TRANSPORTEAST

Transport East State of Rail Report

February 2023

State of Rail Report
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Transport East is the Sub-national Transport Body for Norfolk, Suffolk, Essex, Southend-on-Sea and Thurrock. The partnership provides a single voice for our councils, business leaders and partners on our region's transport strategy and strategic transport investment priorities, working in close collaboration with the government and the rest of the UK.

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Foreword

The rail network in the East provides essential sustainable connections between many of our biggest economic centres. Hundreds of thousands of journeys are undertaken every day, with branch lines linking coastal and rural communities with services and education opportunities as well business and commuter trips.

Rail connections in the East are also essential for the movement of goods both nationally and internationally, connecting our ports with distribution centres in the Midlands, North and around London. Freight trains carry goods that build homes and infrastructure, fuel vehicles, stock supermarket shelves, deliver your online order and even empty your bins.

Increasing the number of journeys and the amount of goods moved by rail is also crucial to meeting net zero targets, as rail journeys have much lower carbon emissions than road equivalents, even if undertaken by a diesel fuelled train.

Rail improvements are an important area of focus for our partnership. By their nature, they are strategic, cross-boundary and need a regional view to be effective. Investment needs to be considered along full routes, both in the Transport East region and beyond, to see safe, reliable and efficient end-to-end journeys. There are several key projects already identified outside our boundary that are essential to delivering better transport within our region.

We are working with Network Rail, the Great British Railway Transition Team, Department for Transport, local authorities, political and industry stakeholders to enhance the evidence for, and help effectively prioritise future rail investments to benefit the region. This report is the first phase in this work, setting out the current picture for rail across the East, identifying areas of weakness and where future improvements could be focused. It will inform the next phase of work – a comprehensive plan for future rail investment benefitting the East.

Economic strength of the East

The East is brimming with energy, enterprise and exports. It is a model of rapid regional growth: with an economy worth over £73bn to UK Plc, and 320,000 new homes and 165,000 new jobs planned in the next 15 years. The region is a crucial gateway between businesses in the Midlands, London and the North, and our international trading partners.

Our diverse and productive economy has proved resilient through recent challenges. We are future-focused, hosting world class life-sciences, clean energy and agri-tech sectors, with further strength in ports, logistics and transport, digital and creative industries, financial services and tourism. Our established partnerships between public bodies, private industry and academia are powering innovation across multiple sectors.

The region has huge potential, and with the right support, is perfectly positioned to lead the UK's accelerated green growth for both our own communities and supporting those across the UK. Our forecasts indicate that with the right investment, regional Gross Value Added could increase to £119bn by 2050, and productivity could increase by over 50%. Transport links, including rail connections, are a core constraint to delivering this.

The Transport East partnership's vision is a thriving economy with modern, efficient, safe and low-carbon transport networks, transforming how people travel and how goods are transported to drive forward a future of inclusive and sustainable growth for decades to come.

We are focused on four core priorities as set out in our Transport Strategy:

Decarbonisation – transport creates 42% of carbon emissions in the East, the largest contributor and a much greater percentage than the national average of 28%. We are leading the way to decarbonise our networks as quickly as possible, in line with Government ambitions.

Connecting our growing towns and cities - enabling the region to function as a coherent economy and boosting productivity. With 75 towns and cities, and strong links beyond our boundaries, the East's diverse economy relies on a web of connections. Our networks are essential to national and regional prosperity, supporting long-term sustainable growth, increasing people's prosperity and quality of life.

Unlocking our international gateways - the East has more international gateways than any other region; 13 ports (including 2 Freeports) and 3 airports. Over 50% of the UK's containerised goods are moved through our region, to and from businesses across the Union. The East's global and national connections are more important than ever. Quick, reliable journeys add value throughout the supply chain.

Energising coastal and rural communities – with 500 miles of coastline and 15% of the UK's farmland, our coastal and rural areas are national assets. Our expanding offshore wind farms power 1.8m homes and our tourism economy is worth £8.8bn pa. Improved connections to education, training, high-skilled jobs and new markets would unleash further green growth.

Rail improvements are essential to delivering all these priorities. While investment in new rolling stock brought into service by Greater Anglia has much improved the customer experience and improved reliability, infrastructure investment to increase the frequency and speed of journeys has not kept pace.

We seek to maximise the use of the existing network for both people and goods movement. Speeding up journey times, improving east-west connections in the region and north-south links in the south.

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Focused investment in a few key pinch points on the network could transform both passenger service frequencies, opening up access to high-skilled jobs, and dramatically increase freight movements from the Port of Felixstowe and Thames ports to distribution centres in the Midlands, North and around London.

Ultimately, we want rail in the East to be a reliable, frequent, affordable and low-carbon mode for moving both people and goods over longer distances. This report is the first step in understanding how we achieve that.

1 Introduction

Introduction

1.1 Following development of the Transport East Transport Strategy further work was identified to establish the role for rail in the region, and to develop a rail plan. Phase one of this work is to understand the current condition of rail services and infrastructure for the region. This 'State of Rail' report reviews existing evidence of the needs and plans for rail in the region. This will inform the scoping and development of a comprehensive Rail Plan. The Transport East Rail Plan will set out the future role for rail in the East and measures needed to achieve this.

1.2 There is an underlying concern amongst partners in the East of a historic lack of investment in the region. In response Transport East recognise the need to present a strong and consistent case for investment. A fundamental part of this is to ensure a collective understanding of where the region is currently and what the next steps are for rail. Alongside this there is a need to continue its partnership working with Network Rail and align Transport East with the emerging Great British Railways team. To address this need, this 'State of Rail' report has considered the following evidence:

- The proposals, ambitions and evidence for addressing constraints on the network serving the East, from both within and outside of the region
- Work by Network Rail, Great British Railways Transition Team (GBRTT), Department for Transport, neighbouring regions (in particular England's Economic Heartland, Transport for London and Midlands Connect) and rail related organisations
- Engagement with Network Rail and the passenger and freight rail operators, ports and airports,

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- A 'lessons learnt' session with other Subnational Transport Bodies (STBs) to gather best practise on developing a rail plan

1.3 This evidence has been reviewed and used to identify constraints and opportunities on the rail network in the region, and to identify gaps in the evidence that will inform future work streams.

Process and Report Structure

1.4 To develop this 'State of Rail' report we have reviewed and consolidated a range of evidence on national, regional and local economic, development and transport objectives. Alongside this existing rail industry plans and strategies have also been considered. The full range of informing evidence is listed in an accompanying technical appendix. The key documents reviewed include:

- Transport East Transport Strategy (Transport East, 2022)(2022) & Regional Evidence Base (WSP, 2019) (2019)
- Local authority Transport Plans and rail-specific documents, noting that these documents are in the process of being updated
- Anglia Route Study (Network Rail, 2016) (2016), Great Eastern Main Line (GEML) Study (Network Rail, 2019) (2019), West Anglia Main Line (WAML) Study (Network Rail, 2021) (2021) and Essex Thameside Study (Network Rail, 2020) (2020)
- Network Rail's East West Mainline Strategic Statement (Network Rail, 2022)(2022)
- The East West Rail (EWR) Consortium's Eastern Section - Interim Strategic Outline Business Case (EWR Consortium, 2021) (2021)

1.5 The full report is structured as follows:

- A summary of national and regional strategic objectives
- A section for each of Transport East's strategic corridors, setting out:
  - The specific objectives for each across stakeholders
  - The existing infrastructure and service pattern
  - Industry plans for enhancements
  - The gaps in outputs that would need to be addressed to deliver those objectives
- The overall conclusions and next steps

Rail Baseline and Emerging Gaps

1.6 Service frequencies in the region vary considerably. Main line corridors have high frequency services into London, particularly on the more suburban services which are heavily used for commuting. Other lines in the region - some of which serve large population and economic centres - tend to have a much less frequent service, with many stations only seeing 1 train an hour, or in some cases fewer.

1.7 Station to station rail journey times into London are often faster than road. Other routes between towns and cities are less competitive – for example Norwich to Cambridge is roughly the same journey time by rail or road. However, it should be noted that given the flexibility of using a car for the entire end to end journey and being able to travel exactly when you want, station to station journey times need to be quicker than the car to fully compete. A comparison of car and rail journey times is provided in the accompanying appendix and summarised in this report.

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1.8 Rail journey times are much less competitive where there are lower frequency all-stations stopping services, and where interchange is required. Travelling from Colchester to Stansted, for example, is more than a 2-hour journey which requires an interchange at London Liverpool Street, whereas by road the travel time is under an hour.

1.9 Following the introduction of new rolling stock by Greater Anglia from 2019, passengers' perception of journey quality is, anecdotally, generally good. The new stock has greater seating capacity, air conditioning, and improved passenger information compared to the previous service, as well as better accessibility and accessible toilets.

1.10 Some corridors across the region are not well served by rail, as infrastructure is focused on journeys to and from London. This is particularly apparent in travel across Essex, and between Norwich and Kings Lynn. Some of the region's towns, such as Haverhill, are not connected to the rail network at all.

1.11 Despite much of the region's rail network comprising two track infrastructure, capacity and reliability of services within the region are limited by a high number of flat 'at grade' junctions[1]. Capacity and reliability are further affected on key east-west inter-regional passenger and freight routes, and many branch lines due to large single-track sections, which limits service frequency to hourly trains.

1.12 Line speeds are mixed; the Great Eastern Main Line has a general line speed of 100mph, matching the capability of the rolling stock, whereas other routes are slower. The West Anglia Main Line has some sections with a 90mph limit but much of the route is below that. Cross-country

[1] 'At-grade' junctions are those where crossing traffic uses the same infrastructure, requiring larger gaps between services for logistical and safety reasons. 'Grade separated' junctions use bridges or underpasses to separate traffic and reduce this problem.

routes to Cambridge from Ipswich and Norwich are slower, at around 60-75 mph.

1.13 Mainline services are electrified – key gaps are the routes to Cambridge from Ipswich and Norwich, as well as the line from Ipswich to Felixstowe including the Bacon Factory Curve which enables freight to bypass Ipswich station. The latter has been identified by Network Rail as a priority to enable more use of electric freight.

1.14 Branch services in the region have been proposed for hydrogen operation in the Network Rail Traction Decarbonisation Strategy. Using these as a 'testbed' for the introduction of hydrogen transport systems could be an economic opportunity for the region, especially with Sizewell's potential capability for green hydrogen generation, but this is an emerging and unproven technology at present. The Harwich branch line was used for a battery train trial in 2015, but this was not permanently implemented.

1.15 Station capacity is a common issue across several routes in the region, both in terms of the number of available platforms and in safely moving passengers through the station. This is particularly acute at London terminals and interchange stations such as Fenchurch Street and Stratford, but capacity at Cambridge and Ipswich is also a limiting factor on the expansion of services.

1.16 There are many level crossings in the region: these have implications for line speeds and for safety, depending on time. They can also be a constraint on service frequency, and upgrades or closures could be required to enable additional services. They can also act as a constraint on road connectivity where they introduce delays or create community severance.

1.17 Freight capacity has been expanded, particularly from Felixstowe to Ipswich, where there is now capacity for around 48 trains per day. However, due to capacity constraints elsewhere on the network, capacity

from Felixstowe is limited to 38 trains a day. Further capacity is therefore needed elsewhere on the network to allow rail freight to grow, particularly at Ely and Haughley Junctions which are well-known constraints on capacity for additional freight services; doubling the line at Soham would also optimise the capacity for freight through Ely.

1.18 Electrification of key gaps in the freight network would support the further decarbonisation of freight, along with further benefits such as reduced operating costs, the ability to handle heavier trains and possible journey time savings.

This gap analysis will inform the strategic evidence base for the development of an integrated rail network, meeting our Transport Strategy goals for sustainable end-to-end journeys on our key corridors and across the region.

Industry Plans

1.19 There are existing planned and committed works on routes in and serving the region, which will enhance services and capacity:

- A new station at Beaulieu Park near Chelmsford
- Overhead line renewal on the Great Eastern Main Line has been mostly completed, with works on the Essex Thameside route between Fenchurch Street and Pitsea currently underway. Further work around Stratford has not yet been planned.
- Network Rail are progressing their planned level crossing closures in Essex and Suffolk, to reduce safety concerns and improve capacity.

