving the vision and objectives of this study.

Package 3: Active Travel

The Active Travel Package would boost cycling and walking by 6% and encourage mode shift from car to active travel modes.

This Package would also make a significant contribution towards reducing carbon emissions in the South East Radial Area.

Package 4a: Highways

The Highways Package delivers a significant boost to GVA (we estimate £72m per annum) but yields a modest increase in carbon emissions.

This package has a relatively small impact on mode share and car trips.

Package 4b: Lower Thames Crossing

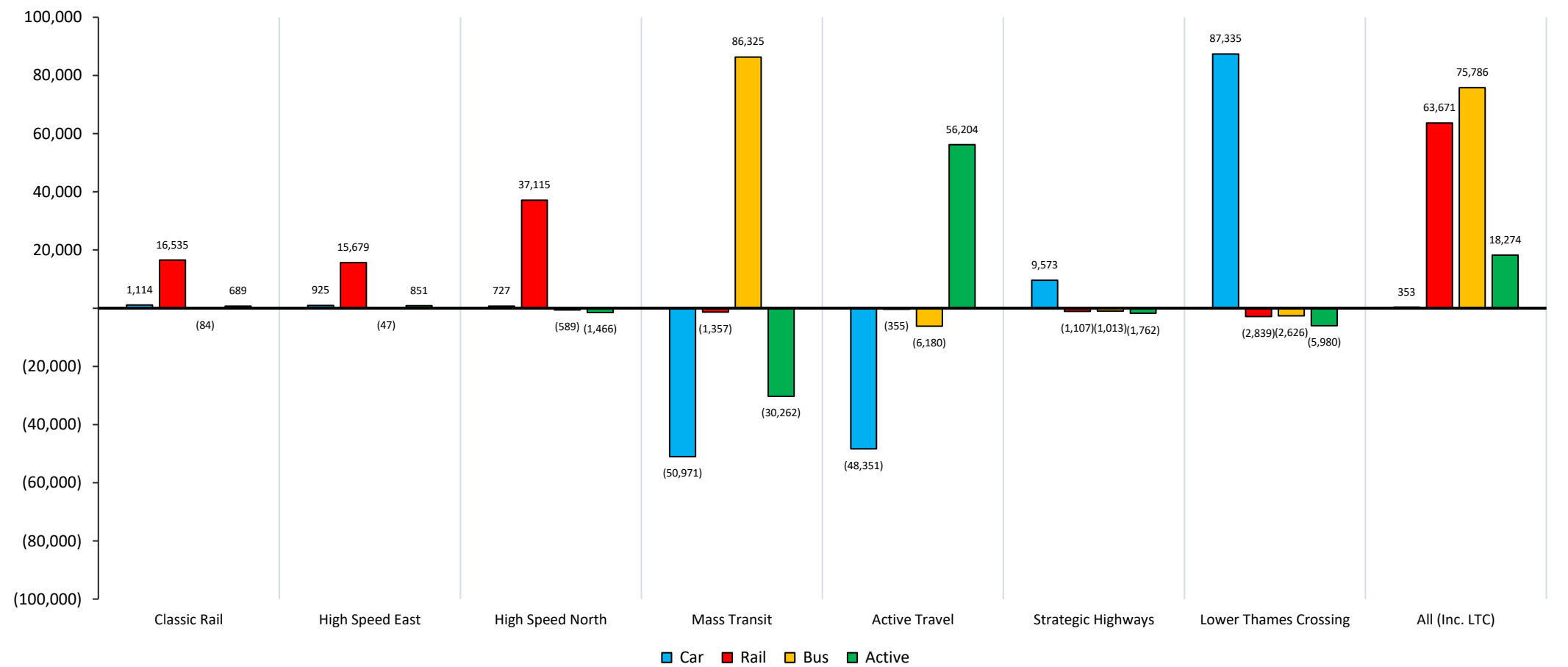
The Lower Thames Crossing also delivers a boost to GVA (our estimates are around £85m per annum) but also increases carbon emissions.

The carbon emission estimates are based on current government forecasts, which we understand are being reviewed in light of emerging (more aggressive) ambitions for decarbonisation.

Modelling Results Details (1 of 4)

Figure 6.3 below presents the change in weekday trips that arise at the end of the modelling period (2050) for each of the Packages and modes in the scope of this study. As expected, rail, bus, and active travel interventions all generate higher demand for their respective modes. The mass transit and active travel packages are effective in reducing car trips.

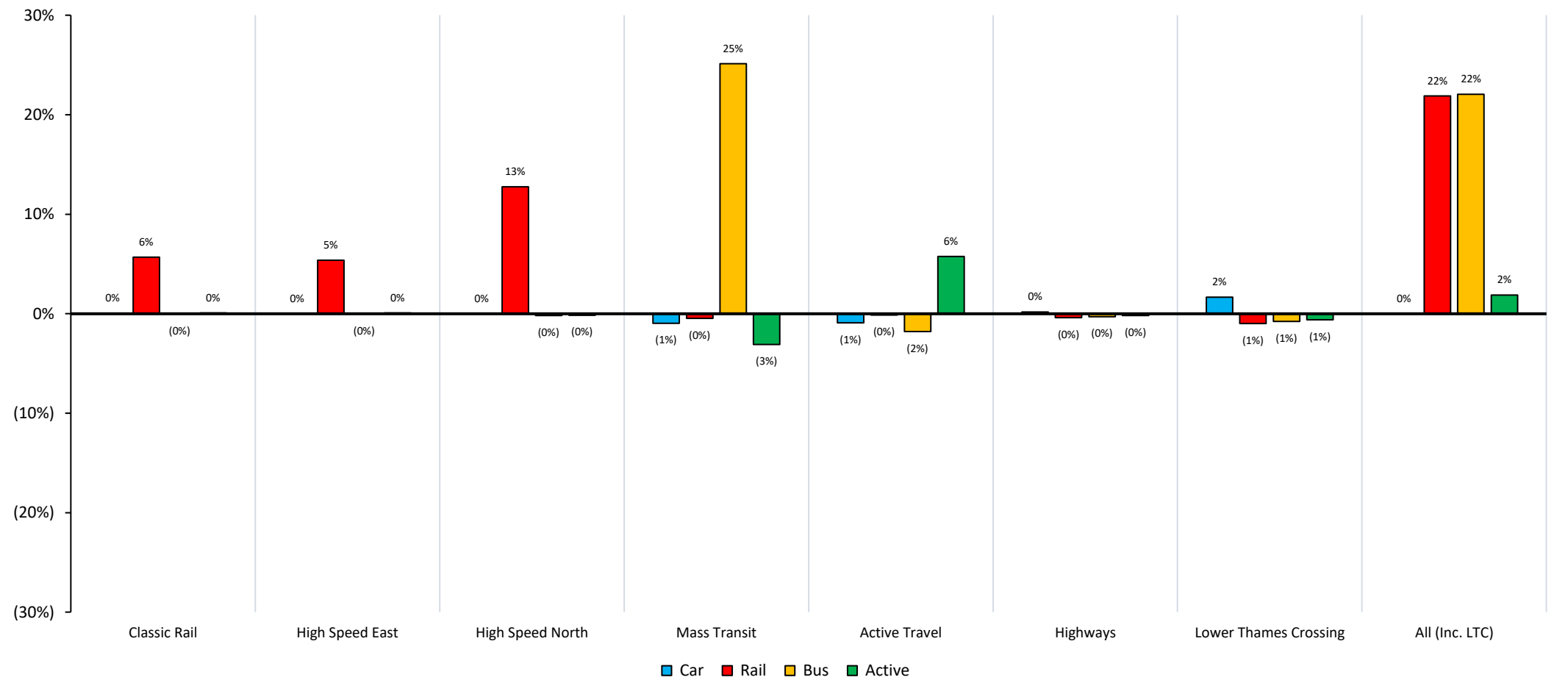
Figure 6.3: Change in weekday trips



Modelling Results Details (2 of 4)

Figure 6.4. presents the same results as Figure 6.3 as a percentage of Business as Usual weekday trips. This highlights the relatively size of growth in rail and bus/mass transit trips that might be achieved if the Packages supporting these modes are delivered. It also highlights that the Highways Packages appear to have a relatively small impact on car trips.

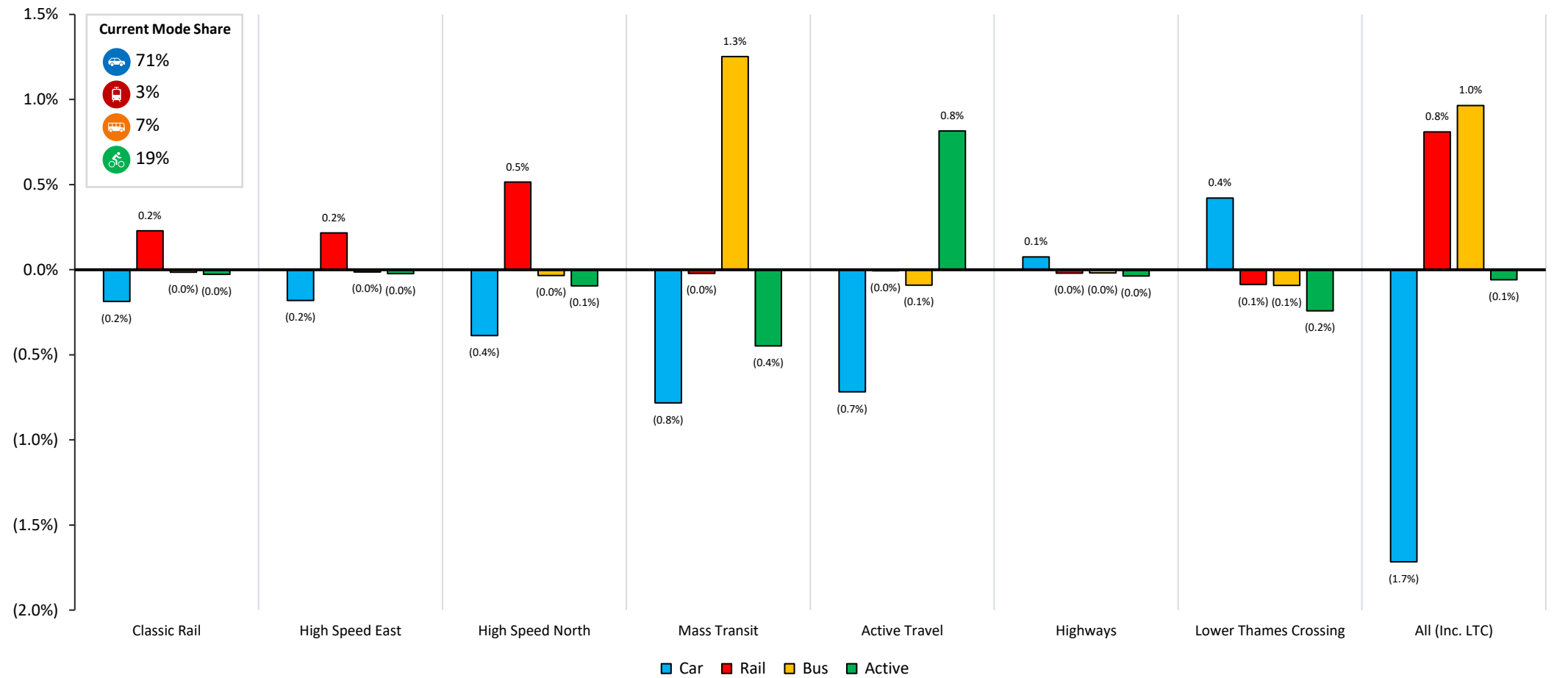
Figure 6.4: Change in weekday trips (%)



Modelling Results Details (3 of 4)

Figure 6.5 presents the travel outcomes from the modelling as a mode share. The Business as Usual mode share is shown in the box in the top left. Together, the Packages generate significant mode shift to mass transit, moderate mode shift to rail, very little (net) change to active travel, and a reduction in car's mode share.

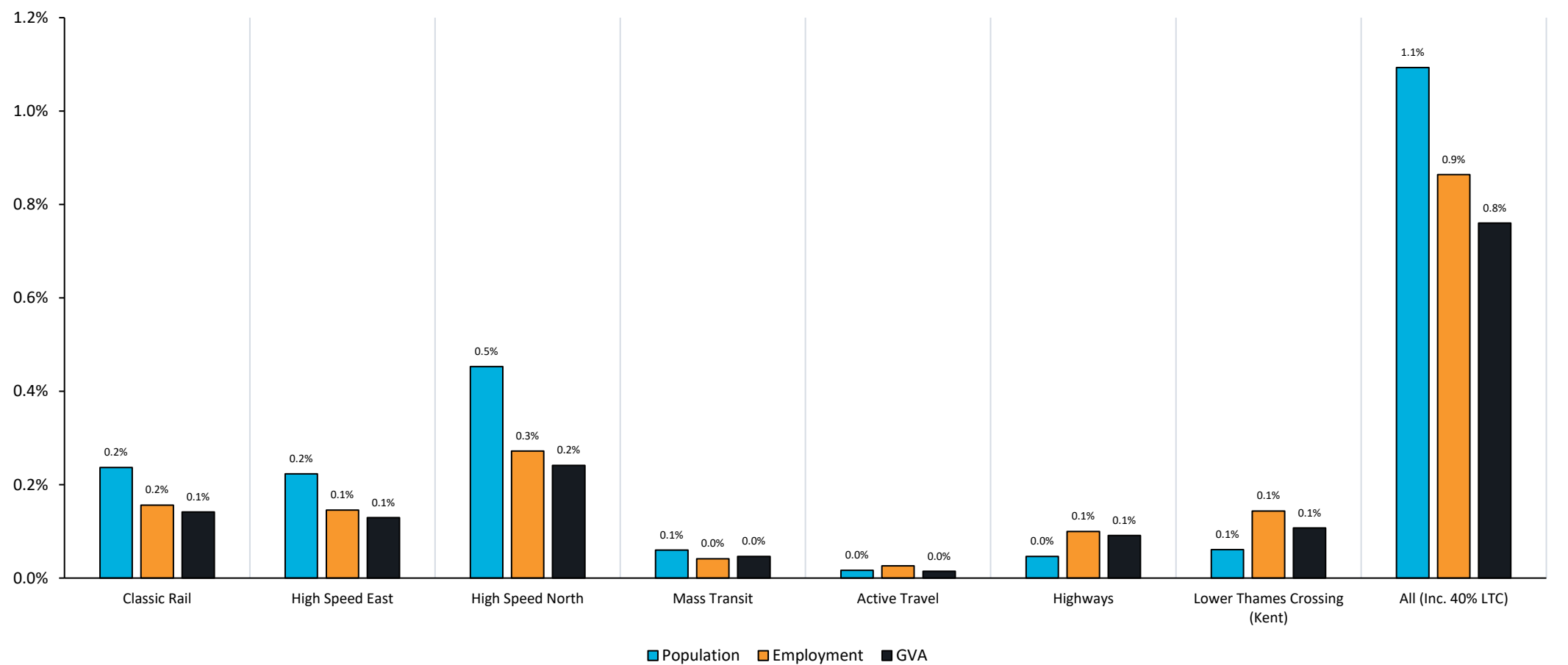
Figure 6.5: Change in mode share (%)



Modelling Results Details (4 of 4)

Figure 6.6 summarises the key socioeconomic outcomes produced by the model runs (by the year 2050). Together, the Packages deliver significant boosts to GVA. The greatest contribution to GVA growth comes from rail and highways interventions. In general, the largest interventions (in terms of likely cost) appear to yield the highest GVA growth.