- Short term station capacity measures are being developed for Stratford and Liverpool Street Stations

1.20 There are also other schemes which have been proposed but are not yet fully developed or funded.

1.21 The Eastern Section of East West Rail would connect the East to the planned new line between Oxford and Cambridge, providing greater connectivity to the Midlands and the South West. Network Rail's 2022 Strategic Statement on East West Rail, along with the EWR Consortium's Eastern Leg Strategic Outline Business case, set out the benefits of this onward connectivity, but detailed plans have not yet been developed.

1.22 Bow Junction, just west of Stratford, is highly complex and limits the use of train paths into London Liverpool Street. A scheme to improve this by remodelling the junction has been developed but not funded. The cost of delivery was estimated at up to £100m in 2015; it does not currently appear to be being taken forward, likely as a result of this high cost.

1.23 Planned works at Ely and Haughley Junctions have been developed but do not have confirmed funding. Without these schemes there is limited capacity to grow rail freight traffic or provide additional or faster passenger services. The longer decisions are delayed the longer it will be before enhancements can be delivered, with work at Ely already not currently scheduled to be complete until 2028/2029 Further schemes to provide additional capacity on the Great Eastern Main Line, including at Bow Junction, have not yet been confirmed, but are central to delivering hourly journey times from London Liverpool Street to Norwich of 90 minutes and 60 minutes to Ipswich.

Some of our immediate priorities for the region have been identified within the Rail Network Enhancements Pipeline. If these schemes are delayed or cancelled there will be limited ability to make substantial service or capacity improvements on the main routes.

However, further improvements are needed to deliver all the region's frequency and journey time objectives.

2 National and Regional Strategic Context

Introduction

2.1 This chapter summarises the aims of existing strategy documents for rail in the East region. A regional level summary of these priorities is drawn from the priority pathways, goals and actions contained in the Transport East Transport Strategy, setting out how rail can contribute to the wider regional objectives.

2.2 Subsequently, this strategic narrative is summarised for each of the corridors mentioned in the Transport Strategy, drawing in any complimentary evidence at a local or county level to produce a set of corridor-specific strategic objectives.

National Policy Context

2.3 A series of Government white papers provide a policy context for the Transport East Transport Strategy, including the Transport Decarbonisation Plan (DfT, 2021) (2021), the Williams-Shapps Plan for Rail (DfT, 2021) (2021) and the Levelling Up White Paper (DLUHC, 2022)(2022).

2.4 Build Back Better sets out a plan to enable post-COVID growth, based on three pillars of investment in infrastructure, skills and innovation. Three themes guide this investment towards intended outcomes - levelling up, achieving net zero, and promoting a global Britain which trades internationally. Investment in rail is named as a key part of infrastructure investment to achieve these outcomes.

2.5 The Transport Decarbonisation Plan sets an ambition to decarbonise the rail network, removing diesel-only trains by 2040 and achieving full net zero by 2050. This ambition includes electrification where necessary, the introduction of battery and hydrogen technology, and encouraging modal shift towards rail, particularly for freight.

2.6 The Williams-Shapps Plan for Rail provides a blueprint to restructure the rail industry. Some activities of current Train Operating Companies and the Department for Transport are expected to be combined with Network Rail into Great British Railways. The white paper sets the ambitions for the new rail industry, including providing a modern passenger experience, a new customer offer, financial sustainability, greater control for local people and places, and a simpler industry structure. Franchising will be replaced with passenger service contracts and GBR will specify timetables, branding and ticketing. Project SPEED aims to reduce the timescales and costs of delivering rail infrastructure.

2.7 Finally, the Levelling Up White Paper sets out the Government's approach to devolution and levelling up, which revolves mostly around devolving powers to mayoral combined authorities. It emphasises the importance of resolving geographical disparities and ensuring people in every part of the UK have pride in place and access to opportunities.

Regional Strategic Objectives: Transport East Transport Strategy

2.8 The Transport East Transport Strategy (2022) sets out how Transport East will achieve its Vision for future transport in the East, which is to create:

> "A thriving Eastern region with safe, efficient and net-zero transport networks advancing a future of inclusive and sustainable growth for decades to come." - *Our Vision, Transport East Transport Strategy p.8*

2.9 The Transport East region is a net contributor to the UK economy, with strengths in sectors including agriculture, food, clean energy, tourism, logistics, digital and IT. It has 13 ports and three airports, including two Freeports, and is a leader in green energy production, making the region's success crucial to a sustainable and outward-looking future for the UK.

2.10 However, currently the East is being held back by its transport system. Congested urban areas, capacity-constrained inter-urban connections and poor connectivity in rural and coastal areas are making it difficult to attract people and businesses, and leading to high car dependency with consequences for emissions and quality of life.

2.11 The Strategy identifies four strategic priorities which Transport East needs to deliver to achieve the Vision. For each priority, a pathway is set out which includes goals and actions for delivering it. The priorities are:

- Decarbonisation to Net Zero
- Connecting Growing Towns and Cities
- Energising Coastal and Rural Communities
- Unlocking International Gateways

2.12 The four pathways overlap and together form an integrated Transport Strategy for the region, with specific projects developed as a portfolio through the Investment and Delivery Programme. They are fully aligned with the three Government themes for post-COVID growth - levelling up, delivering net zero and promoting global Britain.

Decarbonisation to Net Zero

2.13 Transport is responsible for 42% of the East's overall carbon emissions, well above the national average and requiring urgent action to decarbonise. The Government's Transport Decarbonisation Plan sets a clear direction for the transport industry to meet net zero targets. Many local authorities in the region have declared a climate emergency[i], with Essex County Council establishing the Essex Climate Action Commission, and some have targeted carbon neutrality by 2030.

2.14 The key outcome of this priority pathway is to achieve net zero emissions from the regions' surface transport system by 2040, building on the East's status as the UK's premier region for renewable energy. This will be achieved through four goals:

- Goal 1: Reduce demand for carbon intensive trips through local living; making it easier for people to access jobs and services locally or by digital means.
- Goal 2: Shift modes by supporting people to switch from private car to active and passenger transport, and goods to more sustainable modes like rail.
- Goal 3: Switch fuels with all private, passenger transport, fleet and freight vehicles switching to net zero carbon fuels at the earliest opportunity.

- **Goal 4: Zero carbon growth** by supporting authorities and developers to plan, locate and design new development that reduces the need for people to make carbon-intensive trips.

What this means for rail:

Rail needs to become a more attractive mode for more people in the region, to encourage mode shift. More capacity is needed to shift freight to rail, and those journeys need to be fully decarbonised.

Connecting Growing Towns and Cities

2.15 The East does not have one dominant metropolitan centre. The regional economy relies on connections within and between towns and cities, as well as with neighbouring regions. However, strategic transport networks in the East are slow, congested and overcrowded. On the rail network, travel time, frequency of passenger services and movement of freight can be poor due to capacity bottlenecks and large numbers of level crossings.

2.16 The focus of this pathway is to enhance links within and between our fastest growing places and business clusters. This will be achieved through three goals:

- **Goal 5: Improve connections and access** within our urban centres through better walking, cycling and passenger transport, supporting sustainable access to services, education, training, jobs and leisure.
- **Goal 6: Deliver faster and more reliable connections** between our growing places and to the rest of the UK, to support business growth, skills development and employment.
- **Goal 7: Fully integrate transport** networks, services and operations across the Transport East region, through a customer-focused approach, enabling seamless and safe end-to-end journeys by sustainable modes that are attractive to all.

What this means for rail:

Rail operates most efficiently between towns and cities, where it can provide fast and reliable journeys. Integrated transport with other modes is needed to enable end-to-end sustainable journeys and maximise the opportunities rail offers.

Energising Coastal and Rural Communities

2.17 Across the East, 21% of people live on the coast and 33% live in rural areas, which is higher than the national average. These places are home to nationally significant industries as well as rich ecological and heritage landscapes. However, two thirds of rural residents live in a 'transport desert', where there is no access to an hourly or better bus or train service, and as a result no alternative to the private car. Poor accessibility embeds deprivation and creates challenges related to isolation and access to healthcare for the disproportionately high number of people over the age of 65.

2.18 The key outcome is to create a reinvented sustainable coast and thriving rural communities for the 21st century. This will be achieved through two goals:

- **Goal 8: Increase accessibility for rural communities** to education, training, services and jobs through; better ways of taking people to places sustainably, supporting more local trips through closer provision of goods and services, supporting regional partners and the digital sector to provide alternative options to travel.
- **Goal 9: Improve connections** along our 500miles of coastline and connect our coastal communities to the rest of the region and the UK, supporting levelling-up and boosting our coastal industries.

What this means for rail:

Existing rail connectivity in rural areas needs to provide reliable and frequent services which are well integrated with other modes. New services should be considered to address major gaps.

Unlocking International Gateways

2.19 The East has more international gateways than any other region - including 13 ports (including two freeports: Freeport East – Felixstowe and Harwich, and Thames Freeport – London Gateway and Tilbury Port) and 3 international airports. The region's ports handle over half of the UK's containerised freight. But challenges due to Brexit and COVID-19 have been compounded by traffic congestion, limited connections by rail for freight and passengers, and capacity constraints.

2.20 The key outcome of this priority pathway is to better connect ports and airports, helping UK businesses thrive and boosting the nation's economy:

- **Goal 10: Improve connectivity journey time and reliability** for freight, passengers and employees to ports and airports.
- **Goal 11: Move goods and people sustainably** to ports and airports by shifting modes including to rail and water.
- **Goal 12: Increase the use of alternative fuels** for both port and airports, and for the vehicles moving people and goods onwards from international gateways.

What this means for rail:

Rail access to airports for passengers and employees should be improved. Rail freight should be promoted and end-to-end route capacity from ports expanded.

Transport Strategy Evidence Base

2.21 The Transport East Transport Strategy is supported by a complementary local strategic evidence base, including through local authorities' Local Transport Plans and rail prospectuses, which seek rail enhancements to support local development, economic and environmental objectives.

2.22 In the broadest terms, the following rail enhancements would be required to deliver these objectives:

- Increased frequency, to provide better connectivity and greater capacity
- Reduced journey time and/or new direct services to provide enhanced connectivity (e.g. Norwich in 90, East West Rail)
- New stations to connect underserved locations, enable mode shift and support new development (e.g. Beaulieu Park)
- Consistent service quality to attract people to rail from road (e.g. reliable services, rolling stock quality, fares)
- Capacity and capability to handle freight (e.g. Ely Area Capacity Enhancement, Soham line doubling and Haughley Junction)

2.23 However, the key gap in the strategic evidence base is the specific outputs rail needs to deliver at a regional and corridor level to address wider strategic goals. For example, while improved frequency or reduced journey times are clearly desired outputs, it is not clear what the specific frequency or journey time needs to be to unlock benefits.

What this means for rail:

Establishing these specific outputs is critical to definitively establish that there is a gap in what the rail service needs to deliver, and to identify the specific operational and/or infrastructure changes which would be needed to deliver this. Given likely financial constraints in the short to medium term, it would also enable the identification of routes where enhancements are currently less of a priority.

2.24 Defining the required outputs is further complicated by changing priorities in recent years. The COVID-19 pandemic has caused significant change in the rail market nationally, but in several ways that particularly affect the East. A key issue addressed in previous work is for passenger services to provide sufficient capacity for traditional commuter peak demand growth on the main line routes towards London. This market has changed, and while demand is returning, it is returning in a different way. Capacity in the highest part of the traditional peak may no longer be the main constraint, particularly for services into London. Changes in commuter demand are less relevant for cross-country services, many of which have returned to pre-pandemic frequencies and did not demonstrate the same peak capacity challenges. Passenger levels are spread more across the day and have also shown an increase in visitor economy trips.

2.25 Rail freight demand has continued to grow and did so more strongly through COVID-19 due to changing consumption patterns. There is a need to provide the network capacity to support and build on this growth.

2.26 There remains a strong strategic argument for enhanced connectivity to rural locations and between key centres in the East. However, the financial position of the rail industry following the pandemic, and the country as whole reflecting current global economic challenges, makes setting out the case for rail solutions, and securing funding, more challenging. Options for providing and improving connectivity to these

areas should be developed with a modal agnostic approach to ensure that rail is the best possible modal solution, particularly for improving outcomes in the near future.