Figure 6.6: Socioeconomic Outcomes



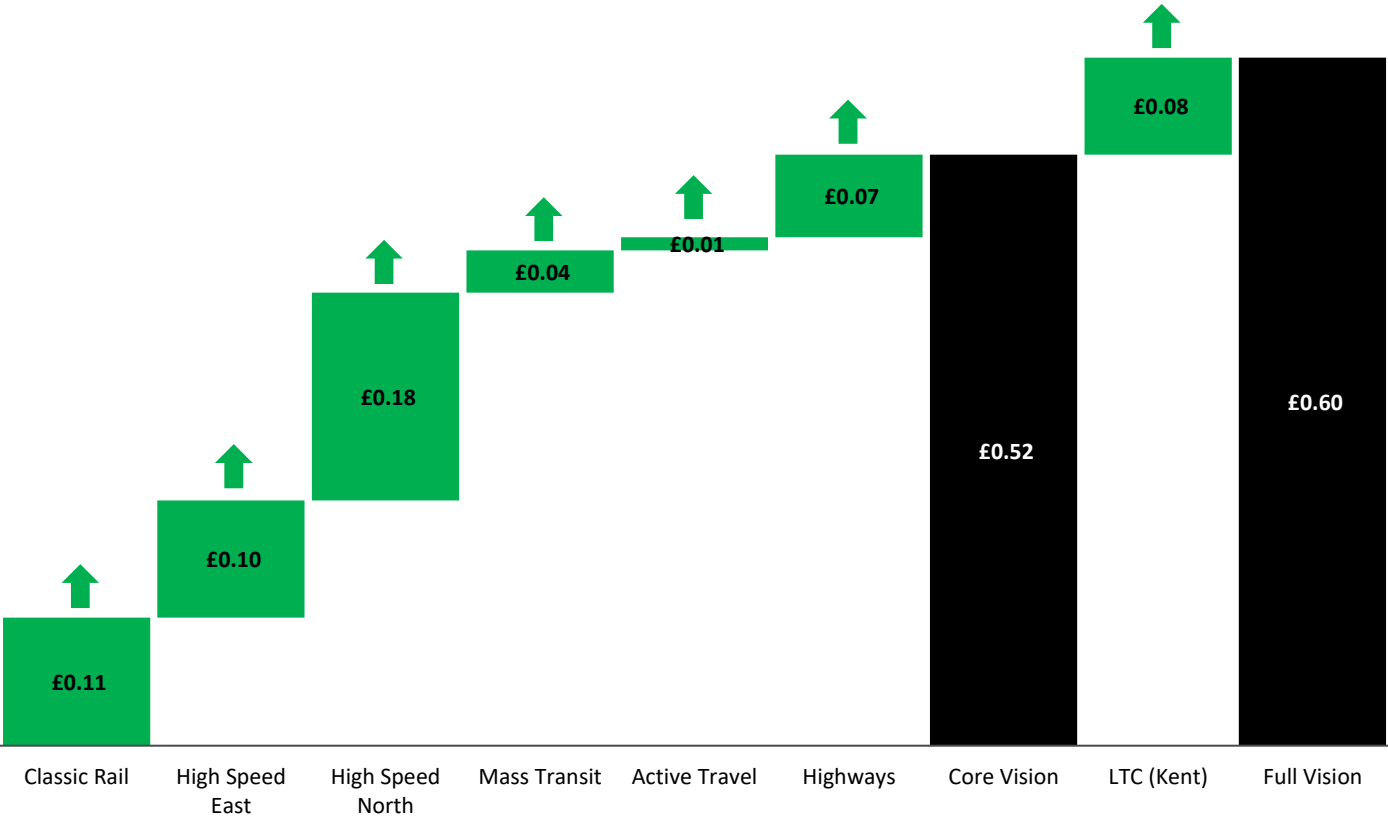
Trade Offs (1 of 2)

Gross Value Added (GVA)

Most Packages generate a boost to population, employment, and (as shown in Figure 6.7. to the right), GVA. Together, these Packages deliver a higher GVA.

All packages contribute to GVA growth. The largest contributors to GVA growth are from the rail packages, including the (potentially significant) high speed rail interventions.

Figure 6.7: Change in GVA arising from Packages (£m per annum by 2050)



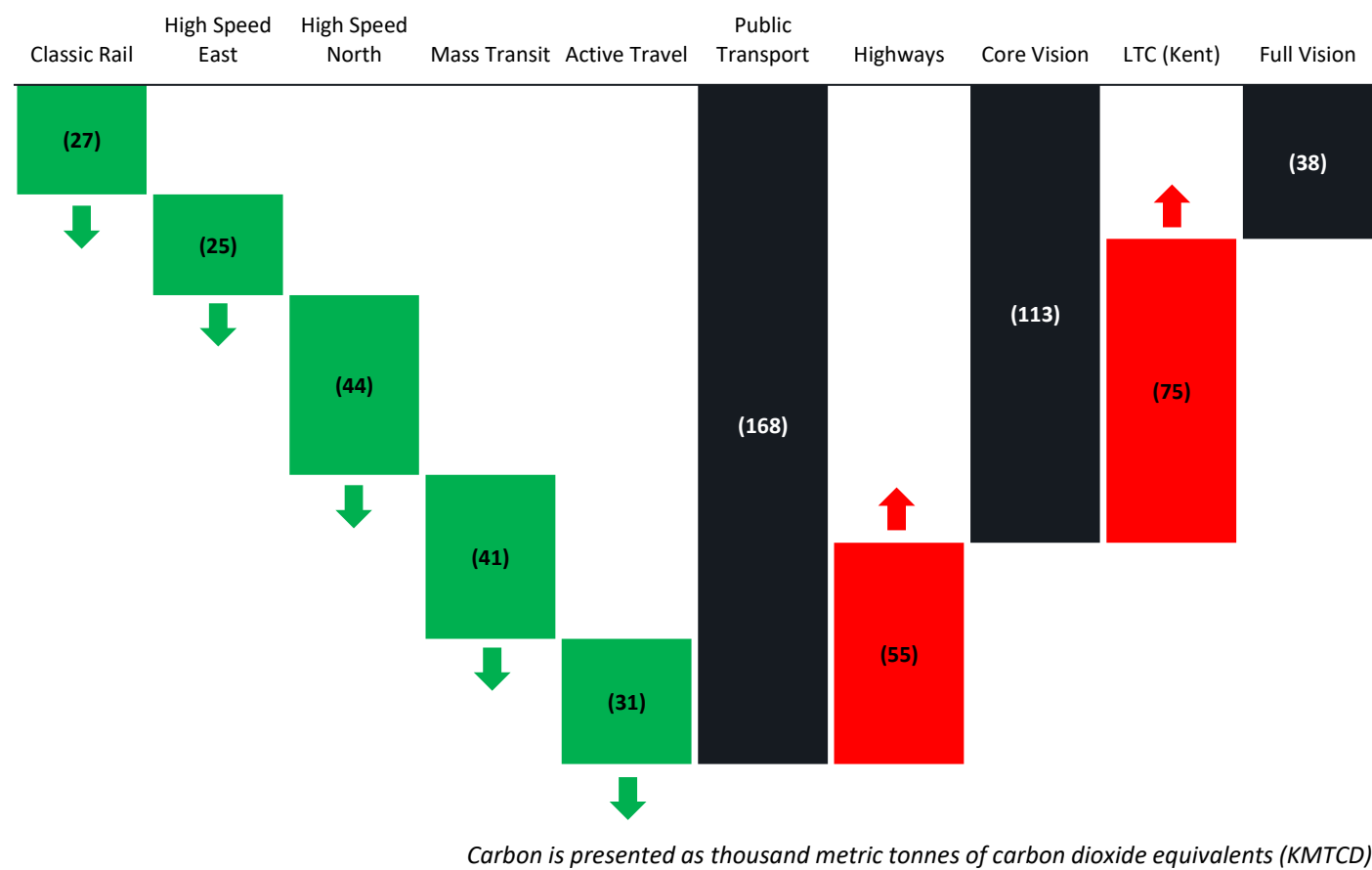
Carbon Emissions

Most Packages contribute to the South East Radial Area Study’s goal of reducing carbon emissions. However, the Highways Package reduces many of the gains made through other interventions.

Figure 6.8 provides a breakdown of the contribution of the Packages towards decarbonisation. The greatest impact arises from the Rail, Mass Transit, and Active Travel Packages. Again, it should be noted the significant contribution the (potentially high cost) high speed rail interventions make towards decarbonisation.

The model results shown in Figure 6.9 do not reflect global policy interventions that will also be included in TfSE’s Strategic Investment Plan. These will be presented in due course. They are likely to include significant efforts to decarbonise highways (faster) and use pricing signals to encourage even greater mode shift towards lower carbon modes. They should help significantly mitigate the impact of the Strategic Highways package.

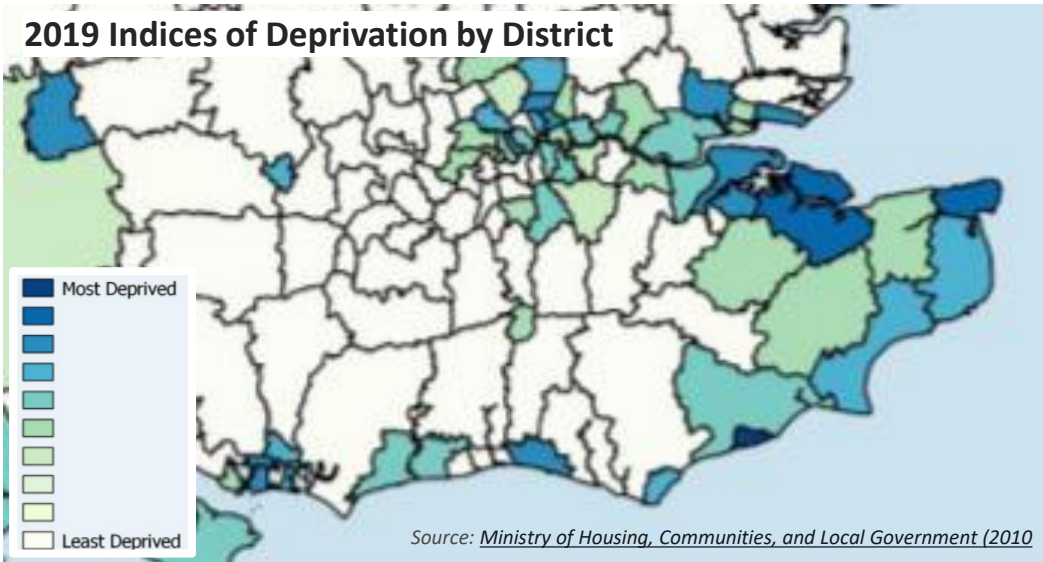
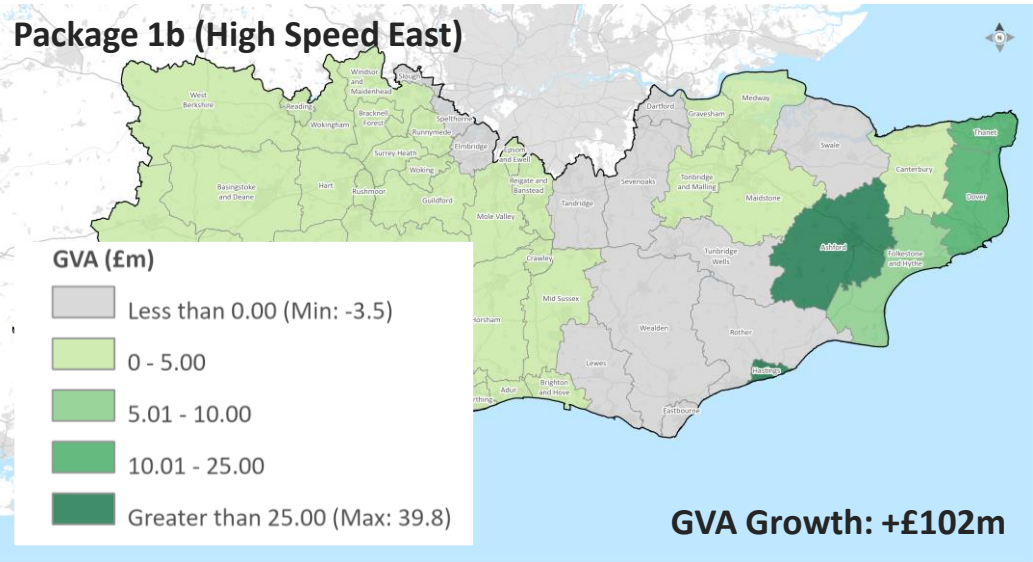
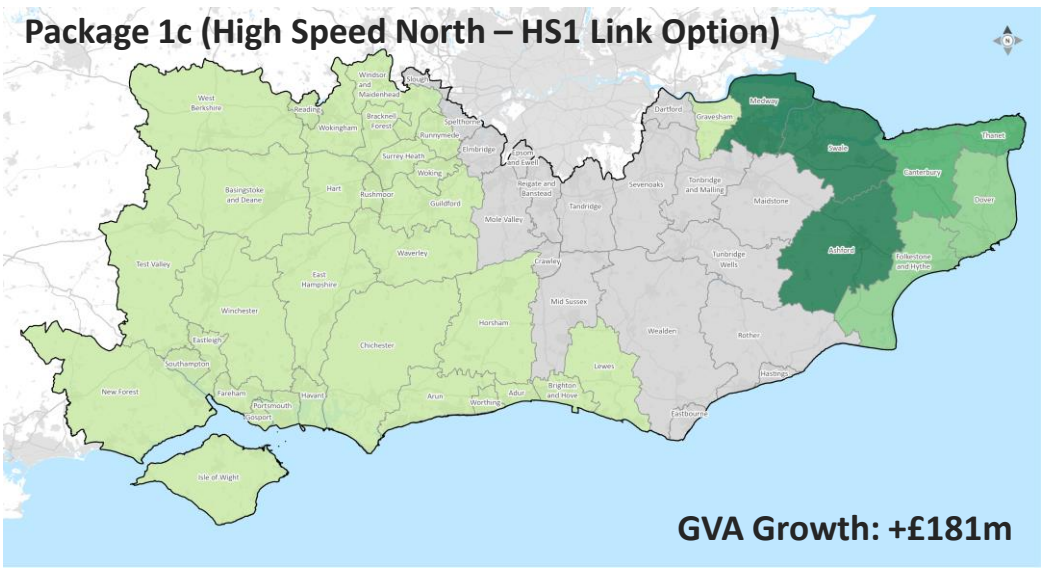
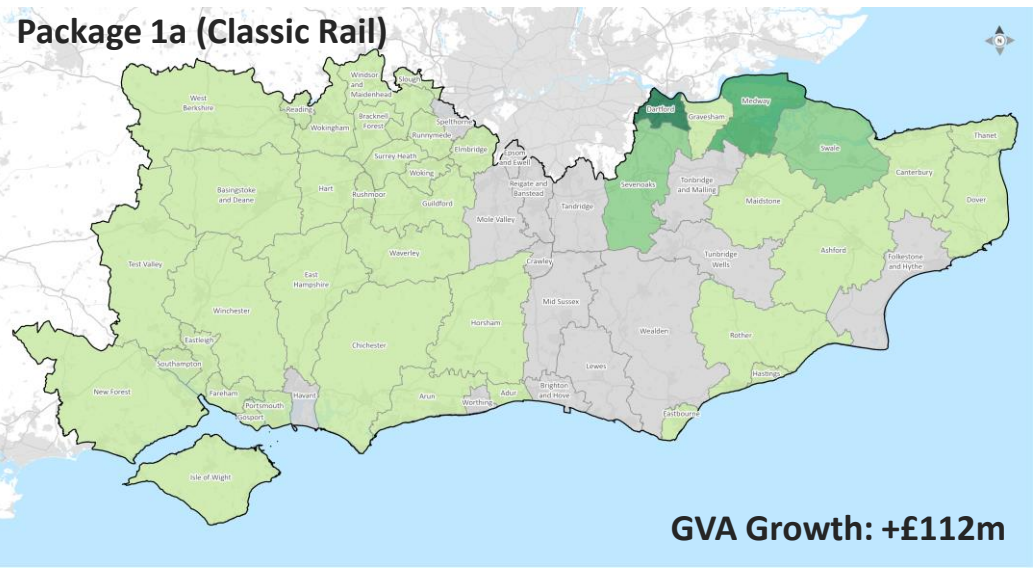
Figure 6.8: Change in carbon emissions arising from Packages (initial impacts, KMTDC)



Spatial Impacts of Rail Packages

Figure 6.9 shows the GVA impacts for the rail packages included in this study compared to the 2019 deprivation index.

Figure 6.9: GVA per annum growth by district (by 2050) for rail packages



Package Alignment to Problem Statements and Objectives

Alignment with Problem Statements

In Part 2 and Appendix A we list 23 Problem Statements that the South East Radial Area Study aims to address.

Table 6.7 on the following page presents a qualitative assessment on the extent to which each package of interventions address each Problem Statement.

This assessment uses a simple scale shown below:

- ✓✓✓ Fully addresses Problem Statement
- ✓✓ Mostly addresses Problem Statement
- ✓ Partially addresses Problem Statement

Table 6.9 includes a column on the right under the heading ‘All Packages’. The scores in this column represent the highest score assigned to each of the individual packages. If one package scores two ticks and all other packages score none, then the column ‘All Packages’ is also assigned two ticks.

Table 6.7 (overleaf) shows that most Problem Statements are fully addressed by the Packages presented in this report.

That said, two Problem Statements are ‘mostly’ addressed, and two Problems Statements are only ‘partially’ addressed. The Problem Statements that are not (yet) fully addressed relate to:

- reliance of freight on highways;
- relatively weak productivity;
- poor rural connectivity;
- highly constrained space at Dover; and
- integration and information.

The Area Study programme will include a global policy package of interventions that will be applied across all packages and areas.

These policies will be designed to directly address the gaps highlighted in Table 6.9.

Alignment with Objectives

We have also assessed the extent to which the packages presented in this report deliver this study’s Objectives.

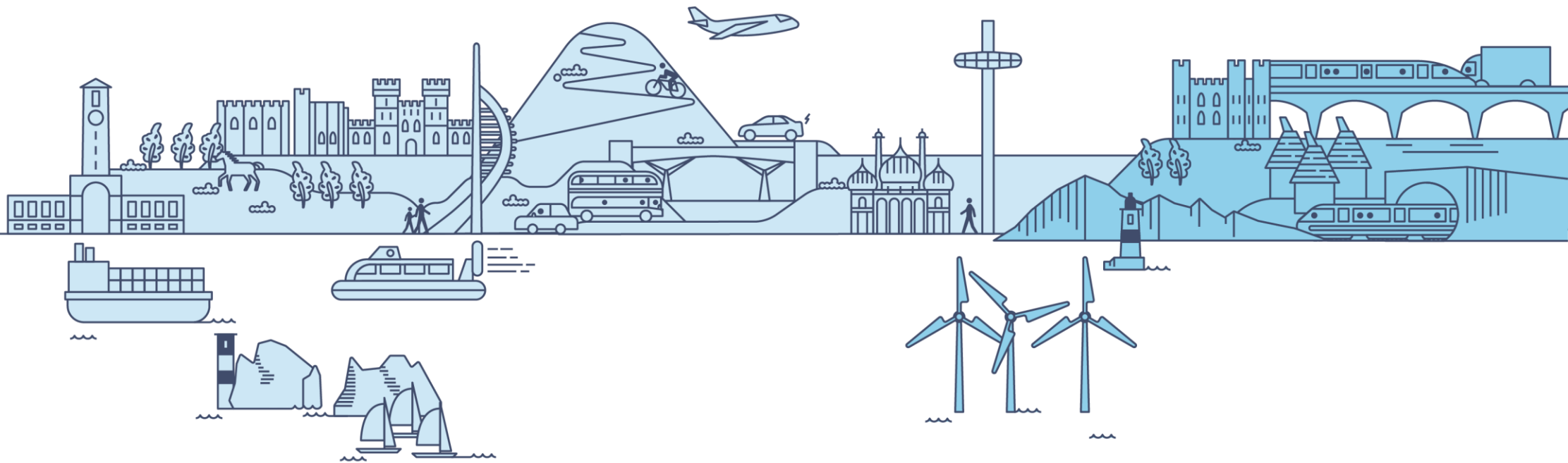
Table 6.6 below summarises the number of interventions in each Package that have a ‘high’ or ‘very high’ alignment with the objectives of the South East Radial Study.

Table 6.6: Interventions and objectives	
Objective	Interventions
Climate Change	35
Regeneration	60
International Gateways	20
Economy	102
Society	97
Environment	31

Based on this analysis, we are confident that the packages developed for this study and presented in this report can help TfSE and its member authorities achieve the Vision and Objectives described in this study.

Table 6.7: Problem Statement Mapping to Packages

Problem Statement	1a Rail (Classic)	1b & 1c Rail (High Speed)	2 Mass Transit	3 Placemaking	4 Highways	All Packages
Decarbonisation	✓✓	✓✓	✓✓✓	✓✓		✓✓✓
Climate resilience	✓✓✓	✓✓✓	✓✓✓	✓✓		✓✓✓
Freight reliance on highways	✓✓	✓				✓✓
Housing (need plan planning)	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
New technologies and equity	✓	✓	✓✓	✓✓✓	✓✓	✓✓✓
Connectivity to rest of UK	✓	✓✓✓	✓		✓✓✓	✓✓✓
Economic (over)-reliance on London	✓✓	✓✓✓	✓		✓✓	✓✓✓
Relatively weak productivity	✓✓	✓✓	✓✓		✓✓	✓✓
Poor coastal connectivity	✓	✓✓✓	✓✓			✓✓✓
Poor rural connectivity	✓		✓✓		✓✓	✓✓
Highly constrained space at Dover	✓				✓✓	✓✓
Channel ports (over)-reliance on one corridor	✓✓	✓✓	✓		✓✓✓	✓✓✓
Impact of port disruption on wider area	✓	✓	✓		✓✓✓	✓✓✓
Highway congestion, safety, and air quality issues	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
Relatively slow rail services	✓✓	✓✓✓				✓✓✓
Rail resilience challenges	✓✓✓	✓✓✓				✓✓✓
Rail capacity challenges	✓✓✓	✓✓✓				✓✓✓
Variable/poor mass transit provision	✓✓	✓✓	✓✓✓	✓✓		✓✓✓
Weak public transport integration	✓✓✓	✓✓✓	✓✓✓			✓✓✓
High and complex public transport fares			✓			✓
Variable accessibility of public transport	✓	✓✓	✓✓✓	✓	✓	✓✓✓
Relatively low cycling participation				✓✓✓	✓	✓✓✓
Variable/poor active travel infrastructure				✓✓✓	✓	✓✓✓



Part 7

Next Steps

Recommendations

In conclusion, this report recommends that the following seven Packages of Interventions for the South East Radial Area Study are taken forward into the next stage of development (Stage D – see overleaf for more details).

Package 1a: Classic Rail

- Victoria Terminal Capacity
- Chislehurst – Tonbridge Capacity
- North Kent/Chatham Main Line Speeds
- London Metroisation
- Maidstone Thameslink Services
- North Kent London Bridge Services
- Gatwick Airport Services
- Grain Branch Passenger Services
- Crossrail to Ebbsfleet
- Ebbsfleet Southern Access
- Ebbsfleet Interchange
- Dartford Remodelling/Relocation
- Bakerloo Line Extension
- Integrated Maidstone Stations
- Strood Interchange
- Canterbury Interchange
- Otterpool Park Access
- London – Dover freight gauge

Package 3: Active Travel

- Urban Active Travel
- NCN Improvements
- Placemaking (e.g. Canterbury)

Package 1b: High Speed (East)

- Dollands Moor Connection
- HS1 Services to Eastbourne
- More International Services

Package 1c: High Speed (North)

- St Pancras Terminal Capacity
- North Kent High Speed Service Connectivity Enhancements
- Non London HS1 Services (e.g. serving Stansted/West Coast Main Line)

Package 2: Mass Transit (and Rivers)

- FastTrack Expansion
- Medway Bus Rapid Transit
- New Medway Bus and Active Travel River Crossing
- General Bus Enhancements
- Strategic Mobility Hubs
- Demand Responsive Transit
- Reinstate/Improve Thames, Medway and Swale Ferries
- Integrated Fares and Ticketing
- Inland Waterway Freight

Package 4: Highways

- Lower Thames Crossing
- M2/M20 Blue Bell Hill Junctions
- M2 J4 – 7 Capacity
- M2 J7 Brenley Corner
- A2 Canterbury Junctions
- M20/A20 Resilience (Brock/Stack)
- Better HGV Facilities/Lorry Parks
- M25 Junctions 1a and 5
- A21 Kipping's Cross – Lamberhurst
- A21 Flimwell Relief Road
- A21 Hurst Green Relief Road
- A21 – Hastings Distributor Road
- A28 Birchington-on-Sea
- Herne – Canterbury Relief Road
- A228 Dualling
- A259 Realignment (East of Rye)

Global Policy Package

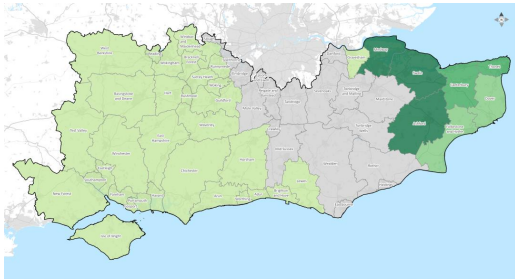
To be defined but likely to include new mobility, rural connectivity, freight, demand management, and accelerated decarbonisation interventions

Delivering our Vision for the South East Radial Area

Figure 7.1 below summarises how each Package contributes to delivering our vision for the South East Radial Area.

Figure 7.1: Delivering our Vision for the South East Radial Area

Coastal Connectivity
It delivers a material boost to the economy in the most deprived areas of the South East – supporting the Levelling Up agenda.



GVA growth focussed in most deprived areas
Supported by Packages 1b, 1c (shown), and 4

Growth and Regeneration
It unlocks opportunities for growth and regeneration, especially in Kent Thameside, Medway, and Ashford.



Development Kent Thameside
Supported by Packages 1a, 1b, 2, 3 and 4

Integration
It includes interventions that integrates modes together (and within each other) to deliver seamless, multi-modal journey experiences.



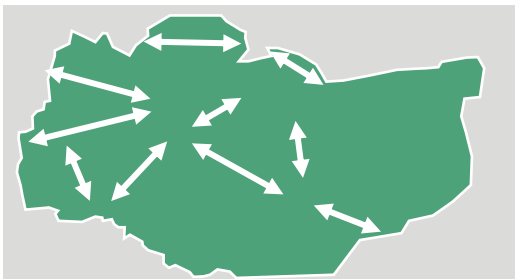
Canterbury integration Options
Supported by Packages 1a,3 and 4

Resilience
It boosts the resilience and connectivity of the key corridors that serve the country’s busiest international gateways.



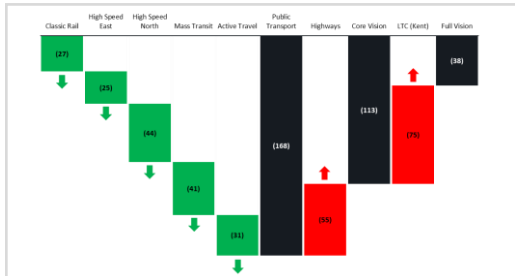
M20 Operation Brock
Supported by Package 4

Sustainable Travel
It enhances bus services and active travel infrastructure to deliver viable sustainable travel options for all.



Priority corridors in KCC Active Travel Strategy
Supported by Package 3

Carbon Reduction
It helps the South East reduce carbon emissions below today and our 2050 baseline – although more is needed to achieve net zero (see Global Policy Interventions).



Carbon Emission Reductions
Supported by Packages 1, 2 and 3

Next Steps

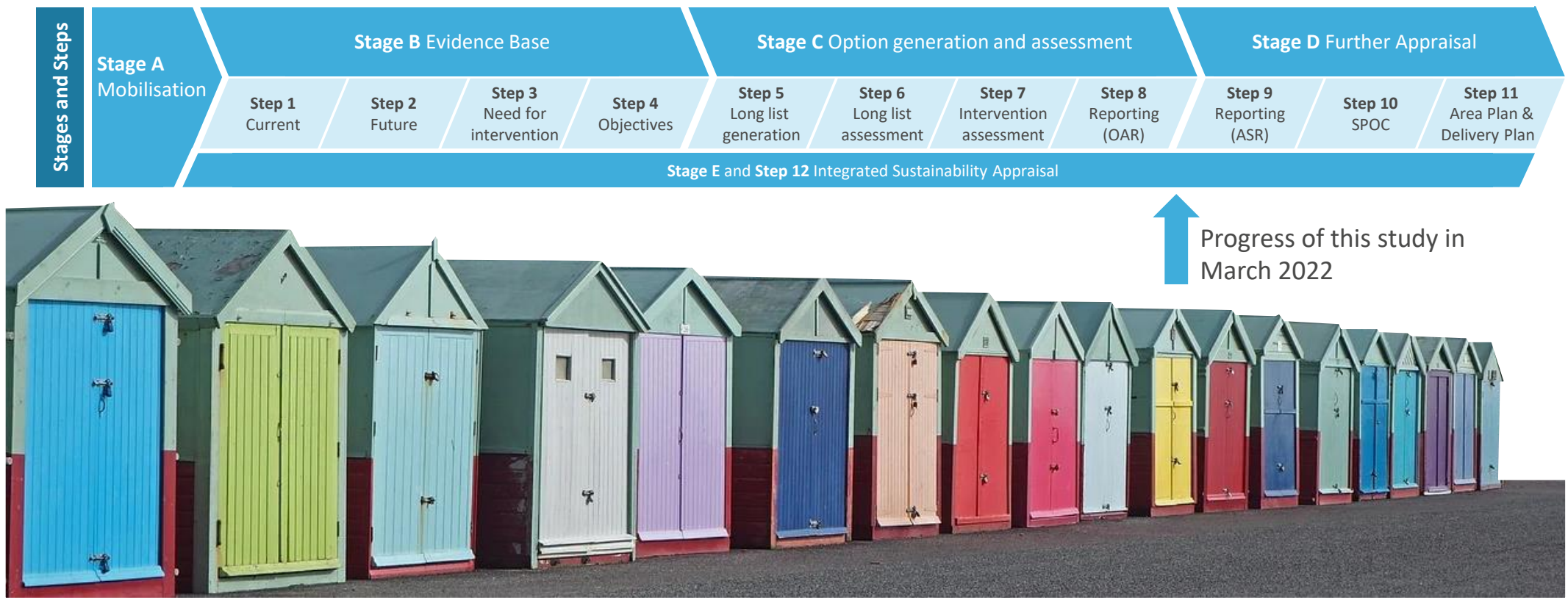
This report has summarised the work undertaken in the third of the five stages underpinning the South Central Area Study.

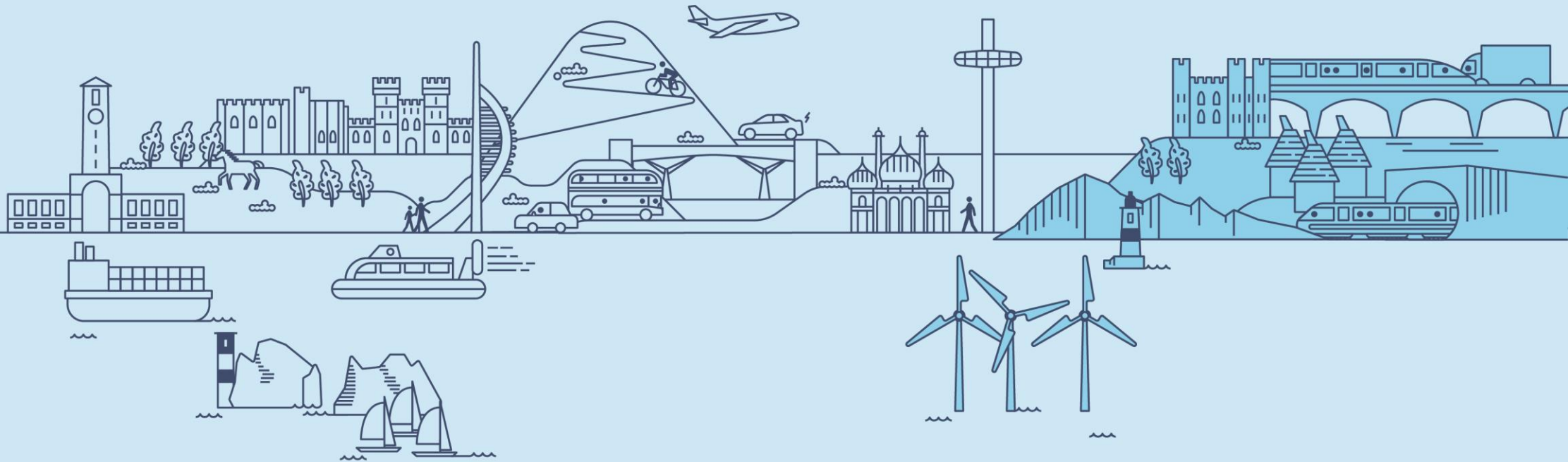
Figure 7.1 shows the stages and steps that are being delivered for this study. This report concludes Stage C, which focused on options generation and assessment.

The next stage for this study is Stage D. The purpose of this this stage will be to produce outputs to make the case (to government and others) for investment in the South East’s transport networks. This Stage will fully mobilise in March 2022.

To ensure that each area study meets the vision, goals and priorities of the Draft Transport Strategy, an Integrated Sustainability Appraisal (ISA) will be developed for each of the five Area Studies – shown below as Stage E – which will also report by March/April 2022.

Figure 7.1: Overview of the South East Radial Area study stages and steps





Part 5

Appendices

Problem Statements

Global Issues

1. Transport is not de-carbonising fast enough.
2. Climate change threatens the resilience of the transport network.
3. Freight is heavily reliant on the highway network, especially for first-mile-last-mile deliveries.
4. There is a recognised need for housing and communities – but it needs to be sustainable.
5. The mobility benefits of new technologies are not accessible to everybody.

Economy and Society

6. The area is “cut off” from the rest of the UK by London and the River Thames.
7. The economic influence of London dominates the area.
8. Industry is relatively weak and economic productivity is below average.
9. Poor connectivity is holding back coastal and island communities.
10. Rural communities are being left behind in digital, active, and public transport connectivity.

International Gateways and Highways

11. Dover is highly constrained by its small footprint and access.
12. The Channel Ports (Dover/Folkestone) are too reliant on one highway corridor.
13. Too many disruptive events at ports result in widespread disruption on the highway network.

Placemaking

14. There are significant highway congestion, safety, and air quality issues in multiple places.

Railways

15. Too many rail services are too slow.
16. There are significant resilience challenges on parts of the rail network.
17. There are capability and capacity challenges on parts of the rail network.