What this means for rail:

There is a need to consider where previous priorities and conclusions should be reviewed in the light of post COVID-19 changes, particularly from the industry but also from local transport plans.

Summary

2.27 The Transport East Transport Strategy sets out how rail needs to contribute to inclusive and sustainable growth in the East, with goals focused on the four priority pathways Table 2.1.

2.28 Within the **decarbonisation** pathway, rail's contribution towards meeting these ambitions is to **attract more freight and people to switch** from polluting modes to using the rail network, address the **frequency, affordability, capacity and connectivity barriers** which prevent people and goods from travelling sustainably, develop **stations as sustainable transport hubs** to encourage zero carbon development, and **switch away from diesel** trains where possible.

2.29 To improve connectivity for the East's **growing towns and cities**, the region needs a world-class rail network with **improved journey times, frequency, capacity and reliability.** Investment is vital to ensure the network can handle the scale of development envisaged in the region, and to **better connect orbital corridors** .

2.30 Currently, many **rural and coastal residents** live in 'transport deserts' with poor access to services by public transport. To address this, the **transport needs of rural and coastal areas should be embedded in rail planning**, and **new lines** should be opened to connect the coast with the strategic rail network.

2.31 Finally, to **unlock international gateways** by improving transport access to ports and airports, freight operators should be supported to **shift to rail freight**, and **rail surface access** to ports and airports should be improved through enhanced rail connections**, improved end-to-end capacity** and support for **mode shift**.

2.32 The next section of the report sets out how these goals apply to the six strategic corridors across the region. The summary table is used in each section to identify the primary strategic priorities for each corridor.

Table 2.1: Emerging Transport East Rail Priorities

Transport East strategic pathway	Deliverables
Decarbonisation for passengers and freight	• Increase frequency and affordability to make mode shift attractive • Switch away from diesel
	• Stations as transport hubs
Growing Towns and Cities	• Increased frequency and capacity • Increased reliability • Better connections East-West
Rural and Coastal	• Support transport needs of rural areas
	• Better connect coastal areas
Unlock International Gateways	• Improve sustainable surface access to ports and airports
	• Support shift to rail freight with improved end to end capacity and capability

3 Corridor-level Evidence Review

Introduction

3.1 As well as setting out region-level priorities and goals, the Transport East Transport Strategy defines six core corridors, illustrated in Figure 3.1:

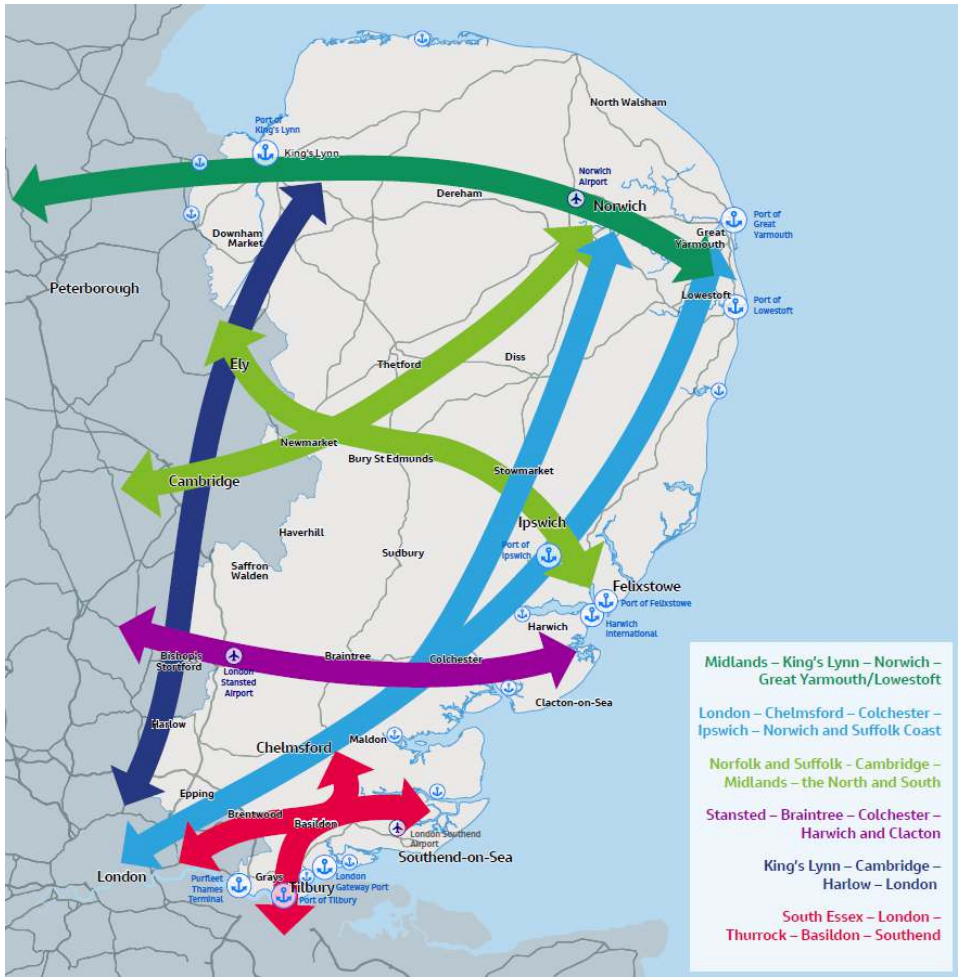
- London - Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast
- Norfolk and Suffolk - Cambridge - Midlands the North and South
- Stansted - Braintree - Colchester - Harwich and Clacton
- King's Lynn - Cambridge - Harlow - London
- Midlands - King's Lynn - Norwich - Great Yarmouth/Lowestoft
- South Essex - London - Thurrock - Basildon – Southend on Sea

3.2 Rail serves a varied role across the different Transport East strategic corridors. Each area has specific challenges and opportunities where rail can help to deliver key strategic objectives; drawing out the local level is crucial to understand the impact of those objectives.

3.3 This section takes the Transport Strategy narrative and summarises it at a corridor level, drawing in any complementary evidence at a local or county level to produce a set of corridor-specific strategic outcomes and illustrative suggestions for what that might mean for the network. It then compares those outcomes to existing and planned infrastructure and identifies key gaps.

3.4 There are also two cross cutting sections on freight and on the passenger experience, which pick up on issues not aligned to specific routes.

Figure 3.1: Transport East strategic corridors



Source: Transport East Transport Strategy

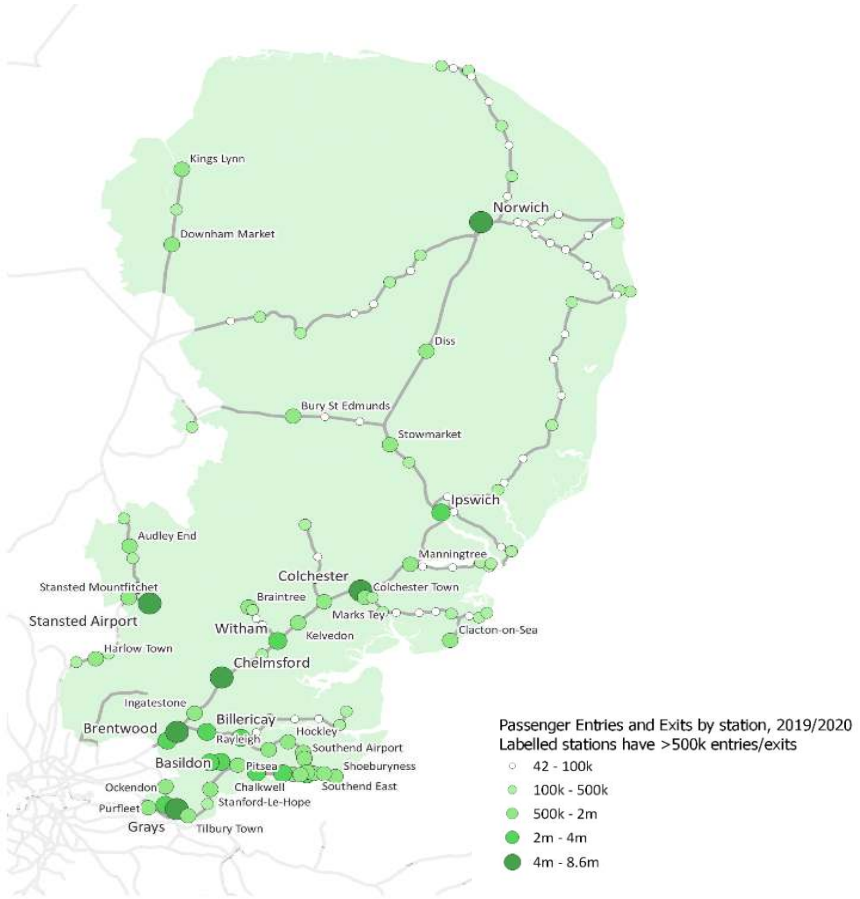


Figure 3.2: Station usage data. Source: ORR

Demand across the region

3.5 Station usage in the region, as shown in figure 3.2, gives an indication of current demand for rail travel. The TE transport strategy (Transport East, 2022) aims to encourage mode shift and rail demand across all routes, recognising the particular characteristics of each core corridor and branch line. The most recently available data which is not substantially affected by Covid-19 is from 2019/2020, . The 'new normal' of post pandemic rail travel patterns has not yet settled, and therefore cannot be accounted for in this analysis.

3.6 Demand is largely concentrated in the south of the region, on the main commuter routes towards London and the route to Stansted airport. Chelmsford and Stansted Airport both had over 8million entries and exits in 2019/2020, almost double that of the next highest station (Colchester).

3.7 At the other end of the spectrum, Berney Arms in Norfolk was the least used station in the UK in 2019/2020 with only 42 entries and exits (although it was closed for much of the year). The next lowest was Buckenham with 212 entries and exits. Both stations receive a very limited service.

3.8 The majority of passenger journeys are not contained within the region: in 2019/2020 there were 34m passenger journeys wholly within the East of England (the statistical region, which includes Cambridgeshire) and 152m journeys to or from other regions (Road, 2020).

3.9 Analysis collected for this report (Intermodality, 2022) suggests that total rail freight demand to, from and within the region is around 419 loaded trains per week, equivalent to 200,000 tonnes of freight or 12,000 HGV loads. Over 90% of that demand originates or departs from the ports of Felixstowe, London Gateway or Tilbury.

Inter-regional travel

3.10 Travel to destinations outside the region is often poor. In most cases the fastest route is via London, with long and difficult interchanges between terminal stations and often higher fares. Norwich has a direct service to Sheffield, Manchester and Liverpool, but this is infrequent. Other journeys to the North and Midlands rely on interchanges between infrequent, and low speed, services. This provides a poor passenger experience and means that any delays can have a more significant impact.

3.11 East-West connectivity is particularly limited, with a negative impact on the region's economy. The region's access to major centres of employment and economic activity is lower than the average for England. Better connectivity between Cambridge, Ipswich and Norwich would support the growth potential of these towns and cities and development along key corridors such as the Norwich-Cambridge Tech Corridor. It would also improve the connectivity with wider UK economic centres, particularly in combination with the delivery of the East-West Rail Mainline.

Infrastructure capacity is under significant pressure, and freight and passenger services are frequently competing for train paths. Addressing this is crucial to both increase freight capacity from the region's major ports, which are of national economic importance, and to provide high quality passenger services that support employment, economic growth and future mode shift in the region.

Table 3.1: Intercity journey times

Journey	Route	Number of interchanges	Rail journey time	Road journey time[2]
Ipswich - Bristol	London	2	3h 20	4h
Norwich - Leeds	Peterborough	1	3h 20	4h 20
Colchester - Brighton	London	2	2h 20	2h 20
Ipswich - Birmingham	London	2	3h 15	3h
Stowmarket - Manchester	London/ Peterborough	2 via London 2 via Peterborough	4h 40 via London 4h 30 via Peterborough	4h 15
Colchester - Nottingham	London	2	3h 6	3h 20
Norwich - Sheffield	Peterborough	Direct	3h 40	3h 50
Ipswich – Milton Keynes	London	2	2h 16	2h 10

[2] Road journey times have been collected via Google Maps API – they reflect average peak journey times on a weekday morning (leaving at 8:30am) at the time of writing, without any intermediate stops.

London – Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast

Figure 3.3: London – Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast corridor map

Table 3.2: London (Liverpool St) – Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast connectivity summary , station to station journey times

	Service (direct unless otherwise stated)	Rail journey time	Road journey time
Norwich - London	2 tph (fast)	1h 50	2h 40
Sudbury - London	No direct service – 1 tph to Marks Tey	1h 26	2h 10
Ipswich - London	2 tph (fast) 1 tph (stopping)	1h 10 (fast) 1h 20 (stopping, 1h 30 in peak)	2h 10
Norwich-Ipswich	2 tph (fast)	37 mins	1h 25
Norwich – Chelmsford	2 tph (fast)	1h 18	2h 10
Chelmsford - London	5 tph (fast) 1 tph additional peak service	35 mins	1h 25
Ipswich - Lowestoft	1 tph (stopping)	1h 30	1h 30
Freight	Up to 2 freight paths per hour (GEML)		

All direct services unless noted

3.12 This corridor covers the Great Eastern Mainline (GEML) and regional services on the East Suffolk Line and connecting branch lines, providing connectivity between many of the region's growing towns and cities, including Norwich, Ipswich, Colchester and Chelmsford. It connects those towns and cities to London and each other, delivering large numbers of commuters to high value industries. Connections to the GEML at Liverpool Street, Ipswich and Norwich provide routes from the region through to the rest of the UK.

Aspirations for the route

3.13 The TE Transport Strategy highlights that *"currently, even with new rolling stock, passenger and station capacity are inadequate, limiting prospects for modal shift."* It specifically identifies Haughley Junction as a major pinch-point for both the GEML and the Felixstowe to Nuneaton freight corridor, while Trowse Bridge and nearby junctions constrain the approach to Norwich. Capacity enhancements - including passing points and upgrades to London stations - will be needed to enable higher line speeds and more frequent services, and ensure rail remains an attractive option.

3.14 The following paragraphs summarise the key rail objectives that have been identified in partners' local transport and economic plans in this corridor. These reflect local rather than Transport East priorities, but are broadly in line with the overall strategic aims. They do not present an exhaustive list of possible interventions, but give an overview of potential options which could be reviewed further in the Rail Plan.

3.15 The Essex Local Transport Plan (Essex County Council, 2011)(2011) includes several strategic priorities for rail focussed on maximising the use of rail and improving services for passengers. This includes additional capacity on the GEML to accommodate growing commuter demand, a minimum 2tph service for all stations, the new station at Beaulieu Park and seeking an enhanced local role in the rail franchising process. Improving access to Harwich port by low carbon transport is also highlighted, along with facilitating a broader shift towards rail freight by working with district councils to safeguard existing freight facilities and promote their use. Essex's focus has been working with partners such as the GEML Taskforce.

3.16 The Suffolk Local Transport Plan (Suffolk County Council, 2011)(2011) has three strands to its approach: reducing demand for car travel (including via mode shift), more efficient use and management of the transport network, and infrastructure improvements where affordable. As elaborated in the Rail Prospectus (Suffolk County Council, 2014) (2014), Suffolk's key aims for the rail network include faster and more reliable journeys on the GEML, increased frequency and speeds between Ipswich and Lowestoft (and intermediate coastal areas) via the East Suffolk Line, and improvements to the Felixstowe-Nuneaton freight route.

3.17 The Norfolk Local Transport Plan (Norfolk County Council, 2022) (2022) sets out a series of strategic objectives for transport in the county: embracing future technology, delivering sustainability, enhancing connectivity, enhancing quality of life, increasing accessibility, improving safety and creating a well-managed and maintained transport network. For the GEML, the Rail Prospectus (Norfolk County Council, 2013)(2013) sets out Norfolk's priorities including 3 trains per hour to London (including 90-minute journey times at least hourly), additional services, and a move towards less disruptive engineering work.

3.18 The Great Eastern Taskforce was set up in 2013, bringing together stakeholders along the GEML. The taskforce has three aims - increasing passenger capacity to accommodate growth, improving services for passengers, and reducing journey times, including an ambition to regularly reach *'Norwich in 90'*.

3.19 Due to the strategic importance and high usage of the GEML, there are a wide variety of suggested enhancements. A key requirement for the Rail Plan will be to consolidate, assess and prioritise different possible interventions for this route.

Table 3.3: London (Liverpool St) – Chelmsford – Colchester – Ipswich – Norwich – Suffolk Coast corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Increased frequency and capacity	• Ipswich to London in 60 minutes • Norwich to London in 90 minutes • Haughley and Bow Junction enhancements • Trowse Bridge and junction enhancement
Increase frequency and affordability to make mode shift attractive	• Ipswich in 60 and Norwich in 90 - making journey times more attractive • Maintaining InterCity stops along the route
Support transport needs of rural areas	• East Suffolk Line improvements • Coastal access • Clacton/Walton to Harwich branches • Introducing 2tph service on branch lines
Support shift to rail freight	• Haughley Junction - to provide more capacity on Felixstowe-Midlands and North • Encourage investment linked to the Freeport at Felixstowe & Harwich • Improve access to Harwich port

Indicative service outputs

3.20 To consider the extent to which the existing network is able to support the desired rail service in this corridor, these broad objectives need to be translated into specific rail outputs. This can then be compared to the infrastructure and rolling stock capability, and industry enhancement plans, to consider where there may be gaps that need addressing to deliver the desired outputs.

Corridor-level Evidence Review

3.21 It should be noted that a key gap in the collected evidence is an explicit link and strong narrative from strategic objectives and problems to the desired service output. It is noted that prior to COVID-19 work had been undertaken to make the case for future capacity provision required to support housing development on the route. However, the change in travel patterns following COVID-19 may mean that these assumptions need reviewing. More specifically, the evidence does not provide a clear link to all the connectivity needs (beyond Norwich in 90/Ipswich in 60), in terms of direct services, journey frequency and journey times needed to deliver the objectives. This makes it more challenging to identify gaps in provision. The highlighted box below therefore sets out existing services and an indicative suggestion of possible enhancements, which will be subject to refinement as part of the later Rail Plan development process.

3.22 This corridor serves a complex market, including commuter trips into central London and journeys into and between other sub regional centres in the corridor. Core commuter services are clearly above a 'baseline' service quality but are also likely to be where the largest economic benefits of improvement are found. The specific outputs suggested here are therefore likely to need more refinement than some of the other corridors.

The following indicative aspirations have been identified to be assessed in the development of the Rail Plan:

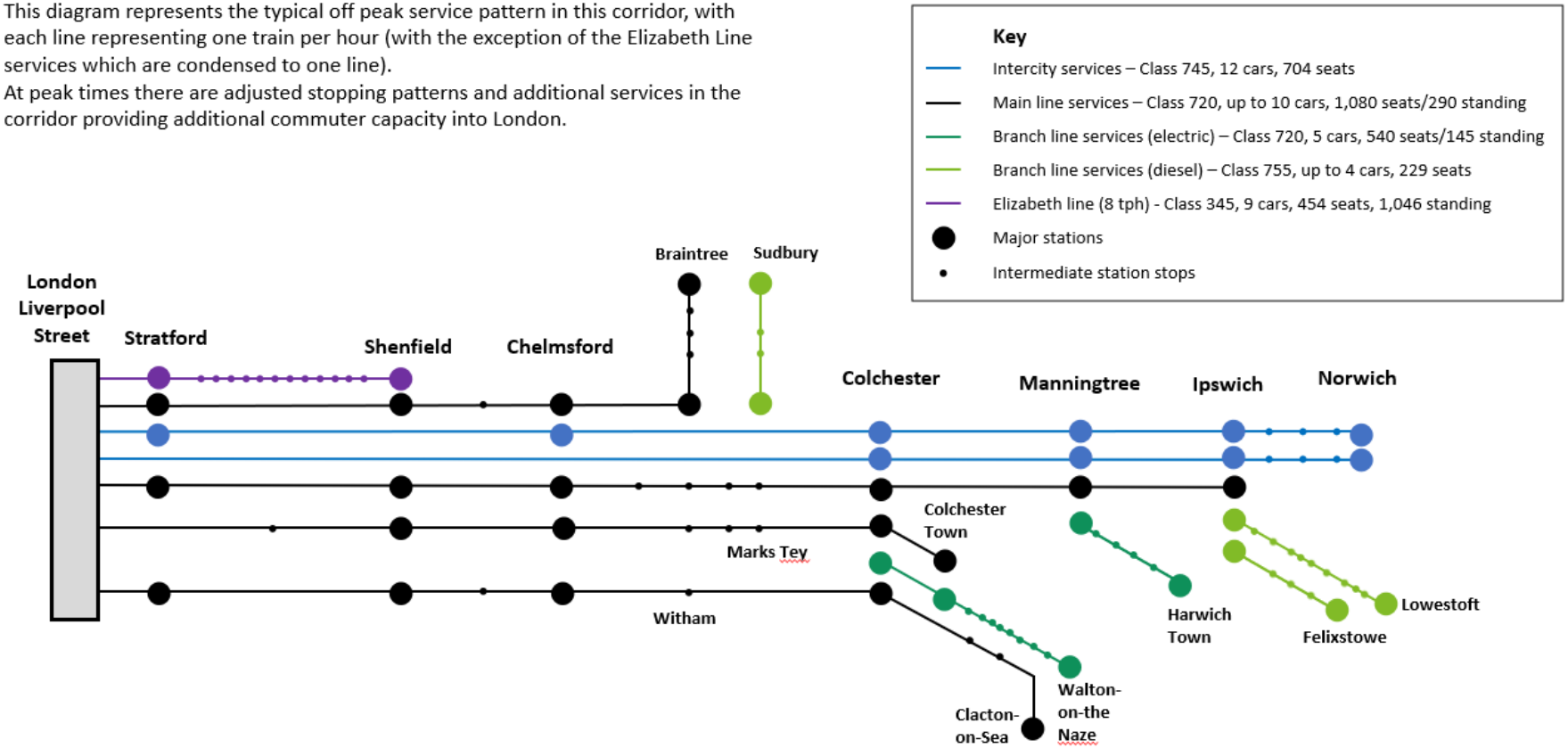
- At least 2 tph frequency is often desirable, including on branch lines, to provide journey flexibility compared with car and to secure modal shift
  A higher frequency may be required to meet passenger capacity needs

- Journey time should be competitive with car for key flows – noting that for journeys to London a quicker journey time may be desirable (e.g. Norwich in 90)

- The route services a wide range of sub-regional centres, and it may not be desirable to provide direct connectivity between all locations. However, in all cases locations should have a direct connection to the nearest sub-regional centre.

Figure 3.4: London – Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast corridor passenger services operated. Services may not stop at all intermediate stations

This diagram represents the typical off peak service pattern in this corridor, with each line representing one train per hour (with the exception of the Elizabeth Line services which are condensed to one line).
At peak times there are adjusted stopping patterns and additional services in the corridor providing additional commuter capacity into London.



Existing infrastructure

3.23 The Great Eastern Main Line is the core route between Norwich and London Liverpool Street, connecting Ipswich, Colchester, Chelmsford, Shenfield and Stratford, along with other intermediate stations. The route is fully electrified. It has a high number of branch lines including:

- Shenfield to Southend Victoria and Southminster (electrified)
- Witham to Braintree (electrified)
- Marks Tey to Sudbury (not electrified)
- Colchester to Colchester Town, Walton-on-the-Naze and Clacton-on-Sea (electrified)
- Manningtree to Harwich (electrified)
- Ipswich to Lowestoft (not electrified, access to Sizewell power station)

3.24 Line speeds on the main line are generally 90 mph from Stratford to Chelmsford and 100mph from Chelmsford to Norwich. The line speeds on the branch lines are typically lower, around 60mph, reflecting more frequent stops, and therefore lower maximum speed potential for services on these routes.