Public Transport

18. The quality of mass transit services is variable and bus patronage is relatively low.
19. Public transport integration is weak – both physically and in terms of the ‘customer journey’.
20. For many people, public transport fares are too high and too complicated.
21. Too many public transport services and networks are not accessible to all users.

Active Travel

22. Cycle participation is relatively low, particularly in North Kent
23. Cycling infrastructure is variable and generally poorer than other parts of the South East.

1 Transport is not de-carbonising fast enough

While many stakeholders in the South East Radial Area recognise the need to decarbonise, this is not happening fast enough.

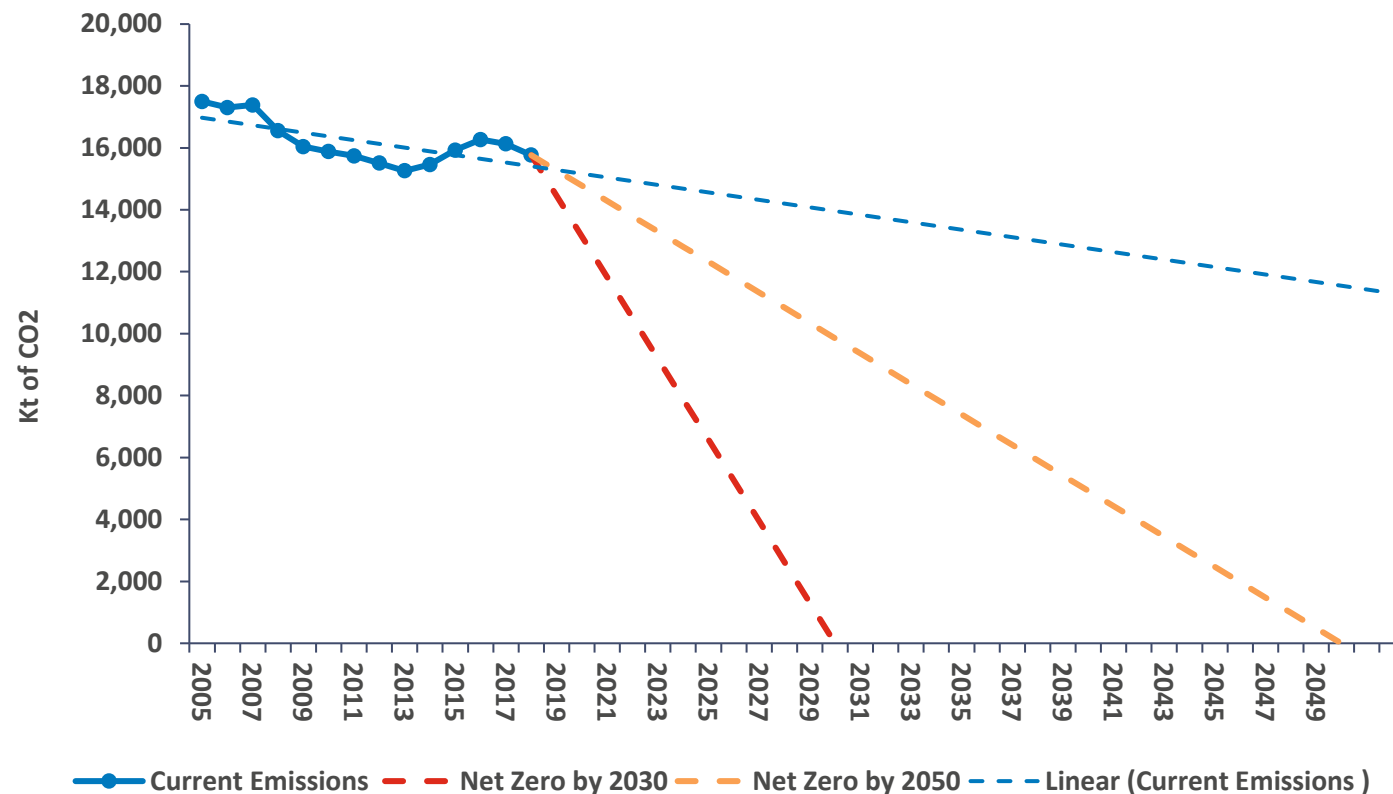
The trajectory shown in the figure to the right indicates, the South East will not reach a position of net-zero carbon emissions by transport by 2050 – which is now a legal requirement supported by domestic legislation and international agreements.

All three Local Transport Authorities in the South East Radial Area have declared Climate Emergencies and committed to ‘net-zero’ carbon emissions by 2050.

Electric vehicle take-up is low and there are some areas with very poor access to charging points. A step change in the electrification of highway transport and modal shift away from fossil fuel transport to electric/healthy transport is needed if the area is to reach its climate commitments.

The South East’s rail network, while almost entirely electrified, includes one section of diesel operations between Ashford and Hastings, which contributes to this problem.

Carbon Emissions Trajectory for the South East Area



Source: Steer analysis of BEIS data

“We recognise the UK environment and climate emergency and will continue to commit resources and align its policies to address this. Through the framework of the Energy and Low Emissions Strategy, we will facilitate the setting and agreement of a target of net zero emissions by 2050 for Kent and Medway ... We will reduce greenhouse gas emissions from our own estate and activities to net zero by 2030. We are also committed to reducing greenhouse gas emissions from the whole county to net zero by 2050.” (KCC, 2019).

The transport networks serving the South East Radial Area are **vulnerable to the effects of climate change and in many areas are showing signs of poor resilience.**

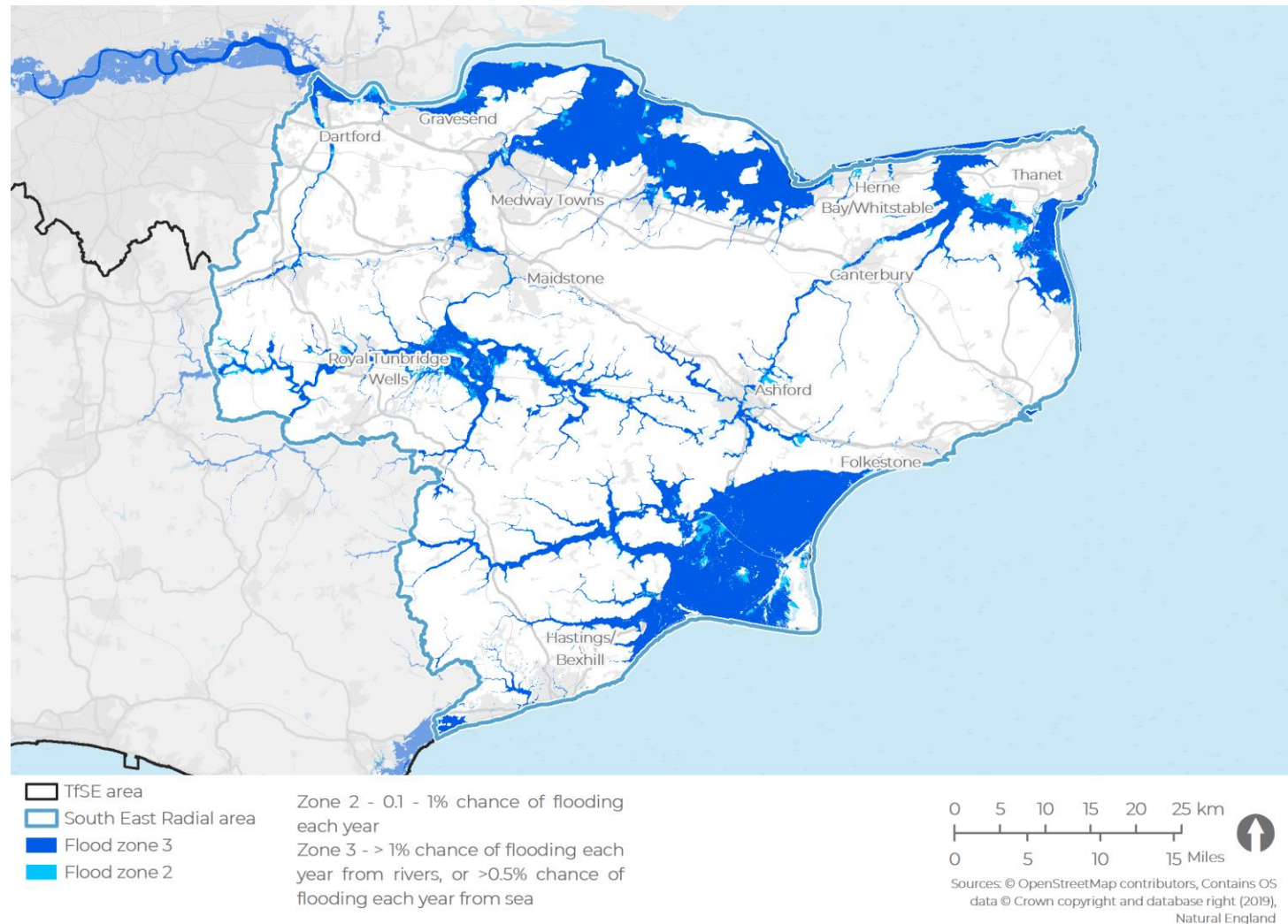
The area's transport networks cut across several areas that are already vulnerable to flooding and temperature extremes. Until recently, Faversham held the record as having recorded the highest temperature in the UK – a heat that can cause disruption to railways and highways.

The railway network is relatively old and features numerous tunnels and cuttings. Some sections, such as Folkestone Warren (see right), are particularly vulnerable to storms and long periods of wet weather.

Climate change is likely to increase the frequency and strength of weather events (and extreme heat in summer). There is also a risk of sea level rise in the longer term, threatening low lying infrastructure and communities.

The outcome of this problem is increased operations, maintenance and renewal costs, which will be borne by transport users and wider society.

Flood Risk in the South East Radial Area



3 Freight is highly reliant on highways, especially for first-mile-last-mile deliveries

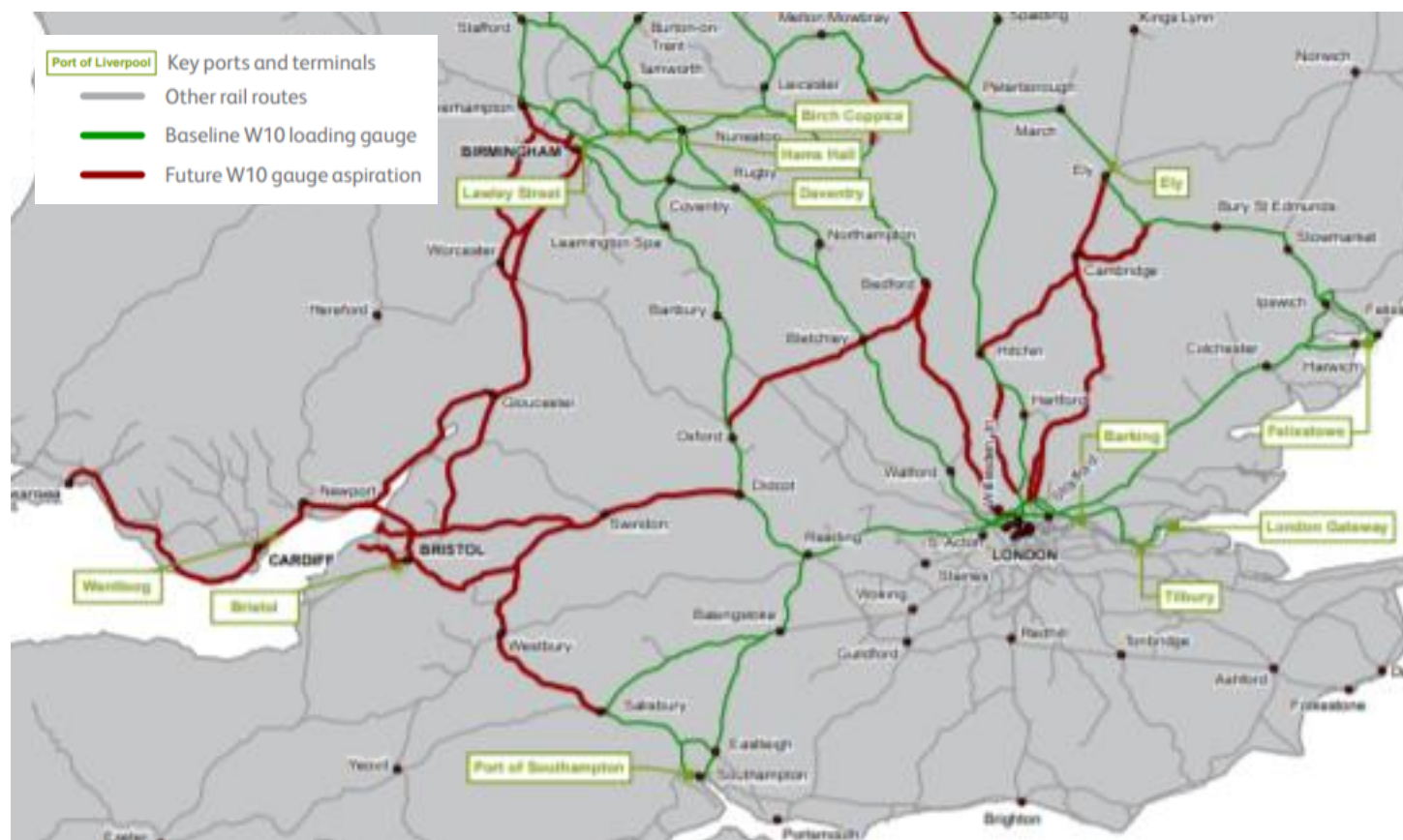
Freight is very reliant on highways.

Rail freight mode share is low nationally (around 5%, based on tonnage) and, according to the ORR, data, has declined in terms of freight train movements on the national network. There is, however, some promising signs of recovery as rail freight grew in 2020. An electric rail freight sector should be well placed to provide a low carbon alternative – although it is recognised freight is in competition with passenger rail for paths. Inland waterways could also play a role.

It should be possible to achieve higher mode shares. However, there are significant barriers to rail freight in the South East, particularly for routes to/from the Channel Ports. These barriers include a lack of freight terminals and strategic rail freight interchanges, poor access across London, high access charges on High Speed 1 and the Channel Tunnel. Inadequate gauge clearance also affects rail routes serving Dover (see right).

First-mile-last-mile-deliveries, which include (fast growing) home deliveries, are almost entirely reliant on highways.

Rail network gauges (2017)

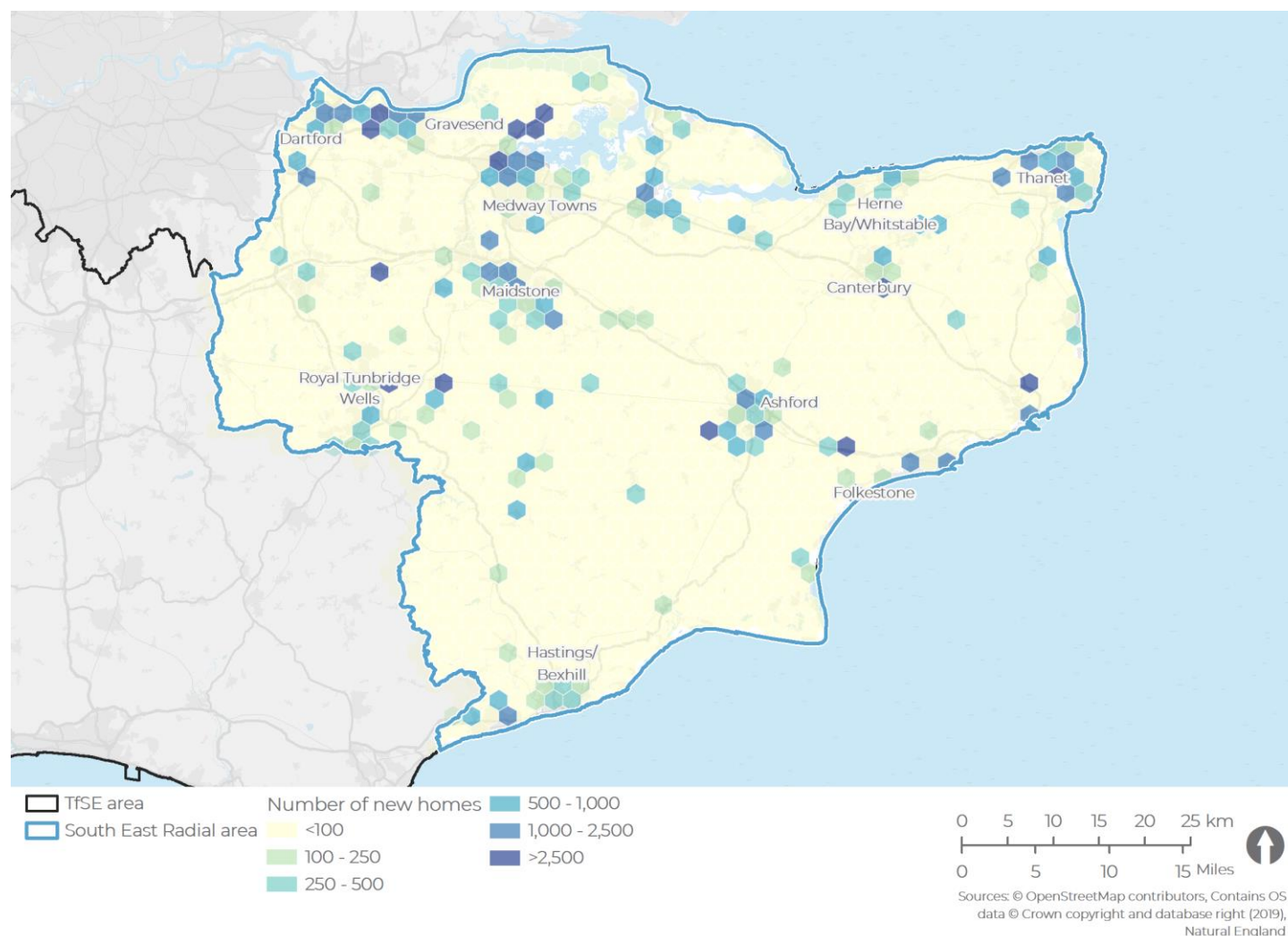


Map source: Network Rail, freight Network Study, <https://www.networkrail.co.uk/wp-content/uploads/2017/04/Freight-Network-Study-April-2017.pdf>
Freight statistics source: <https://dataportal.orr.gov.uk/media/1738/freight-rail-usage-performance-2019-20-q4.pdf>

There is a recognised need for housing in the South East Radial Area – but in the right places, supported by the right infrastructure, and planned to deliver sustainable travel outcomes.

The fragmented nature of the planning system and lack of effective strategic planning makes it difficult to integrate spatial, transport, and economic planning. The area is also heavily constrained by the landscape and layout of urban areas. To accommodate over 185,000 new homes by 2050 (see **Figure 2.2**), there will be a need for additional housing and employment. Recent discussions with government suggest this figure may grow, albeit with more of a focus on delivery in urban areas. There is risk that housing growth will result in unsustainable transport patterns as many housing developments are being delivered some distance away from shops, town/city centres, commercial services, public services, and transport hubs. There is also a risk of imbalance in employment and housing growth (see **Figure 2.3** in Part 2).

Local Plan projections for housing and employment growth



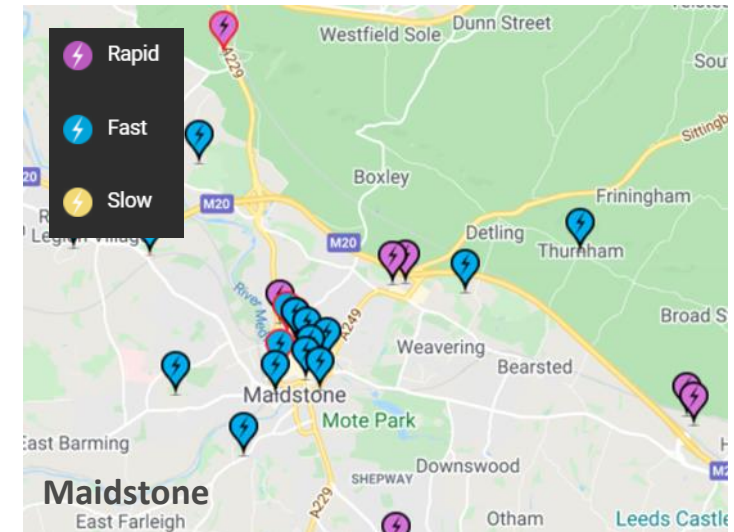
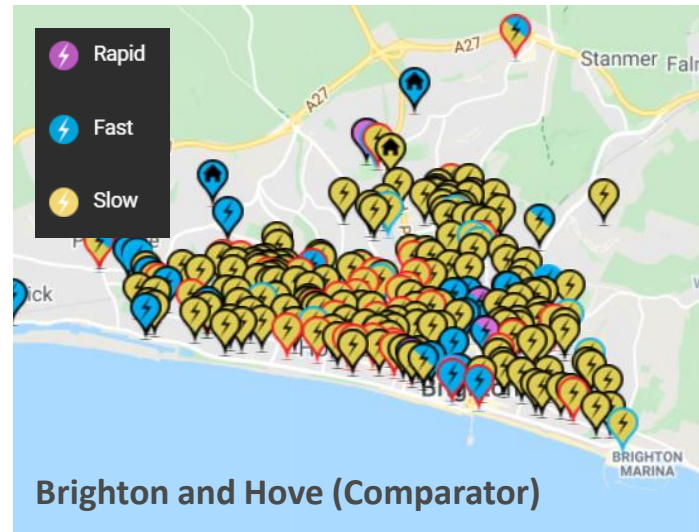
There are significant gaps in infrastructure to support future technologies – notably electric vehicle charging infrastructure.

Evidence from Zap Map (see right) shows there is a significantly higher provision of electric vehicle charging point in urban areas such as Brighton and, to a lesser extent, Maidstone than there are in less densely populated (but still semi-urban) areas such as Deal and Bexhill.

While it is acknowledged this reflects higher levels of on street parking in areas like Brighton City Centre, it appears that more deprived areas (such as Bexhill) are less well served than more prosperous suburban areas, such as Canterbury. This problem underlines the risk of technology contributing to – rather than helping address – rural and socioeconomic inequality in the South East Radial area.

There are other barriers to electric vehicle uptake – notably the price of Electric Vehicles and range anxiety associated with their performance – that will need to be addressed if we want the road fleet to fully decarbonise by 2050.

Zap Map locations of Electric Vehicle chargers (all at the same scale)



Source: Zap Map <https://www.zap-map.com/live/>

6 The area is 'cut off' from the rest of the UK by London and the River Thames

Google Earth view of the South East Radial Area from above



The ceremonial country of Kent borders the Thames Estuary and the North Sea to the north, and the Straits of Dover and the English Channel to the south. Lille is closer to Maidstone than Leicester. Most of the UK can only be accessed by crossing the River Thames at Dartford, driving through Greater London, or via the M25 through Surrey. Rother and Hastings are similarly remote and have limited transport connectivity thanks, in part, to the Weald. This means the South East Radial Area shares many characteristics of peninsulas such as the South West Peninsula, which suffer similar challenges with connectivity and (especially in Cornwall's case) productivity.

While the whole TfSE area has strong economic ties to London, the economic influence of the Capital is particularly strong in this area.

London's pre-pandemic population was 3 – 4 times larger than the population of the South East Radial Area. However, it's economy is estimated to be 8 times larger than Kent, Medway and East Sussex.

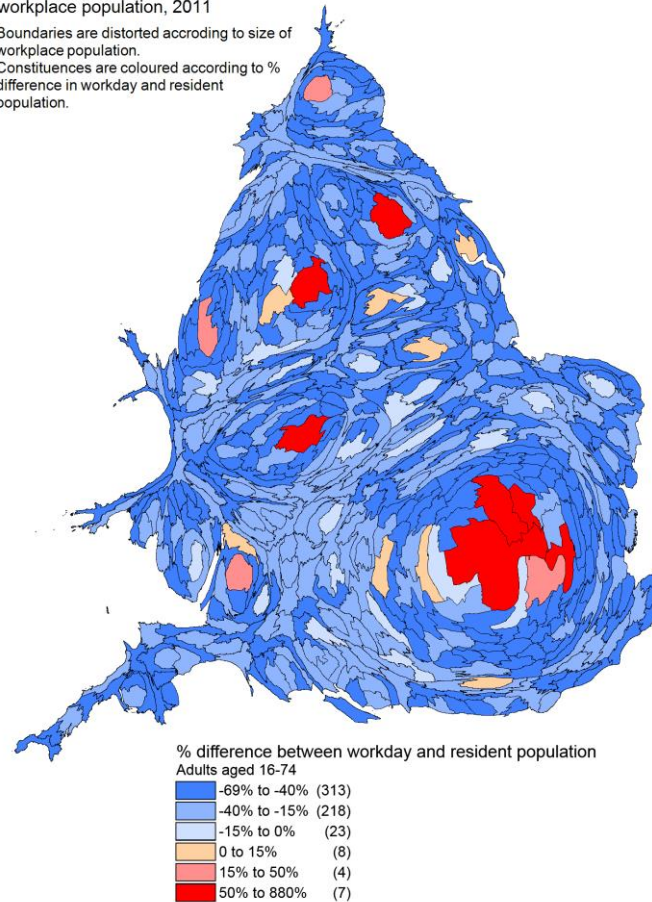
London's overwhelming economic influence is compounded by:

- the South East Radial Area's relative isolation compared to other parts of the South East (Problem Statement 8);
- the absence of a large cities such as Southampton or Brighton;
- the absence of a large employment cluster, such as Gatwick Airport; and
- the development of the transport system, which offers high quality access to London.

Having access to an international city represents a significant strength for the South East. However, many stakeholders would like to see less reliance on the Capital to promote a more resilient economy.

Workday and resident population (HoC, 2011)

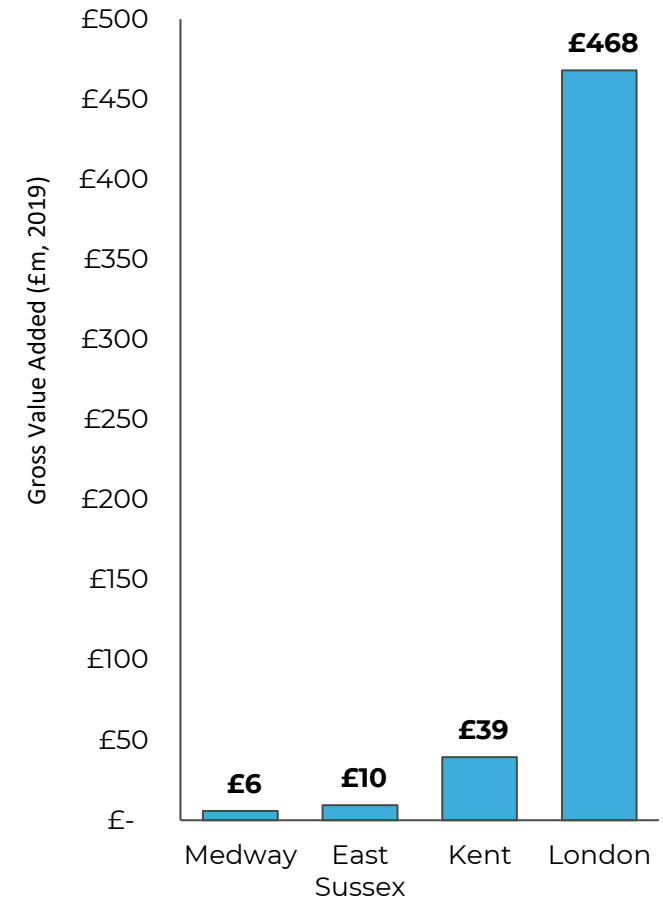
Where do people work?
Parliamentary constituencies in England and Wales scaled by the size of the workplace population, 2011
Boundaries are distorted according to size of workplace population.
Constituencies are coloured according to % difference in workday and resident population.



© Crown copyright. All rights reserved. House of Commons Library (OS) 100040654 and (OSNI) 2085 (2014)

Sources: <https://commonslibrary.parliament.uk/who-works-in-your-constituency-a-new-interactive-tool-for-exploring-workplace-populations/> and <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/revisionstrianglesregionalgrossvalueaddedbalancedincurrentbasicprices>

Gross Value Added (£m, ONS, 2019)



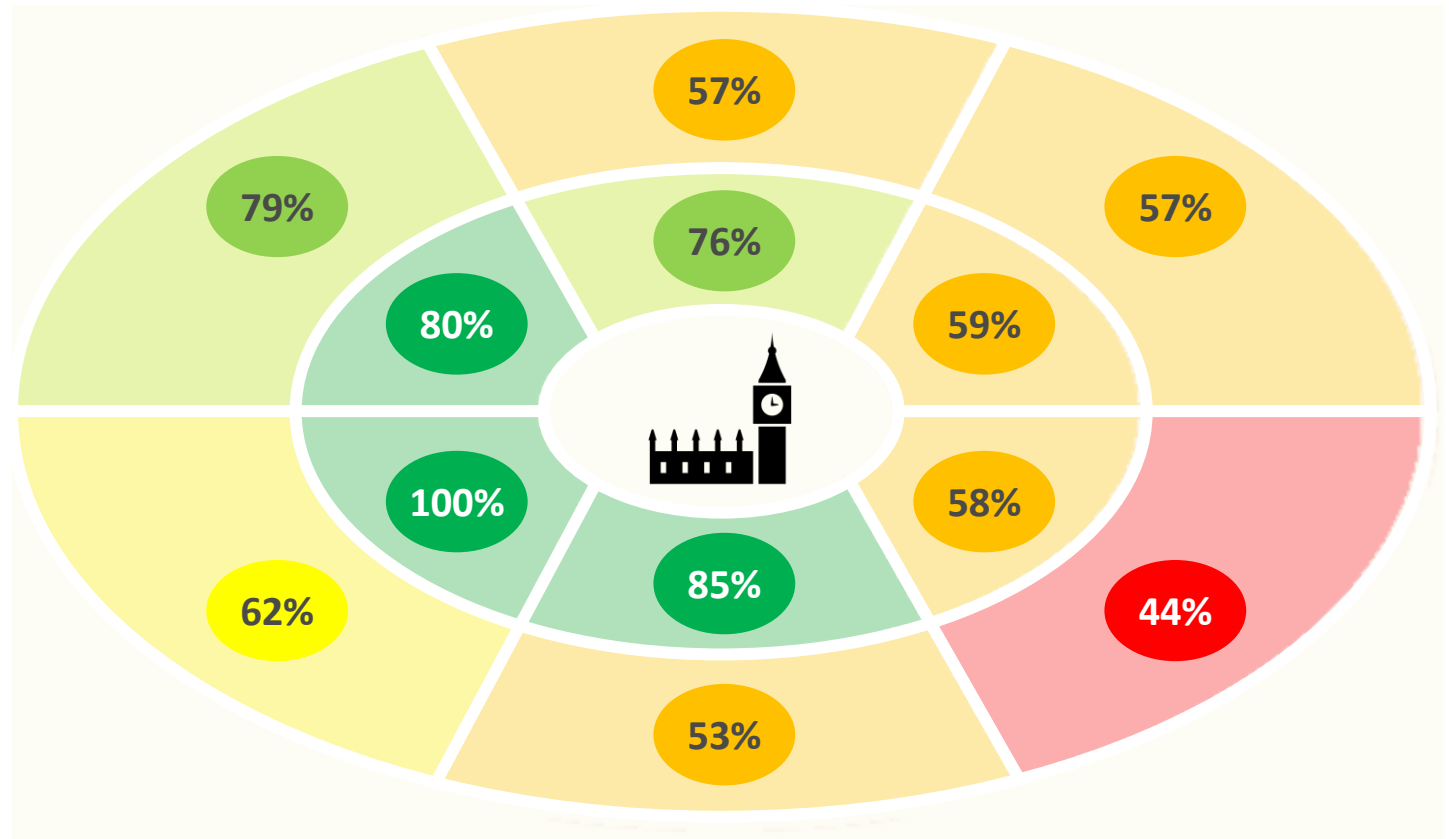
The South East Radial Area has weak socioeconomic outcomes compared to other parts of South East England.

Socioeconomic indicators such as GVA per capita (see right), education, deprivation, and unemployment are relatively low in this area. Districts/boroughs furthest east and further away from London generally have weaker socioeconomic outcomes than those located further west and closer to the Capital. There are pockets of high deprivation closer to London (e.g. North East Kent) and vice versa (e.g. Wye), but the broad trend is clear.

TfSE's Economic Connectivity Review identified several clusters of high-value/high-growth industrial sectors in the South East, which offer a route to greater prosperity. However, very few of these clusters were identified in the South East Radial Area.

The reasons behind the area's current performance are complex and transport is just one of many factors. That said, many stakeholders believe improving transport connectivity is needed to enable many of the most deprived areas to develop.