3.25 Infrastructure on the London end of the line is complex. There are four lines from Liverpool Street to Shenfield for faster (main lines) and stopping services (electric lines/slow line). This allows for the complex mix of service patterns that use the approach into Liverpool Street. However, the slow lines are only used by Elizabeth Line services, meaning all fast and semi-fast services from beyond Shenfield make use of the fast lines. As a result, very few Greater Anglia services stop between Shenfield and Stratford. The line is mostly double-track (i.e. one track in each direction) from Shenfield to Norwich, with passing loops at larger stations including Witham, Colchester and Ipswich. There is a short single-track section on the approach to Norwich across Trowse bridge.

The double-track main line route is a key capacity constraint, preventing faster services overtaking slower services. Given the mix of fast passenger, semi-fast passenger and freight services using the route, the double-track route restricts the ability to run either faster and/or more frequent services.

3.26 Most of the branch line routes are double-track. However the branches to Braintree, Southminster, Sudbury, Colchester Town, Walton-on-the-Naze, Felixstowe and Lowestoft are predominantly single-track, providing constraints on both the ability to run more frequent services, and on timetable flexibility. Further, with the exception of Shenfield (for Southend) and Colchester (for Colchester Town, Clacton and Walton-on-the-Naze), junctions on the route are at grade, further constraining capacity. This is particularly critical for freight traffic at Ipswich to and from the Port of Felixstowe, and may also become a constraint for traffic servicing Sizewell C nuclear power station.

The single-track nature of branch lines on the route, together with at-grade junctions, restrict the ability to operate more frequent services on these routes.

Industry plans

3.27 There are several enhancement programmes recently completed or currently being constructed on the GEML. Overhead line replacement on the majority of the GEML was largely completed in 2019, with a small but complex section around Stratford still in progress. Beaulieu Park station near Chelmsford is under construction, having received HIIF (Housing Infrastructure Investment Fund) funding in 2019. Network Rail has received DfT funding to develop options for reducing congestion at Stratford station, working in collaboration with TfL. A programme of level crossing closures is also currently underway.

3.28 Additional infrastructure required to increase capacity was identified in the 2016 Anglia Route Study (Network Rail, 2016). This included works at Haughley Junction, track doubling at Trowse Bridge and the associated junctions, and a passing loop north of Witham.

3.29 Haughley Junction is where the line to Cambridge (via Newmarket) and the West Midlands (via Ely) splits off from the GEML. The junction is single-track; adding an additional line would allow for greater flexibility and higher frequency of freight and Ipswich to Cambridge services. Removing the level crossing at Haughley would also create some operational efficiencies.

3.30 Trowse Bridge is a single line bridge which, along with the junctions approaching the bridge, acts as a bottle neck on the railway lines into Norwich. This limits flexibility to introduce new services, and tends to magnify delays in the event of disruption. The line carries a mix of fast and slow passenger services, as well as freight traffic.

3.31 The 2019 Great Eastern Main Line route study (Network Rail, 2019) is a key source of rail industry planning. It focused on capacity enhancements and did not address possible quality improvements or additional services. It identified that the full introduction of the Elizabeth Line would reduce pressure on the main line station at London Liverpool Street – however in the longer term, measures to address crowding were still considered likely to be needed. Plans for the station redevelopment were progressed to design stage in 2020-2021 and are expected to progress further in 2023 – this will follow on from shorter term capacity measures and roof replacement currently being carried out.

3.32 The 2019 route study modified the schemes identified in the 2016 study. The new station at Beaulieu Park is suggested as an alternative location for a passing loop rather than Witham, with an additional one provided at Marks Tey. It also suggested that the doubling at Trowse Bridge was no longer required to address capacity constraints on North-South services, within the terms of the study, due to the increased service frequency and new rolling stock. However, it did acknowledge that it would still impact on delays, and elsewhere Trowse has been identified as essential to enable further East-West services.

3.33 Bow Junction is highly complex, and was identified as a critical constraint, with no ability to accommodate growth in the number of peak time services coming into Liverpool Street without remodelling. Two tracks through the junction are used by TfL Rail services prior to the full introduction of the Elizabeth Line. Once these are no longer required by Elizabeth Line trains they will be available for use by other services enabling up to 10 additional trains per hour through Shenfield to Liverpool Street, but using these effectively, particularly for longer distance routes, requires remodelling the junction. This scheme with an estimated cost of up to £100m, was originally planned for CP5, pushed to CP6 and then defunded.

3.34 The Traction Decarbonisation Strategy (Network Rail, 2020) (NR TDS) suggested that hydrogen could be a preferred option for decarbonising the East Suffolk Line in order to meet net zero targets (along with other regional services), due to the relatively low density of traffic.

Gap analysis

3.35 Delivering frequency and speed improvements to branch lines as set out in the illustrative outputs table is constrained by their single-track nature, and the limited flexibility of the two-track main line; it would require further infrastructure which is not currently planned. Sudbury has a particularly limited rail service at present, where direct services only operate to Marks Tey. Braintree also has a limited service, with only 1tph to London. This makes journey times to Ipswich and other regional destinations extremely slow. Connectivity from Sudbury to Cambridge is particularly poor and uncompetitive with car, with only extremely indirect connections.

3.36 Delivering 'Norwich in 90' on an occasional basis has previously been achieved by running services with fewer intermediate stops between Norwich and London. The full ambition is for 90-minute journey times with current calling patterns to maintain connectivity. Running these services on an hourly basis would require the delivery of the infrastructure schemes included in the 2019 GEML route study – Bow Junction, Haughley, and an additional passing loop. Making journey time improvements across all services would require additional works which have not been identified.

3.37 Passenger capacity constraints are likely to have been reduced, in the shorter term, by the impact of COVID-19, delaying the need for enhancements to create additional capacity. New rolling stock introduced in 2019 has also provided additional seating capacity. Passenger capacity is however still likely to become a concern in the medium term, particularly on the southern end of the GEML for shorter distance services. Capacity for freight is also constrained without infrastructure improvements at Haughley and Ely, reducing the ability to increase rail freight from Felixstowe. The North London Line freight route has no capacity for any further freight services.

3.38 There are currently no firm commitments to the enhancements previously identified which would enable faster, higher frequency or more reliable services. It is unclear what the current stage of planning is for making use of the additional platform and track capacity into Liverpool Street which will become available once the Elizabeth Line is fully operational. Making full use of this capacity is likely to require remodelling Bow Junction to allow greater use of those lines for long-distance services. This scheme has been planned in detail but does not have any funding commitments. It is also reliant on additional capacity being provided on the GEML to deliver the benefits of the scheme.

3.39 Works at Haughley Junction and Trowse Bridge were proposed in 2019 and are currently awaiting a funding decision to be announced in the RNEP. Without Haughley Junction enhancements there is limited ability to grow freight or provide additional passenger services on the GEML, or to deliver a timetable that would enable regular faster London – Norwich services. Trowse Bridge and junctions were deprioritised in the 2019 route study as they are not required to accommodate growth in the existing GEML services. However, these enhancements would be necessary to support the additional East-West services planned as part of the EWR Eastern Leg. These interdependencies have not yet been considered in industry plans.

3.40 There do not appear to be any committed and funded plans to provide additional capacity on the main line between Colchester and Stratford.

3.41 Pedestrian capacity at Liverpool Street and Stratford is limited, with congestion on platforms and at gate lines at present and this forecast to worsen in future. Plans to improve this are being developed, with the scheme at Stratford currently in development in partnership with TfL, with a target delivery date over the next five years. Network Rail is

developing a more substantial upgrade to Liverpool Street station capacity as part of a commercial project, which is likely to be longer term.

3.42 Electrifying the East Suffolk Line appears unlikely to offer good value for money in the short term. The hydrogen approach set out in NR TDS could be effective, but is currently untested. More work is required to understand the potential impacts, particularly due to the high operational costs of hydrogen.

Norfolk and Suffolk - Cambridge - Midlands - the North and South

Figure 3.5: Norfolk and Suffolk – Cambridge – Midlands – the North and South corridor map

Table 3.4: Norfolk and Suffolk – Cambridge – Midlands – the North and South connectivity summary

	Service	Rail journey time	Road journey time
Norwich - Cambridge	1 tph	1 hr 20 mins	1h 25 mins
Ipswich -Cambridge	1 tph	1 hr 20 mins	1h 20 mins
Norwich - Ely - Peterborough	1 tph	54 mins to Ely 1 hr 28 mins to P'boro	1h 10 mins to Ely 1h 40 mins to P'boro
Ipswich - Ely - Peterborough	0.5 tph	58 mins to Ely 1 hr 38 mins to P'boro	1h 10 mins to Ely 1h 40 mins to P'boro
Norwich – Stansted	1 tph	~2 hrs	1 hr 50 mins
Ipswich – Stansted (interchange at Cambridge or London)	3 tph	2 hrs 3 mins – 2 hrs 30 mins	1 hr 5 mins
Freight	Up to 2 freight paths per hour (Ipswich - Ely Line) Up to 1 freight path per hour (Breckland Line)		

All services unless noted

3.43 This corridor covers the **international gateways** at Felixstowe and Ipswich ports, Norwich Airport, and **growing towns and cities** at Norwich, Thetford, Bury St Edmunds and Ipswich. Rail infrastructure includes the regional rail lines from Cambridge to Norwich via the Breckland Line and Cambridge/Peterborough to Ipswich via the Ipswich-Ely Line and Newmarket. The corridor also includes the proposed Eastern section of East West Rail (EWR) which includes journey time and frequency enhancements to the Cambridge-Norwich (providing connectivity from Norwich to Stansted) and Cambridge-Ipswich routes. These routes provide most of the onward connections from the region to the rest of the UK.

Aspirations for the route

3.44 The TE Transport Strategy highlights that, as Britain's premier rail freight corridor, the regional rail lines are important to **unlocking international gateways**. To maximise the contribution of ports to post-Brexit economic growth, relieve the road network and support **decarbonisation**, rail freight capacity needs to be significantly enhanced. For both passengers and freight, the EWR Eastern Section is a nationally significant project linking **growing towns and cities** to the Oxford to Cambridge Arc, as well as the East and West Coast Main Lines. It is a key strategic link in the rail network.

3.45 The Strategy identifies the Ely area and Haughley Junction as constraints on this corridor. Investment in junction capacity improvements is essential, paired with double-tracking, electrification, resolving level crossing issues and traction power increases. These improvements will help enable rail's contribution towards many of the regional strategic priorities, including **mode shift** for passengers and freight, **improving access to international gateways** and creating a **world-class rail network** connecting key towns and cities.

3.46 The following paragraphs summarise the key rail objectives that have been identified in partners' local transport and economic plans in this corridor. These reflect local rather than Transport East priorities, but are broadly in line with the overall strategy. They do not present an exhaustive list of possible interventions, but give an overview of potential options which could be reviewed further in the Rail Plan.

3.47 Local authorities in Norfolk, Suffolk and Cambridgeshire have come together with LEPs, local transport bodies and other stakeholders to form the EWR Eastern Section Group. The Eastern Section Prospectus (EWR Consortium, 2018) (2018) sets out the case for faster, more frequent services and better rail connectivity between Ipswich, Norwich, Cambridge and the Midlands, as well as enhanced freight services. They argue that investment in the Eastern Section can help realise the East's growth ambitions by connecting areas of key growth, as well as contributing to decarbonisation through modal shift. This is supported by the EWR Eastern Section pre-SOBC.

3.48 The Suffolk Local Transport Plan (Suffolk County Council, 2011)(2011) has three strands to its approach: reducing demand for car travel (including via mode shift), more efficient use and management of the transport network, and infrastructure improvements where affordable. As elaborated in the Rail Prospectus (Suffolk County Council, 2014)(2014), Suffolk's key aims for the rail network on this corridor include station improvements, capacity improvements and electrification between Felixstowe and Peterborough (including Newmarket to Cambridge) to improve freight and passenger services, a direct hourly service between Ipswich and Peterborough (which was a previous franchise commitment), and a half-hourly frequency with better trains between Ipswich and Cambridge. Suffolk also supports EWR and the Eastern Section.

3.49 The Norfolk Local Transport Plan (Norfolk County Council, 2022)(2022) sets out a series of strategic objectives for transport in the county: embracing future technology, delivering sustainability, enhancing connectivity, enhancing quality of life, increasing accessibility, improving safety and creating a well-managed and maintained transport network. For this corridor, the Rail Prospectus (Norfolk County Council, 2013)(2013) sets out Norfolk's priorities including a half-hourly service, faster journey times and electrification between Norwich and Cambridge, delivery of EWR, and improvements to Norwich-Peterborough services with better connections to the East Coast Main Line.