Average GVA per capita around the South East, where South West/Inner = 100



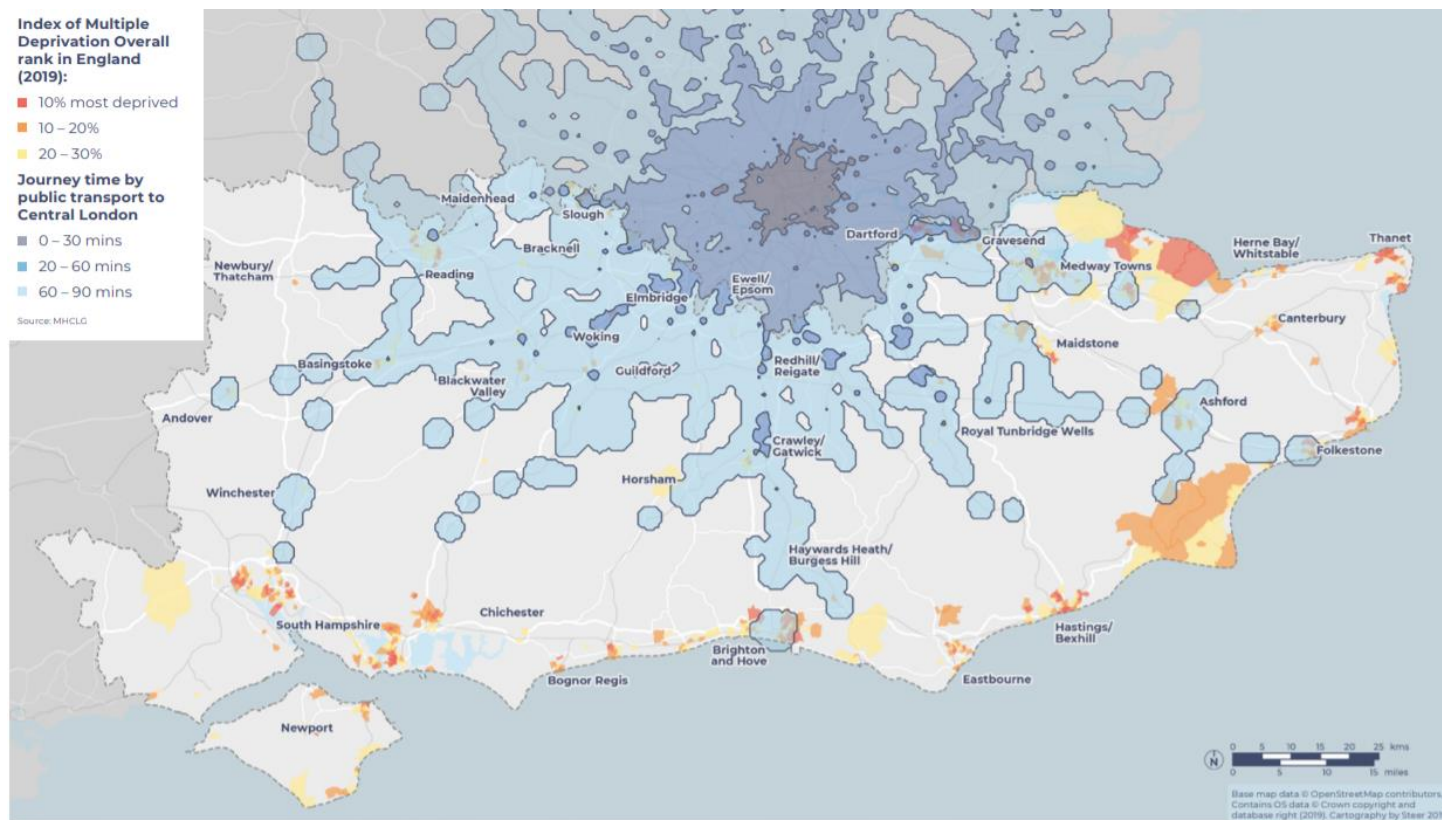
Source: Steer, ONS GVA per capita data
South West / Inner Orbital zone = 100%
Icon Credit: Pham Duy Phuong Hung

Some of the most deprived communities on the South Coast are less well connected than nearby, more prosperous neighbours.

For example, Ashford enjoys very high levels of public and highway connectivity compared to nearby Hastings and Thanet. Communities living on peninsulas (e.g. Hoo) and Islands (e.g. Sheppey, Thanet) also face similar connectivity challenges.

The link between socioeconomic outcomes and transport investment is complex. However, many stakeholders have told us they believe poor connectivity means places like North East Kent and Hastings/Bexhill need to “work harder” to secure the investment in opportunities that these places deserve.

Public transport catchment areas for Ashford and Hastings



Rural communities in the South East Radial Area have significantly poorer access to public transport, Mobility as a Service providers, and high-speed broadband compared to urban areas.

This means it will be harder for rural communities to:

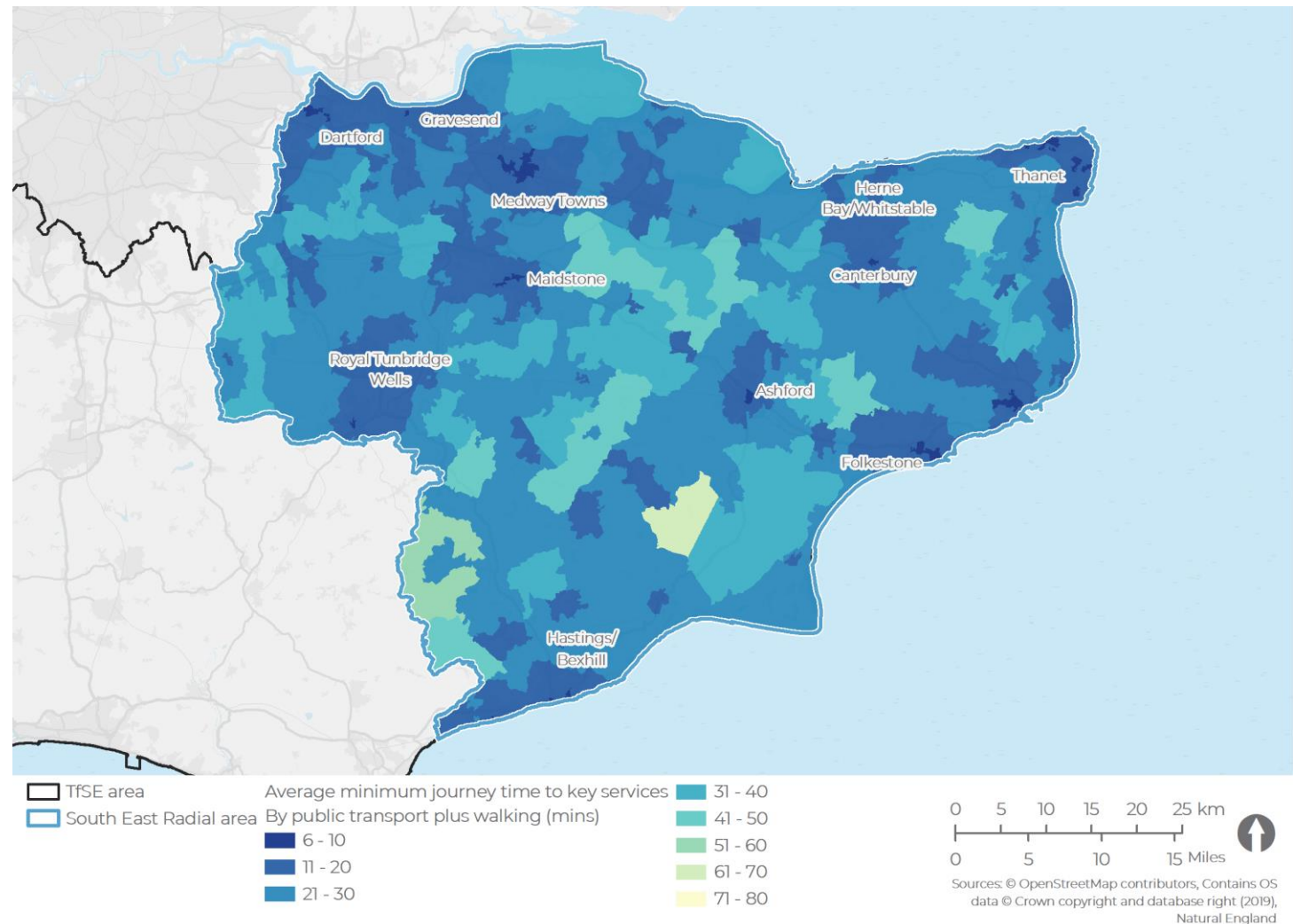
- work remotely;
- access future mobility technologies;
- access emerging Mobility as a Service services;
- access public transport networks; and
- attract businesses that rely on technology and/or public transport.

This promotes a high reliance on private motoring in rural communities.

While many rural areas are prosperous, there are pockets of high levels of deprivation in rural parts of the South East Radial Area.

There is also a risk that inequality in access to broadband will result in wider inequality in socioeconomic outcomes.

Public Transport connectivity (from Figure 1.19)



11 Dover is highly constrained by its small footprint and access

The Port of Dover is (or, at least pre-COVID-19, was) the busiest Roll-On Roll-Off port in the world and the busiest passenger port in Europe. However, it is constrained by its relatively small footprint.

The figure to the right illustrates the constraints in available land for Dover to 1) provide adequate highway and railway access/interchange and 2) expand port operations. The Port of Calais, on the other hand, benefits from more space that can be used for transport access and expansion. For example, highway access to the Port of Calais is provided by a grade separated, motorway standard expressway that entirely avoids the town.

Clearly, the geographic context of Dover is very different to Calais. However, it must be acknowledged that Dover faces constraints that present challenges for the future of the South East's transport network and economy.

Footprint of Ports of Dover and Calais (same scale)

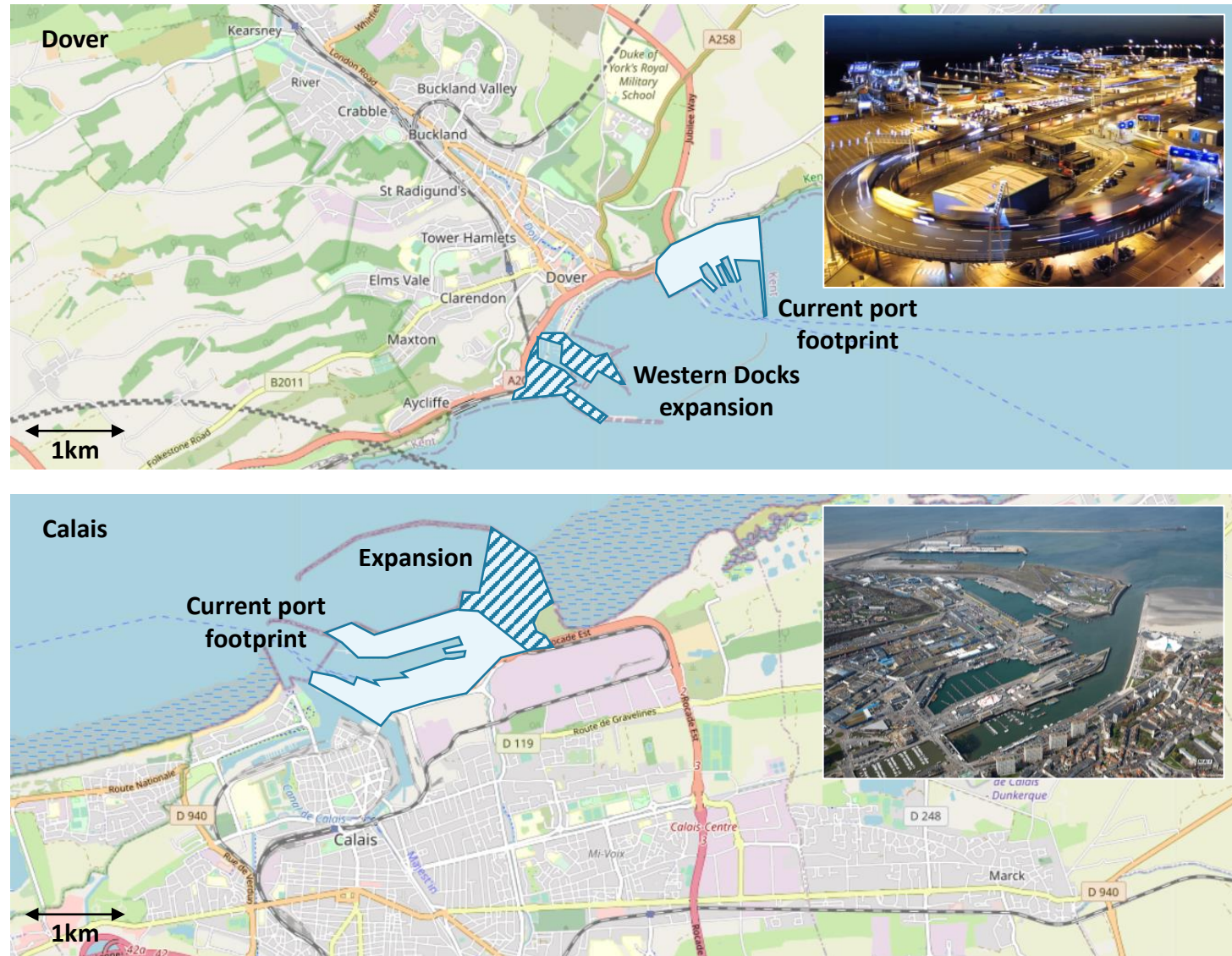


Image sources: <https://www.openstreetmap.com>, TfSE (Dover), <https://www.portboulogne-calais.fr/en/who-we-are>

At present, there is only one motorway for the full route between Dover, Folkestone and the M25.

Kent is the gateway to the British Isles for many international travellers and freight transporters. The two busiest international gateways – the Port of Dover and Folkestone-Cheriton Channel Tunnel Terminal – are linked to the rest of the GB motorway network by the M20 and A20.

An alternative route is available via the M2 and A2 corridor, which runs through North Kent. However, this corridor features several sections that fall below the standard offered by the M20, including:

- single carriageway sections between Dover and Canterbury;
- constraints at junctions such as Brenley Corner and Blue Bell Hill; and
- the Dartford Crossing

Kent and Highways England wish to see a bifurcation strategy implemented that would deliver two high quality corridors to the Channel Ports. This would significantly strengthen resilience and connectivity.

Key highways in Kent and East Sussex

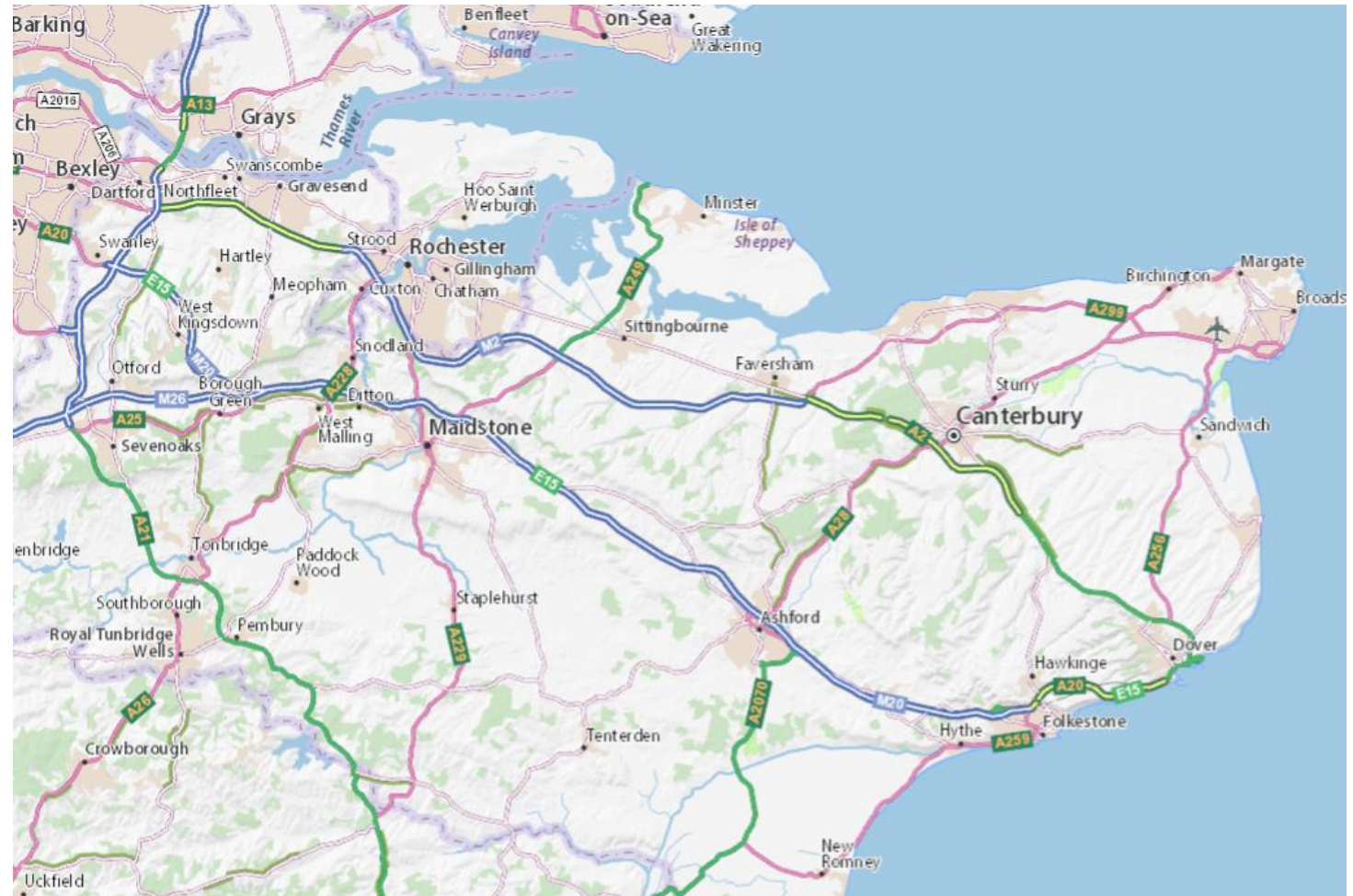


Image source: <https://www.viamichelin.co.uk/>

Disruption at the Channel Ports is regularly in the news and its impact often ‘spill overs’ across Kent.