3.50 The Cambridgeshire and Peterborough Combined Authority Local Transport Plan (Cambridge and Peterborough Combined Authority,

2020)(2020) includes support for frequency enhancements to Newmarket-Cambridge services to half hourly, in order to provide a genuine alternative to driving along the A14 corridor and reduce traffic. The Plan also supports electrification of this route in the longer term to reduce journey times for passengers and provide a key electrified component of the Felixstowe-Nuneaton rail freight route.

3.51 England's Economic Heartland (EEH) is a neighbouring STB covering the area from Cambridgeshire to Oxfordshire. Their Regional Transport Strategy (England's Economic Heartland, 2021) (2021) focuses on decarbonisation, digital infrastructure, improved East-West links, active travel and meeting freight needs. EWR is central to the strategy, as a catalyst for transforming the strategic public transport network and removing the need to travel through London. The Strategy also states that EEH will work with EWR and TE to develop and promote delivery of the Eastern Section.

3.52 The importance of EWR is supported by the EEH Passenger Rail Study (England's Economic Heartland, 2021) (2021) which identifies a need to improve strategic east-west connectivity by rail. An economic analysis to identify the most economically valuable strategic flows *"demonstrate[s] unequivocally that a significant market exists to justify enhancements to regional and intercity travel by rail"*. Cambridge-Norwich and Cambridge-Ipswich are specifically identified as high-value flows with the potential to generate a significant return on investment as a result of improved rail connectivity.

3.53 On this corridor there is a well-developed strategic narrative, as part of the established Eastern Leg pre-SOBC (EWR Consortium, 2021), demonstrating how the EWR Eastern Section contributes to regional strategic objectives, with local and regional authorities speaking with a unified voice in support of the scheme through the Eastern Section Group. However, at this early stage of work more detail needs to be developed around specific outputs of the Eastern Section; Norfolk and Suffolk have both specified desired service levels.

3.54 Given that the Eastern Section of East West Rail is in the early stages of planning, a key requirement for the Rail Plan will be to consolidate, assess and prioritise different possible interventions, ensuring these are clearly linked to the existing strategic narrative and empirical evidence. It will also need to influence design choices yet to be made on the central section to ensure they don't limit options for connectivity to the East.

Table 3.5: Norfolk and Suffolk - Cambridge - Midlands - the North and South corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Better connections East-West	• EWR Eastern Section to link with the EWR Mainline
Increased frequency and capacity	• Ely and Haughley Junction improvements to accommodate freight and passenger ambitions
Increase frequency and affordability to make mode shift attractive	• Increase capacity for intra and inter-regional journeys (EWR partnership)
Switch away from diesel	• Electrification of EWR and F2MN
Support shift to rail freight	• Felixstowe-Nuneaton capacity improvements

Indicative service outputs

3.55 It should be noted that a key gap in the collected evidence is an explicit link from strategic objectives and problems to the desired service output. This makes it more challenging to identify gaps in provision. The box below therefore sets out existing services and an indicative suggestion of

possible enhancements, which will be subject to refinement as part of the later Rail Plan development process.

3.56 On this corridor there is a clear connectivity gap to be filled. Outputs will need to be further developed in parallel with work on East West Rail to ensure consistency.

The following indicative passenger service aspirations have been identified to be assessed in the development of the Rail Plan:

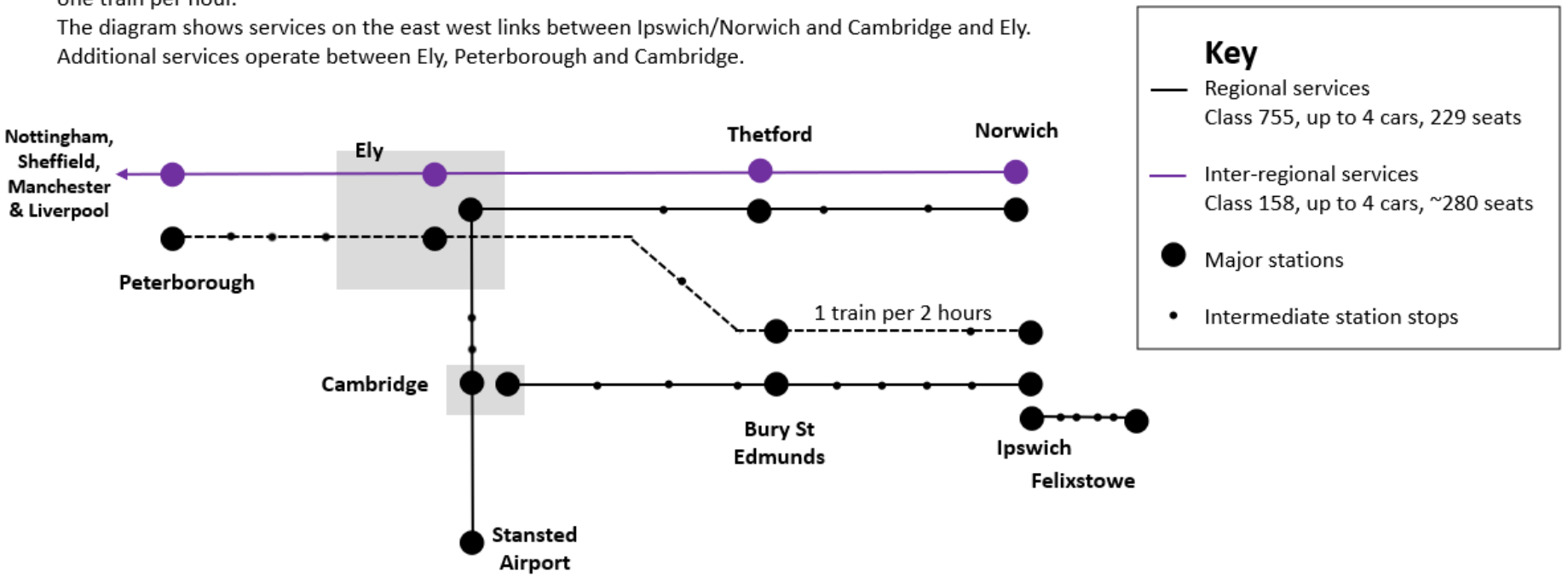
- 2 tph frequency is often desirable, to provide journey flexibility compared with car and to secure modal shift. However it is recognised that this is a significant step up for some routes (such as Ipswich - Peterborough)where there is currently an infrequent service, for which a 1 tph frequency could be considered as an initial output.
- Journey time should be competitive with car for key flows – notably between Felixstowe, Ipswich, Bury St Edmunds, Newmarket, Colchester, Cambridge Ely, Norwich, Thetford and Peterborough.
- Better connections need to be provided to the North and Midlands so that journey times are competitive with car. This includes both direct journey times and improving interchanges to provide a faster overall journey.

Corridor-level Evidence Review

- It is accepted that the route serves a wide range of sub-regional centres, and it may not be possible to provide direct connectivity between all locations, for example between Bury St Edmunds and Thetford.
- it is expected that these corridors will need to facilitate the full proposed East West Rail service pattern, with hourly EWR services running through the central section to Norwich, Ipswich and Colchester.

Figure 3.6: Norfolk and Suffolk - Cambridge - Midlands - the North and South corridor passenger service comparison. Services may not stop at all intermediate stations.

This diagram represents the typical off peak service pattern in this corridor, with each line representing one train per hour.
The diagram shows services on the east west links between Ipswich/Norwich and Cambridge and Ely.
Additional services operate between Ely, Peterborough and Cambridge.



Existing infrastructure

3.57 There are several separate rail routes in this corridor, summarised as follows:

- The Breckland Line – connecting Norwich with Ely, Peterborough, and Cambridge
- The Cambridge-Ipswich Line via Newmarket
- The Ipswich to Peterborough Line via Soham
- The Felixstowe Branch – providing passenger services between Ipswich and Felixstowe Town and freight connections to the port of Felixstowe

3.58 The routes are largely diesel operated, electrified only between Ipswich and Stowmarket. The onward line from Ely to Peterborough (outside the region) is also not electrified. Passenger services are provided by bi-mode diesel/electric rolling stock. Freight services are diesel operated.

All trains (both passenger and freight) on this route are being operated largely by diesel traction, limiting rail's contribution to overall decarbonisation targets.

3.59 The **Breckland Line** is double-track, with line speeds around 75mph. Key capacity constraints on the route are at grade junctions and the station approaches at either end of the route. At Norwich the route uses the heavily constrained single-track section over Trowse Bridge, and platform capacity at Norwich limits the ability to accommodate additional services. At Ely Junction the route shares a single line junction with services to and from King's Lynn. There are also constraints with at grade junctions at Cambridge station.

3.60 Both Trowse Bridge (and approaching junctions) and Ely Junction place significant capacity constraints on service frequency on this part of the route.

3.61 The 75mph speed limit is less than the 100mph capability of the new Class 755 rolling stock operating on the route. This is also bi-mode stock, which would enable some decarbonisation benefits of electrification to be felt even if it only covered small sections of the route.

3.62 The onward line from Ely to Peterborough is outside the Transport East area, but still places constraints on journeys from Norwich to the Midlands and North. Although it is double-track throughout, it has a speed limit of 40-75mph which is below the 100mph capability of the new rolling stock.

3.63 The **Cambridge-Ipswich** line leaves the West Anglia Main Line a short distance north of Cambridge station, via a tight radius curve with a maximum 25mph speed limit. The route is single-track as far Chippenham Junction, just to the north of Newmarket, where it joins with the Ipswich to Ely line. There is an intermediate passing loop at Dullingham, though this is not optimally located to provide an even interval 30-minute service frequency on the route. From Chippenham Junction the route is two-track through Bury St Edmunds to Haughley Junction, where it joins the Great Eastern Main Line. The prevailing line speed on the route is 60 mph between Coldham Lane and Chippenham Junction and then 75mph to Haughley, though there are several slower sections of the route which further restrict journey time. This is less than the 100mph capability of the new Class 755 rolling stock operating on the route. There are also constraints caused by long signalling sections.

The single track route between Chippenham Junction and Coldham Lane Junction to the North of Cambridge mean it is not possible to enhance the frequency on this corridor. Further, Haughley Junction is a single line at-grade junction, placing further constraints on capacity and the flexibility of paths on both this and the GEML routes.

3.64 The Soham Line links Chippenham Junction (Newmarket) with Ely Dock Junction, providing a direct freight and passenger route from Ipswich to Peterborough. The 12-mile line is double-track to Soham Junction, and single-track for the remaining 4 miles to Ely. Although at grade, the Ely Dock Junction and Ely station include freight loops to provide flexibility with train pathing.

The single track section of this route provides a further constraint on capacity and timetable flexibility for enhancement of freight and passenger services in the corridor, and reduces resilience.

3.65 Ipswich station is also a key capacity constraint on the ability to operate additional services in this corridor. A combination of the number, location and length of platforms at Ipswich means there is limited capacity at the station to terminate additional trains, particularly with the new rolling stock operated on routes through the station.

3.66 There have been recent improvements at the junctions connecting the GEML to the Felixstowe branch, particularly aimed at increasing capacity for freight movements. The Ipswich Chord completed in 2014 enabled freight traffic to join the cross-country route from Felixstowe directly, increasing freight capacity towards Ely by avoiding the bottleneck at Ipswich Station. An additional passing loop on the Felixstowe branch line at Trimley was delivered in 2019 to enable further additional freight paths.

The nature of the at-grade junctions connecting the Great Eastern Main Line and the Felixstowe branch at Ipswich, and the single-track route, continue to restrict the ability to operate additional freight services from Felixstowe to Nuneaton and the Midlands via Ely, and passenger services between Felixstowe Town and Ipswich.

Industry plans

3.67 This corridor maps onto Network Rail's 'cross-country' route, connecting Norwich and Ipswich to Cambridge and to the Midlands via Ely. It covers the Felixstowe-Nuneaton freight route (covered in more the Freight section).

3.68 The 2016 Anglia Route Study (Network Rail, 2016) identified a shortfall in freight capacity on the route. It also suggested increasing frequencies for passenger services from Norwich and Ipswich to Cambridge to 2 tph, as well as 3 tph from Norwich to the North via Ely, dependent on business cases.