The causes of this disruption are diverse – weather, industrial action, operator performance issues – and could increase as the UK-EU trading relationship changes. Government and resilience partners have developed two broad responses to disruption at the Channel ports:

- **Operation Stack**, where the M20 is closed to normal traffic (between different sections depending on the severity of disruption) and the motorway is used to park HGVs; and
- **Operation Brock**, which instigates a contraflow system on the westbound carriageway of the M20 (see right) and sets aside the eastbound carriageway for HGV parking.

Operational Brock can take several days to implement, whereas Stack is can be rolled out in a matter of hours.

Many stakeholders view current resilience arrangements as unsustainable and wish to see a better solution delivered in Kent.

Operation Brock on the M20



Image source: PA via Kent Live <https://www.kentlive.news/news/kent-news/what-operation-brock-7-questions-3473722>

These hotspots can significantly blight an area's economy, environment, and quality of life for residents, businesses, and visitors.

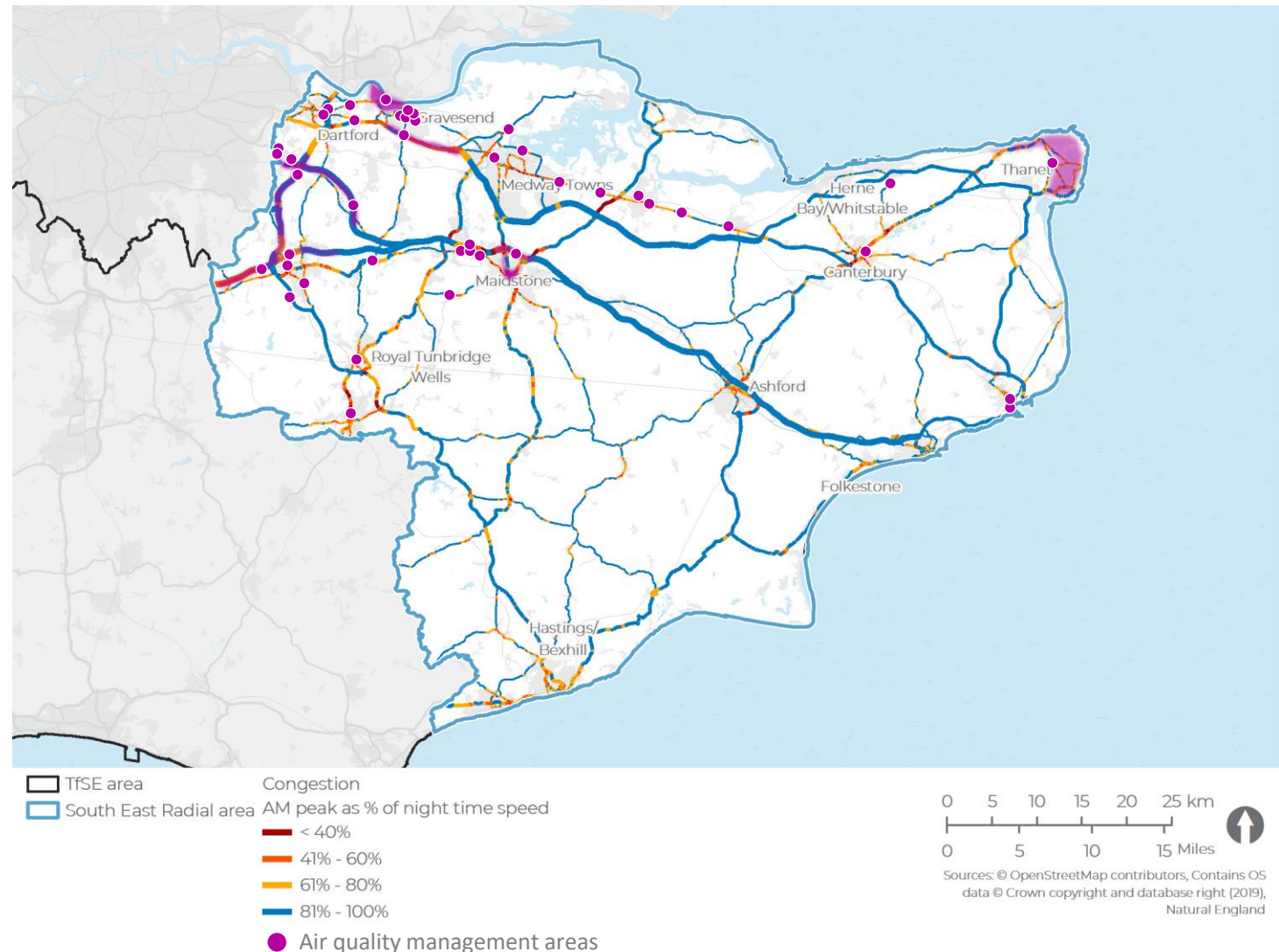
The figure to the right, which is based on **Figure 1.15** in Part 1, shows congestion and air quality hotspots on the highway network in the South East Radial Area. It should be noted this data reflects pre-COVID-19 data and may not be representative of future travel patterns.

Congestion, road safety, and air quality hotspots tend to arise at the same location. This is often where highway infrastructure is unable to accommodate all the traffic demand placed upon it.

In the South East Radial Area, this is observed at major junctions, town and city centres, and on some sections of the Strategic and Major Road networks.

Congestion undermines the efficiency of the transport network and the economy, while poor safety and air quality harms human health. These hotspots are often hostile environments for vulnerable road users and can act to deter people from choosing to walk or cycle in these areas.

Congestion and Air Quality 'Hot Spots' in the South East Radial Area



15 Too many rail services are too slow

Rail services serving communities in North East Kent and the East Sussex Coast are objectively slower than services in other parts of the area.

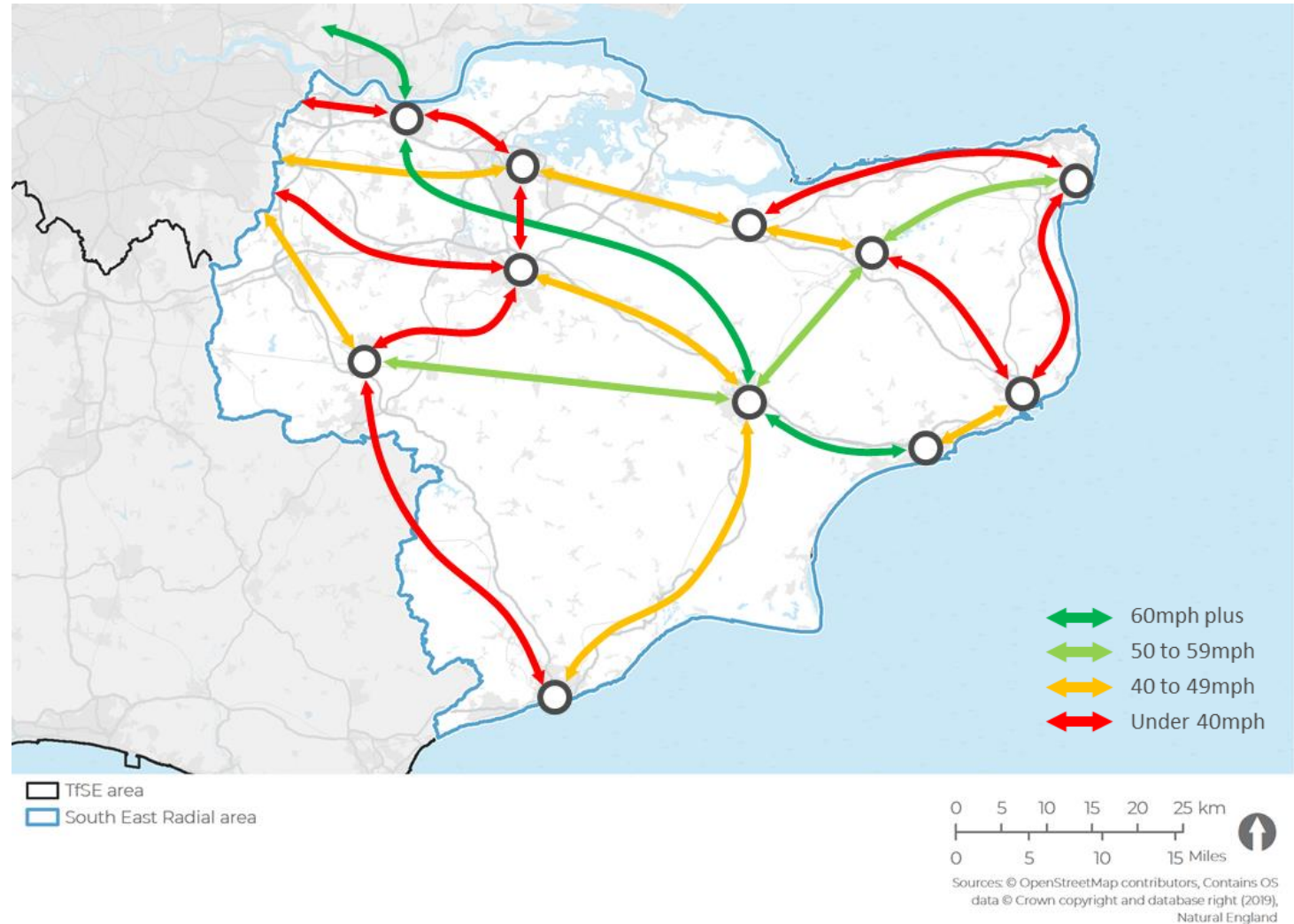
The differences in connectivity provided is especially stark when compared to the excellent connectivity provided by the High Speed 1 (HS1) railway.

The slower speeds off HS1 Line (shown in the figure to the right) reflect the alignment of the track, signalling arrangements, and the passenger rail service calling pattern.

The difference in rail connectivity means places like Thanet and Hastings/Bexhill need to 'work harder' to attract investment compared to better connected Major Economic Hubs such as Ashford.

This may explain why these areas generally have weaker socioeconomic outcomes (such as higher levels of deprivation) than places closer to London.

Average rail speeds on selected sections of the area's railway network



It is getting harder to maintain an old railway that is embedded in a coastal and chalky landscape, especially as the climate changes.

Some of the oldest railways in the world are located in the South East Radial Area. Many were built at a time when trains operated at lower speeds and therefore follow alignments that do not work well for modern needs. They were also among the first to be electrified (to third rail).

Much of the railway is built in chalk and clay cuttings/tunnels, which bring their own challenges (notably in poor weather).

All the above presents resilience challenges for the railway. There are regular issues with embankment and cutting subsidence in the Weald and along the Kent coast. Some railways run through areas prone to coastal and inland flooding. The third rail limits the railway's resilience to ice and snow.

Network Rail are expecting to need to invest millions in the railway just to 'stand still'. There is also a risk that some links – such as at Folkestone Warren – could become unviable if sea levels rise.

Folkestone Warren



Source: Network Rail, <https://www.networkrail.co.uk/stories/the-great-fall-historic-landslip-images-resurface/>

While the South East Radial Area's railway benefits from multiple routes to London, there are some bottlenecks holding back growth.

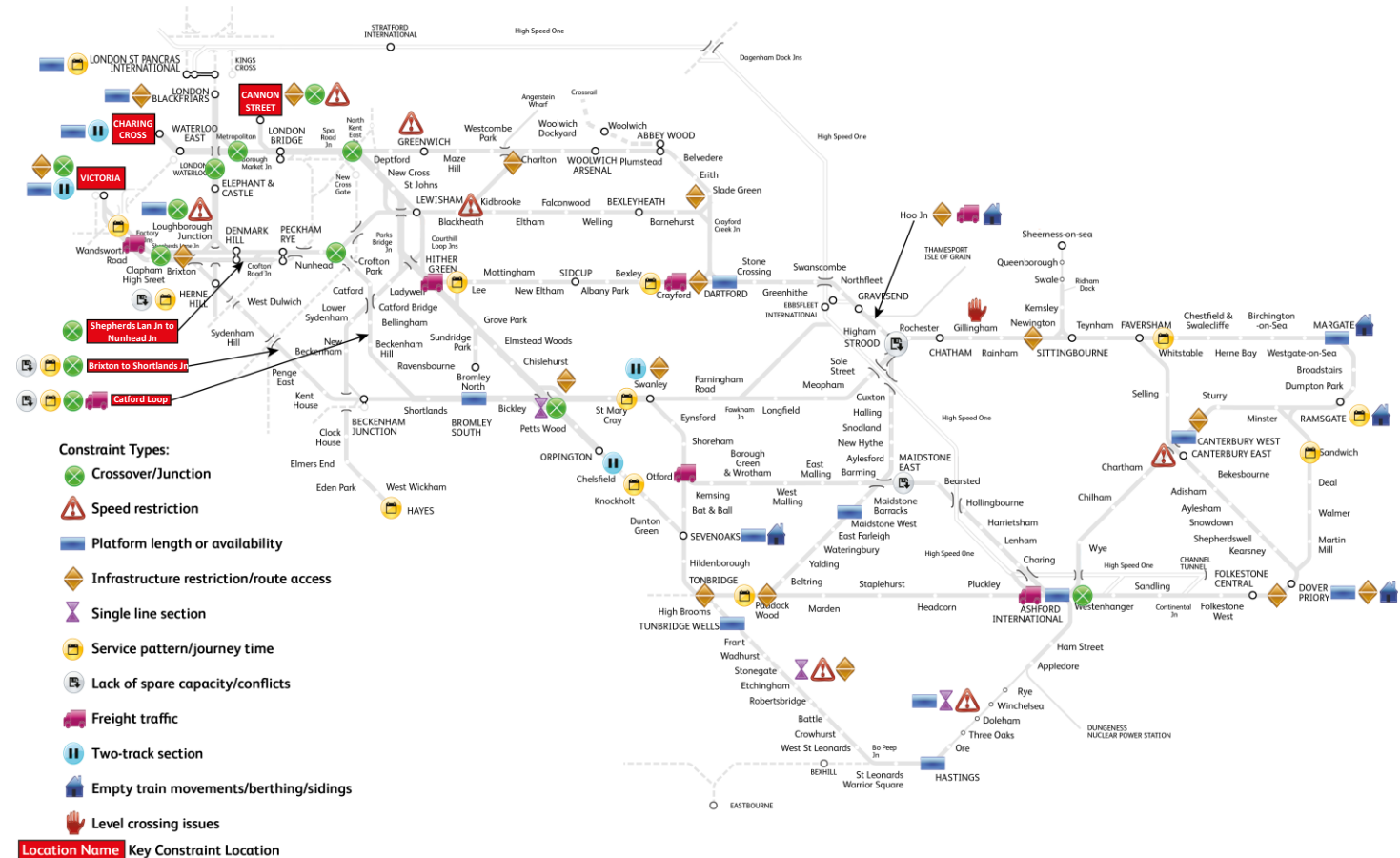
Thanks to the way the railway developed (under the direction of two companies for many years), there are multiple routes to London. High Speed 1, which fully opened in 2007, provides an additional route to London and beyond.

That said, there are some bottlenecks that undermine operational performance and make it difficult to address (pre-COVID-19) crowding challenges. These include:

- most (if not all) London Terminals;
- several approaches to London Terminals (e.g. twin track section from Bromley South to Brixton);
- two track sections between Orpington and Tonbridge;
- Rochester Bridge Junction;
- flat junctions around Lewisham; and
- Dartford station and junctions.

Further detail about these constraints is provided in the diagram to the right.

Capability and capacity constraints on Network Rail's South East Route



Source: Network Rail

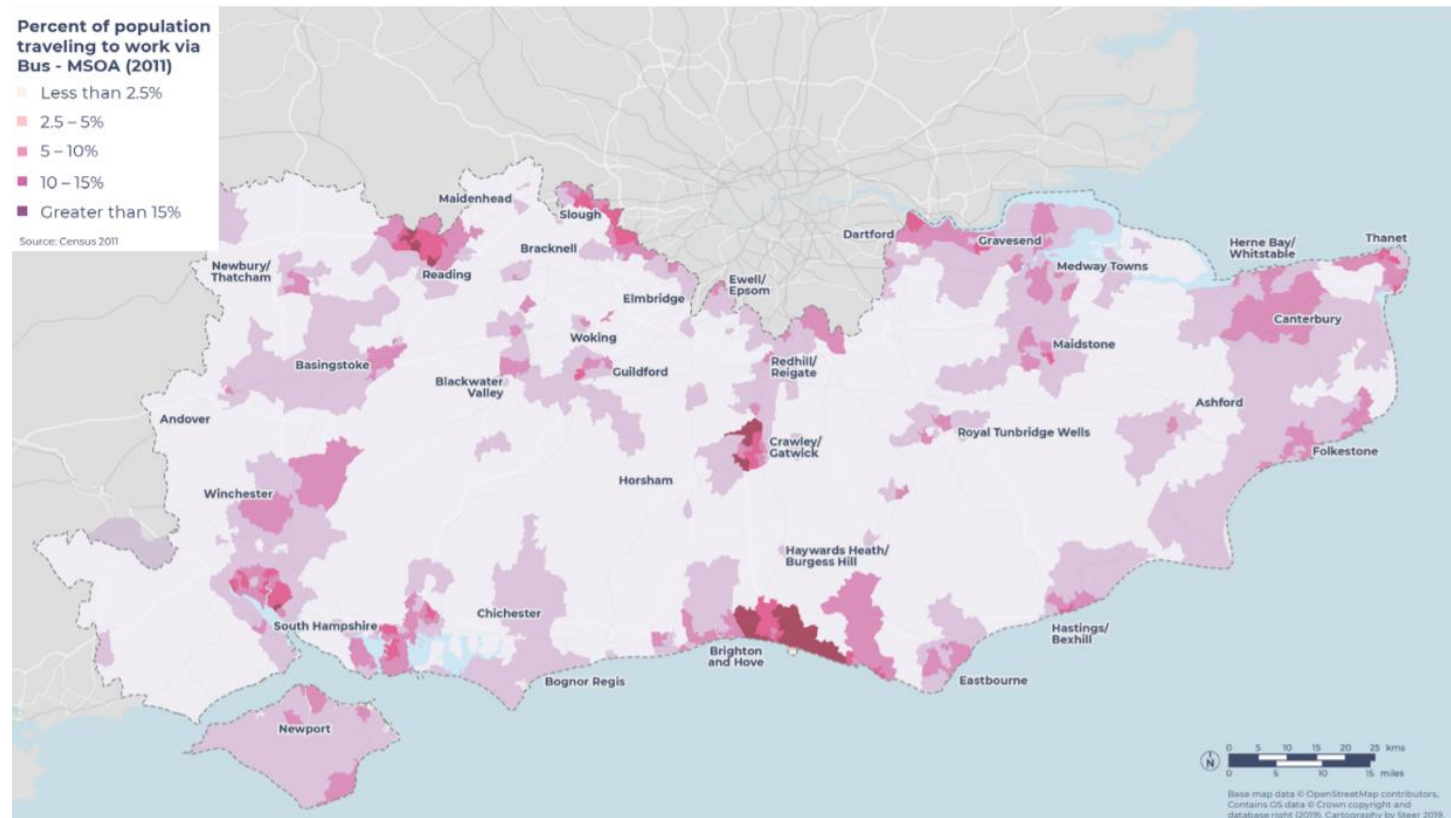
Bus patronage is low and in many areas is declining.

The figure to the right shows the percentage of the population travelling to work by bus at the time of the 2011 census. **Figure 1.22** (see Part 1) shows recent trends in bus patronage. In East Sussex, Kent, and Surrey, bus use declined by more than 10% over the period 2009/10 – 2019/20. In contrast, bus use in Brighton and Hove has increased by 19% over the same period.

This evidence points to a bus industry that – outside Brighton and Hove – serves few Travel To Work journeys and is in decline. Bus patronage is particularly low in rural areas as well as in fast growing Major Economic Hubs such as Ashford.

The recent successful performance of the bus networks serving, Crawley, Reading, and Brighton and Hove bus networks show the opportunity for bus in the South East Radial Area.

Bus share of Travel To Work flows



Public transport interchanges, information, and ticketing are not sufficiently coordinated nor adequately integrated, particularly across transport modes

Parts of the South East are included in the London Travelcard area and are included in Transport for London’s contactless travel arrangements.

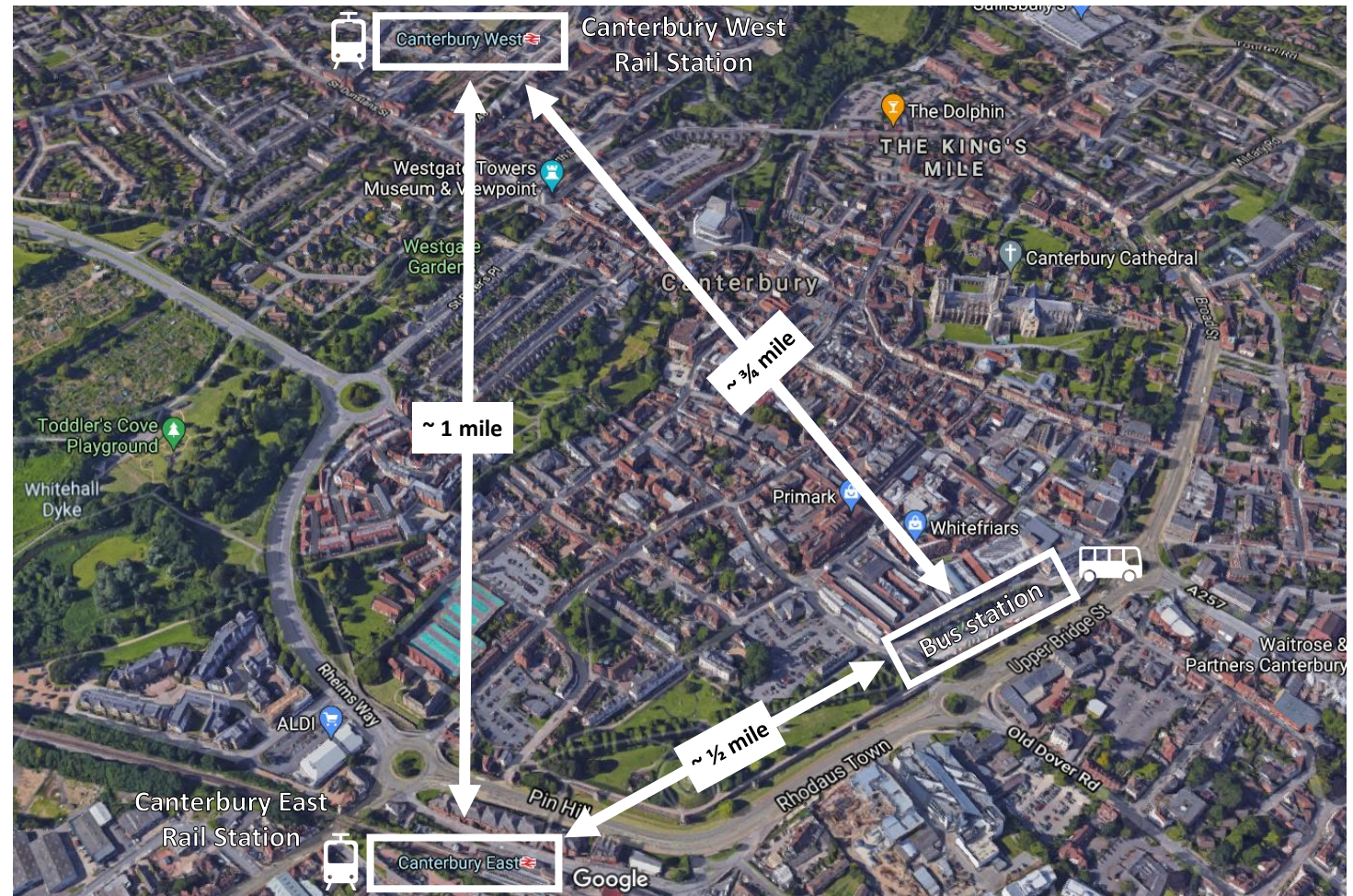
However, outside the London Travelcard area, there are few examples of:

- integrated journey planning tools;
- integrated, multi-modal fares (noting some areas have access to PlusBus);
- zonal fares systems; and/or
- Integrated, multi-modal payment systems.

All the above makes it harder to plan, pay for, and complete multi-modal journeys in the South East.

Additionally, there are several examples of poor physical integration in transport hubs, such as in Maidstone, Strood, and (right) Canterbury.

Location and approximate distances between Canterbury’s three city centre transport hubs



20 For many people, public transport fares are too high and too complicated

Stakeholders have cited the price of rail tickets and the complexity of ticketing as a disincentive to travelling by public transport.

The perception that rail fares are high means it is harder to persuade people to change from the car to rail. This is particularly the case for families and for those having to travel via London (even if their journey is not to/from London).

While Season Tickets offer better value for money (if they are used in full), headline figures of £6k+ annual season tickets is off-putting to many and may disincentivise people from moving to the South East.

The complexity of the tickets offered also puts people off using the railway. As an example: a myriad of different fares are offered between Ashford and London. The Williams Rail Review has identified the complexity of fares as an issue.

It is acknowledged that this is a complex topic and there are examples of low fares available during off peak periods, particularly on longer distance journeys (which do not make up a significant portion of journeys in the South East).

Real terms increase in costs of public transport and motoring

Retail Prices Index (RPI): Bus and coach fares, rail fares and motoring expenditure, 1987–2019²⁵



Source: DfT, "Bus Back Better" (2021)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/969205/DfT-Bus-Back-Better-national-bus-strategy-for-England.pdf

21 Too many public transport services and networks are not accessible to all users

While there has been good progress in improving accessibility in recent years, significant issues remain.

Accessibility – in the broadest terms – is a key barrier to many users. The Williams Rail Review identified this is a key challenge for the rail industry. The DfT's 'Access for all' programme has unlocked some investment in some rail stations. However, as the table to the right shows, there is a need for more progress. Other examples where improvements should be considered include:

- improving the accessibility of bus fleets (with low floors/ramp features) and rail rolling stock;
- Improving accessibility of bus stops;
- making it easier to plan, buy, and use public transport services;
- improving access to public transport for passengers with hearing, vision, and/or cognitive needs;
- improving walking and cycling facilities (many people with additional needs rely on cycles for their mobility); and
- making public spaces (e.g. town centres) more accessible.

Accessibility at train stations (% stations offering fully accessible provision at January 2019)

	Accessible ticket machines	Accessible ticket office	Train ramp access	National Key toilets	Step free access	Mobility set down
Great Britain	53%	21%	73%	18%	61%	28%
East of England	80%	17%	73%	33%	72%	23%
East Midlands	39%	17%	41%	20%	77%	16%
London	87%	33%	60%	24%	44%	24%
North East	24%	13%	98%	13%	84%	47%
North West	16%	18%	96%	8%	63%	17%
South East	89%	24%	79%	32%	56%	46%
South West	51%	15%	74%	22%	57%	60%
West Midlands	37%	16%	82%	25%	67%	33%
Yorkshire and the Humber	24%	8%	99%	8%	67%	34%
Scotland	40%	27%	35%	4%	51%	10%
Wales	37%	18%	94%	10%	79%	17%

Key Lowest proportion of stations Highest proportion of stations

Data from National Rail Enquiries, Knowledgebase XML API, accessed 24 January 2019

Source: House of Commons Library (2019) <https://commonslibrary.parliament.uk/how-accessible-are-britains-railway-stations/>

22 Cycle participation is relatively low, particularly in North Kent.

Cycle participation – defined in this case as the percentage of residents who cycle at least once a week – is lower in the South East Radial Area than other areas of the South East.

The figure to the right, which was published in TfSE's Transport Strategy for the South East in 2021, shows low (and variable) levels of cycling participation across the South East. Cycling participation is especially low in Medway, Dartford, and several districts in the Weald area. The TfSE strategy also presents data showing that fewer than 1 in 5 residents cycle once or more a week. Travel To Work data also shows cycling has a low mode share, particularly outside Brighton and Hove.

Every Local Transport Authority on this corridor wants to see a step change in cycling participation in their areas.

Furthermore, improving cycling infrastructure is seen as an enabler for new technologies such as electric bikes/scooters. A lack of infrastructure could be holding the region back from the opportunities these technologies offer.

Cycle participation and national/international cycle routes in the South East



The existing cycle network is not at a consistent standard and does not support wider cycling participation, and there are strategic gaps in the parts of the area's cycle network.

TfSE analysis has shown a lower proportion of residents in the South East live close to the National Cycle Network than residents in neighbouring regions. This is a metric that many stakeholders wish to see improve.

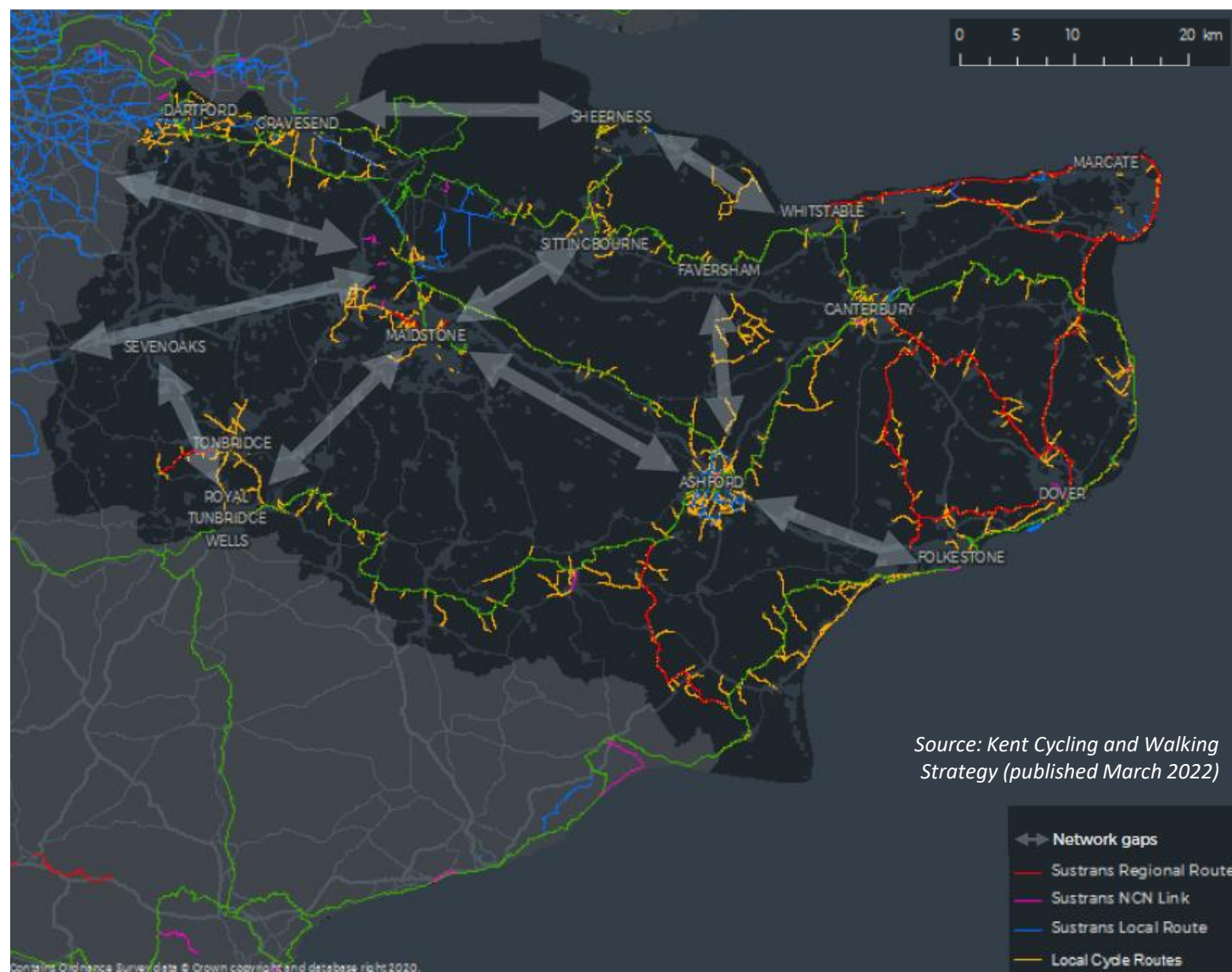
The South East Radial Area is a popular area for leisure cycling – particularly in and around the North Downs.

Urban cycle routes are particularly variable and often do not connect the right places together. For example, the cycleways in Medway avoid Gillingham and Rainham town centres.

There are notable gaps in longer distance cycle routes, as identified in Kent's (recently published) cycling strategy.

There are similar gaps in the East Sussex cycling network (e.g. Royal Tunbridge Wells to Hastings).

South East Area Cycle Network (and strategic gaps)



Source: Kent Cycling and Walking Strategy (published March 2022)

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