3.69 To deliver these improvements it identified Haughley Junction as a major constraint on increasing peak passenger or freight service frequency, requiring grade separation or four-tracking. The mix of slow freight and fast passenger traffic at Haughley is a constraint on capacity and performance. Additional track would enable these flows to be separated more effectively, enabling greater volumes of traffic through the junction.

3.70 It also suggested a range of infrastructure improvements at Ely, alongside some track doubling between Ely and Soham to enable additional freight and passenger capacity. Works at Trowse Bridge primarily benefit the Great Eastern Main Line, but would also enable an additional hourly Norwich to Ely/Cambridge service to be provided.

3.71 The 2022 Ely Area Capacity Enhancement Programme Outline Business Case (Network Rail, 2022) has identified a preferred solution to be taken forward to detailed design, subject to approval of the business case which is expected alongside publication of the Rail Network Enhancement Plan. The programme is intended to increase the capacity through Ely from 6.5 train per hour to 10 trains per hour. The infrastructure investment includes doubling Ely Dock Junction and Ely North Junction, straightening the track through Ely station and replacing the two river bridges, and closing or upgrading 44 level crossings.

3.72 Electrification of the line from Felixstowe to Nuneaton is proposed in the Traction Decarbonisation Network Strategy given the unsuitability of other decarbonised forms of traction for freight services. This has been suggested previously on several occasions, and Network Rail developed a business case for the scheme from Felixstowe to Nuneaton in 2015.

3.73 High-level options have been proposed for service improvements to these lines as the Eastern Section of East West Rail and reviewed as part of the Pre-SOBC (EWR Consortium, 2021), which would address many of the constraints on these corridors. These have not been developed in detail and are to some extent dependent on the design of the central section from Bedford to Cambridge, particularly the choice of approach to Cambridge station.

3.74 Network Rail's Cambridgeshire Corridor Study (Network Rail, 2019) evaluated the improvements needed to enable more frequent services between Cambridge and Newmarket that could form more strategic links with EWR to Ipswich or beyond. It identified options including additional tracks and a possible 'turn-back' facility at Newmarket for greater service flexibility'.

Gap analysis

3.75 Existing service frequency is generally hourly and limits the benefits of these routes for passenger connectivity. Journey times are broadly comparable with road at present, although in some cases this also reflects poor road infrastructure, and neither is an attractive option. Ipswich to Cambridge however is substantially slower than travelling by road, and options to improve this by increasing line speeds or offering additional fast services should be considered, noting that this may require additional passing loops or double tracking.

3.76 Network Rail's strategic statement on East West Rail (Network Rail, 2022) suggested that delivering the Central Section alone would have a minimal impact on journey times from the East – and that in this situation *"future passengers are likely to be confronted by a lengthy and complex journey via London, or a lengthy and complex journey via East West Rail."* Delivering only the Central Section is unlikely to make rail a more attractive journey option than travelling by car - improvements to the east would be needed in order to provide direct connectivity and faster journey times. The same applies for freight: with constrained capacity for additional freight traffic through Newmarket, and the absence of a direct connection with the East or West Coast Main Lines, freight from the East to the Midlands and North would need to use existing routes if only the Central Section is delivered. Improvements to the east of Cambridge, as set out in the Eastern Section SOBC (EWR Consortium, 2021), would contribute to fully unlocking the benefits of EWR for the Transport East area.

3.77 Ensuring that the station at Cambridge yet enables direct through services from EWR to Ipswich, Colchester, Norwich and possibly beyond via the Eastern Section is essential for the project to deliver benefits for the

region. There is substantial work still to be completed to understand how Eastern Section services could be delivered, given capacity constraints on existing lines and at stations. There is also work to ensure EWR is aligned with government policy to make the case for investment, particularly in terms of levelling up, housing and access to freight ports.

3.78 A connection at Bletchley to the West Coast Main Line would make EWR substantially more valuable for rail freight travelling from Felixstowe, by providing an alternative route to the North, Midlands and South West. Freeing up the paths currently used through London by traffic from Felixstowe could also enable more rail freight from the Thames estuary ports, and provide greater resilience to rail freight operations by adding potential diversionary routes. Without this addition it will not make a substantial difference to freight capacity.

3.79 Ely is a significant constraint on East-West services, particularly the Felixstowe to Nuneaton freight route, and an OBC has been submitted for works to improve capacity in the area. Haughley Junction enhancements are also needed to unlock capacity for freight and for higher frequency passenger services. These schemes are currently awaiting a funding decision to be announced in the RNEP. Without them there is limited ability to grow rail freight or provide additional passenger services on this corridor.

3.80 Sudbury is the end of a north-south branch line that connects with the GEML at Marks Tey, with trains offering a shuttle service between the two. Former rail lines beyond Sudbury (connecting with Thetford, or Cambridge via Haverhill) are long closed and the cost of reopening is likely to be prohibitive. Affordable improvements in public transport connections (eg to Stansted, Cambridge or Ipswich are therefore unlikely to be rail-based."

King's Lynn – Cambridge - Harlow - London

Figure 3.7: King's Lynn – Cambridge - Harlow - London corridor map

Table 3.6: King's Lynn – Cambridge - Harlow - London passenger connectivity summary

	Service (direct unless otherwise stated)	Rail journey time	Road journey time
King's Lynn - Cambridge	1 tph (2 tph peak)	1h	1h 15
Harlow-Cambridge	2 tph	39 mins	45 mins
Kings Lynn - London	1 tpd to Liv St 1 tph to King's X (2 tph peak)	2h 14 (1h 50 via Hitchin and ECML)	2h 20
Stansted - Harlow	3 tph peak	18 mins	18 mins
Stansted - London	3 tph peak, 2 tph	50 mins	62 mins
Harlow - London	6 tph	35 mins	1h

All services unless noted

3.81 This corridor covers the West Anglia Main Line (WAML), and provides important connectivity between London and growing towns and cities. It serves Harlow and Saffron Walden in Essex, and King's Lynn in Norfolk – though Cambridge and Ely are also key destination and interchange points for passengers from Norwich and Ipswich. As a result, the corridor forms an important part of the strategic rail network. The corridor includes international gateways at Stansted Airport and King's Lynn port – London to Stansted passengers make up a high proportion of traffic on the route, especially outside of the commuter peak.

Aspirations for the route

3.82 The TE Transport Strategy highlights that high-quality, sustainable transport corridors such as the WAML are central to supporting growing places and economies, and unlocking international gateways, including the UK Innovation Corridor growth partnership and the Harlow and Gilston Garden Town masterplan. It specifically identifies plans for track and station capacity increases in London and Broxbourne as essential to allow additional capacity on the line and bring forward plans for 20,000 homes and 10,000 jobs.

3.83 Capacity improvements in the Ely area are named as an essential improvement to unlock the potential of rail within the East, both for passengers and freight, by allowing additional train movements and improving the connection between Felixstowe and Nuneaton and the Midlands. The Transport Strategy also supports the West Anglia Task Force aspiration to reduce journey times between London and Stansted to 40 minutes and improve rail connections with destinations to the north of the airport.

3.84 Stansted is already well connected to London by rail and other public transport, with regular direct Stansted Express services to London, Cambridge and Norwich. The frequency of services decreased in response to the COVID-19 pandemic; re-instating four trains an hour from London is identified as a priority to support rail mode share at the airport. Further improvements could also be made to services to Stansted from the rest of the Transport East region. Late night and early morning services could also be improved, providing more options for both passengers and airport staff.

3.85 Haverhill, to the east of the WAML, is currently not connected to the rail network and is one of the largest towns in the south of England without a railway station. Local campaigners have put forward plans to reopen the historic route and provide connectivity into Cambridge.

3.86 The following paragraphs summarise the key rail objectives that have been identified in partners' local transport and economic plans in this corridor. These reflect local rather than Transport East priorities, but are broadly in line with the overall strategic aims. They do not present an exhaustive list of possible interventions, but give an overview of potential options which could be reviewed further in the Rail Plan.

3.87 The Essex Local Transport Plan (Essex County Council, 2011) (2011) includes several strategic priorities for rail, though these are over 10 years old. For the WAML, their focus is on providing additional capacity by running additional services to Stratford and Liverpool Street following the completion of Crossrail, and addressing bottlenecks throughout the route (including Tottenham Hale, Coppermill Junction and the Lee Valley). Essex also supports the West Anglia Task Force and has a longstanding ambition for 2tph serving all stations in Essex.

3.88 The Norfolk Local Transport Plan (Norfolk County Council, 2022) (2022) sets out a series of strategic objectives for transport in the county: embracing future technology, delivering sustainability, enhancing connectivity, enhancing quality of life, increasing accessibility, improving safety and creating a well-managed and maintained transport network. For the WAML, the draft Rail Prospectus (Norfolk County Council, 2020) (2020) sets out Norfolk's priorities including completion of the Ely Area Capacity Enhancement scheme to allow half hourly frequencies to King's Lynn throughout the day, longer trains and faster journey times.

3.89 The West Anglia Task Force was convened in 2015, bringing together Network Rail and stakeholders along the route. It released a report in 2016 (West Anglia Taskforce, 2016) which explained that rail services on this corridor are constrained by competing demands for fast journey times and frequent train services, which the two-track line struggles to deliver. The maximum line speed, at 90 mph, is below the capability of the rolling stock used. Aspirations included London-Cambridge in 1 hour and

Stansted in 40 minutes, improved service levels to other communities along the route, a new timetable to take advantage of faster and longer trains, four-tracking and identifying a medium-term programme which could deliver benefits before delivery of Crossrail 2.

Table 3.7: King's Lynn – Cambridge - Harlow - London corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Increased frequency and capacity	• Track and station capacity increases between London and Broxbourne • Ely capacity enhancement
Increase frequency and affordability to make mode shift attractive	• Half hourly frequencies to King's Lynn • 2tph service at all stations in Essex
Support shift to rail freight	• Ely capacity enhancement to improve Felixstowe-Midlands and North route
Improve sustainable surface access to ports and airports	• Reinstate 4 tph Stansted Express service • Improve late night and early morning services to Stansted • Improve journey times to Stansted Airport

Indicative service outputs

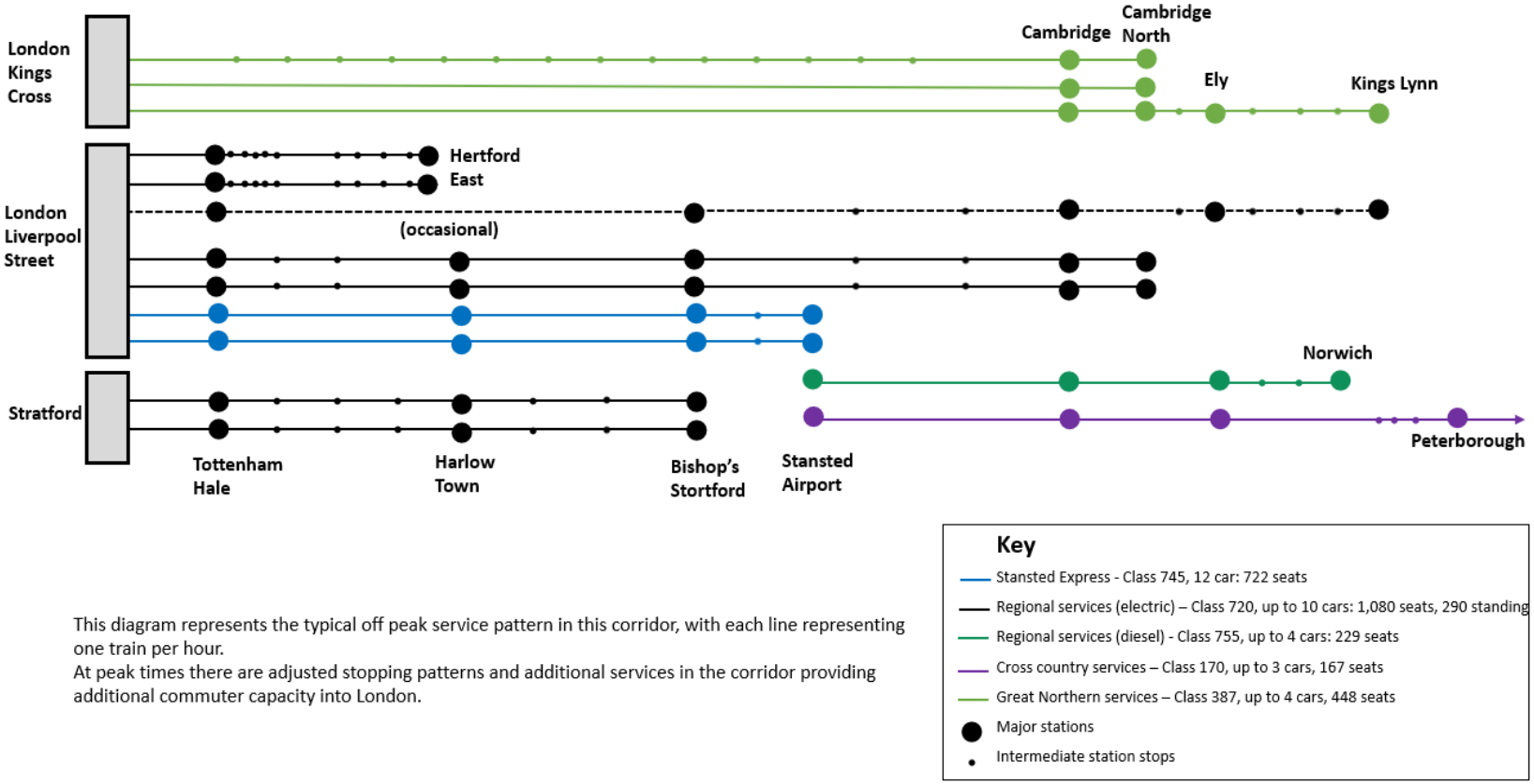
3.90 Though the WAML Study identified strategic outputs and interventions for the southern half of the route, a key gap in the collected evidence remains an explicit link from strategic objectives and problems to the desired service output. This makes it more challenging to identify gaps in provision. The table below therefore sets out existing services and an indicative suggestion of possible enhancements, which will be subject to refinement as part of the later Rail Plan development process.

3.91 This corridor serves a complex market, balancing long and short distance commuting with a strategically important airport flow. Target outputs for the route will have to be further developed to balance the needs of these different markets.

The following indicative aspirations have been identified to be assessed in the development of the Rail Plan:

- At least 2 tph frequency is often desirable, to provide journey flexibility compared with car and to secure modal shift.
- In addition, it is recognised that this is a well utilised urban commuter artery and there is a need to provide an attractive option for arriving and departing passengers to Stansted Airport.
- Stansted Airport should have a minimum frequency of 4 tph, with journey times reflecting the Airport's key International Gateway role.
- Consideration should be given to a 4 tph service on commuter routes into London.
- Consideration should be given to enhancing direct connectivity to Stratford to provide connections to opportunities in the Docklands and south of London.
- Journey time should be competitive with car for key flows outside of London.

Figure 3.8: King's Lynn – Cambridge - Harlow - London corridor passenger service comparison. Services may not stop at all intermediate stations.



This diagram represents the typical off peak service pattern in this corridor, with each line representing one train per hour.
At peak times there are adjusted stopping patterns and additional services in the corridor providing additional commuter capacity into London.

Existing infrastructure

3.92 The West Anglia Main Line connects London Liverpool Street and King's Lynn, including a branch line to Stansted Airport. Long-distance services run from Cambridge and Stansted to London Liverpool Street, with one train per day from King's Lynn. The route also has a relatively complex suburban train service passing through north London and the commuter belt of Essex and Hertfordshire. The hourly services to Kings Lynn do not operate over the south end of the WAML route, instead joining at Cambridge Shepreth Branch Junction) from King's Cross.

3.93 The WAML currently has a maximum line speed of 90mph, but speed limits vary significantly along the line. The section between Tottenham Hale and London Liverpool Street is limited to 30-40mph, while the majority of track between Sawbridgeworth and Great Chesterford is limited to 70mph.

3.94 The line is electrified throughout its whole length to King's Lynn. It is largely two-track throughout, aside from a four-track section between Hackney Downs and Liverpool Street, single-track sections between Littleport and Downham Market and between Watlington and King's Lynn, and the single-track branch lines to Stansted Airport. The line also shares 6 tracks from Bethnal Green into Liverpool Street with the GEML and Essex lines.

3.95 This configuration has led to competing demands between fast journey times and frequent train services, particularly on the lower half of the route. This is addressed by stopping services waiting in at station passing loops for fast trains to pass, which can create performance challenges at times of disruption and slower journey times on local services.

The two-track section south of Broxbourne, where a busy timetable of stopping and non-stopping services shares the same infrastructure, is a severe constraint on capacity for the whole route.

3.96 There are currently no grade-separated junctions on the line, meaning several areas require trains to cross the line running in the opposite direction. This includes Bethnal Green North, Coppermill, Broxbourne, Shepreth Branch Junction and the Stansted junctions. There are also several level crossings.

For freight, a loading gauge of W8 prevents 'intermodal' container traffic from running on the WAML, including traffic to and from Felixstowe, London Gateway and Tilbury which often requires the wider W10 or W12 clearance. These restrictions are a result of narrow tunnels at Audley End. However, there is little prospect of substantial intermodal traffic on the route (as it does not connect easily to major ports) and limited capacity to accommodate additional freight services.

Industry plans

3.97 Committed schemes on the route are limited, but include a new station at Cambridge South which would also be served by East West Rail, and potential further works to increase train frequency to Meridian Water. Neither of these are within the Transport East region, but they could have knock-on benefits or impacts on the ability to improve connectivity and run services in the Transport East region.

3.98 The 2021 West Anglia Route Study (Network Rail, 2021) did not forecast any crowding issues on the route, as a result of the combination of new rolling stock which substantially increased capacity and the impact of COVID-19.

3.99 It did identify where infrastructure limits the ability to run additional services or compromises performance. There is effectively no ability to increase service frequencies, particularly on the shorter distance suburban services, without compromising performance. The Route Study identifies a package of local line speed enhancements and capacity provision that delivers journey time reduction and network resilience.

3.100 In the 2021 route study Cambridge station was the most technically constrained area, due to the complex track layout and mix of terminating and through services. East West Rail will add additional services and further complexity, and will require station and track upgrades. The approach to Liverpool Street station is also constrained, with the maximum track capacity used during the morning peak with no ability to add additional services.

3.101 Services to Stansted Airport have to pass through a single-track tunnel to reach the airport, which restricts the number of services which can be offered. Network Rail propose a second tunnel in order to remove this bottleneck, reducing journey times and likely increasing performance, but there are likely to be cost challenges to delivering this since the tunnel passes directly under the runway. Line speed improvements and reducing signal headways could also deliver some small journey time improvements to Stansted, but wider four-tracking is necessarily to make significant improvements.

3.102 Pedestrian capacity at Liverpool Street and Stratford is limited, with congestion on platforms and at gate lines at present and this forecast to worsen in future Plans to improve this are being developed, with the scheme at Stratford currently in development in partnership with TfL, with a target delivery date over the next five years. Network Rail is developing a more substantial upgrade to Liverpool Street station capacity as part of a commercial project, which is likely to be longer term.

Gap analysis

3.103 Service frequency to Kings Lynn is low, with 1 train per hour off-peak. Extending the peak service of 2 trains per hour across the day would require substantial additional capacity to address the single-track section north of Ely Junction, as well as capacity at Ely Junction itself.

3.104 Journey times are largely competitive with road, but could be improved further if line speeds were increased. Current line speeds are below the capability of the existing rolling stock, so there is potential for minor improvements to be delivered relatively quickly.

3.105 Generally, journey times and frequencies to Stansted mean the airport is not seen as attractive as Heathrow and Gatwick, putting Stansted at a disadvantage. Network Rail has proposed a set of measures which will incrementally reduce journey times to Stansted, which would cumulatively give a journey time of around 40minutes, but these are not yet funded. Further improvements would likely require more substantial infrastructure works, such as four-tracking south of Broxbourne.

3.106 Track capacity, and in particular the two-track section south of Broxbourne, has a substantial impact on the ability to provide further services on the line. The Northern section of Crossrail 2 was designed to alleviate this through providing additional tracks between Tottenham Hale and Broxbourne.

3.107 Delivery or further development of Crossrail 2 now appears extremely unlikely. Identifying and developing standalone options which would enable higher frequency, such as those suggested in the WAML Route Study, is crucial to delivering strategic ambitions for the route.

South Essex -London – Thurrock – Basildon – Southend

Figure 3.9: South Essex - London - Thurrock – Basildon – Southend corridor map

Table 3.8: South Essex - London - Thurrock – Basildon – Southend connectivity summary

	Service (direct unless otherwise stated)	Rail journey time	Road journey time
Shoeburyness-London*	4 tph	1h	1h 40
Southend-London	4 tph	51 mins	1h 30
Basildon-London	4 tph	40 mins	1h 10
Stanford-le-Hope-London	3 tph	54 mins	1h 5
Grays-London via Ockendon	2 tph	35 mins	50 mins
Grays-London via Rainham	2 tph	40 mins	50 mins
Freight paths	40-45 trains per day[3]		

* London Fenchurch Street unless otherwise stated

3.108 This corridor covers the largely urban area between London, Thurrock and Southend-on-Sea. The TE Transport Strategy identifies the corridor as a major location for economic growth and the expansion of **international gateways** at London Southend Airport and Thames Freeport, encompassing the ports at London Gateway, Tilbury and Purfleet**.** The corridor also comprises **growing towns and cities** across Thurrock, Southend and South Essex (including Basildon), connecting to neighbouring areas including London and across the Thames to Kent. Rail services in this corridor are largely provided by the Essex Thameside network which has high commuter demand into London Fenchurch Street.

Aspirations for the route

3.109 The following paragraphs summarise the key rail objectives that have been identified in partners' local transport and economic plans in this corridor These support growth across the area and are broadly in line with the overall strategic objectives of the TE Strategy. They do not present an exhaustive list of possible interventions, but give an overview of potential options which could be reviewed further in the Rail Plan.

The Essex Local Transport Plan (Essex County Council, 2011) (2011) includes several strategic priorities for rail. The Plan notes that for Essex Thameside services, train speeds are considerably lower than comparable

[3] Network Rail Essex Thameside Study (2020)

commuter links, leaving destinations within the area at a competitive disadvantage when attracting employers. The focus is therefore on lobbying Government for improved journey times on Essex Thameside services, additional capacity to accommodate growing commuter demand, and an enhanced local role in the rail franchise process.

Underlying corridor objectives	Linked local and TE identified interventions
Increase frequency and affordability to make mode shift attractive	• Improve journey times • 'Metrorail' marketing campaign
Station hubs	• Station travel plans
Increased frequency and capacity	• Capacity enhancements to accommodate commuter demand
Support shift to rail freight	• Increase freight capacity • Electrify links to rail freight terminals • Freight connectivity via London to markets in the Midlands and North

Table 3.9: London – Thurrock – Basildon – Southend corridor Summary Table

3.110 The Thurrock Transport Strategy (Thurrock Council, 2013) (2013) aims to deliver and enhance an accessible and sustainable transport network. Most Thurrock residents are within 1-2 miles of a rail station, meaning that rail is an important mode in the area. Specific priorities include improving interchange and accessibility at stations, creating station travel plans to encourage mode shift to rail, and developing a 'metro-rail' marketing and promotional campaign. In terms of rail infrastructure, capacity problems need to be addressed to facilitate further growth, and improvements are required to facilitate rail freight including rail freight terminals at London Gateway and West Thurrock.

3.111 The Southend-on-Sea Local Transport Plan (Southend-on-sea Council, 2015) (2015) aims to support a thriving and sustainable local economy, minimise the environmental impact of transport, improve safety and reduce inequalities in health and wellbeing. There is excellent rail connectivity and frequency in the Borough; building on this, aims for rail include encouraging a 'Southend Metro' approach on the Shoeburyness to London line, improving stations and supporting efforts to introduce integrated ticketing. Orbital connectivity from Southend to Chelmsford and North to the rest of the region is however particularly weak – existing rail journeys are indirect and slow.

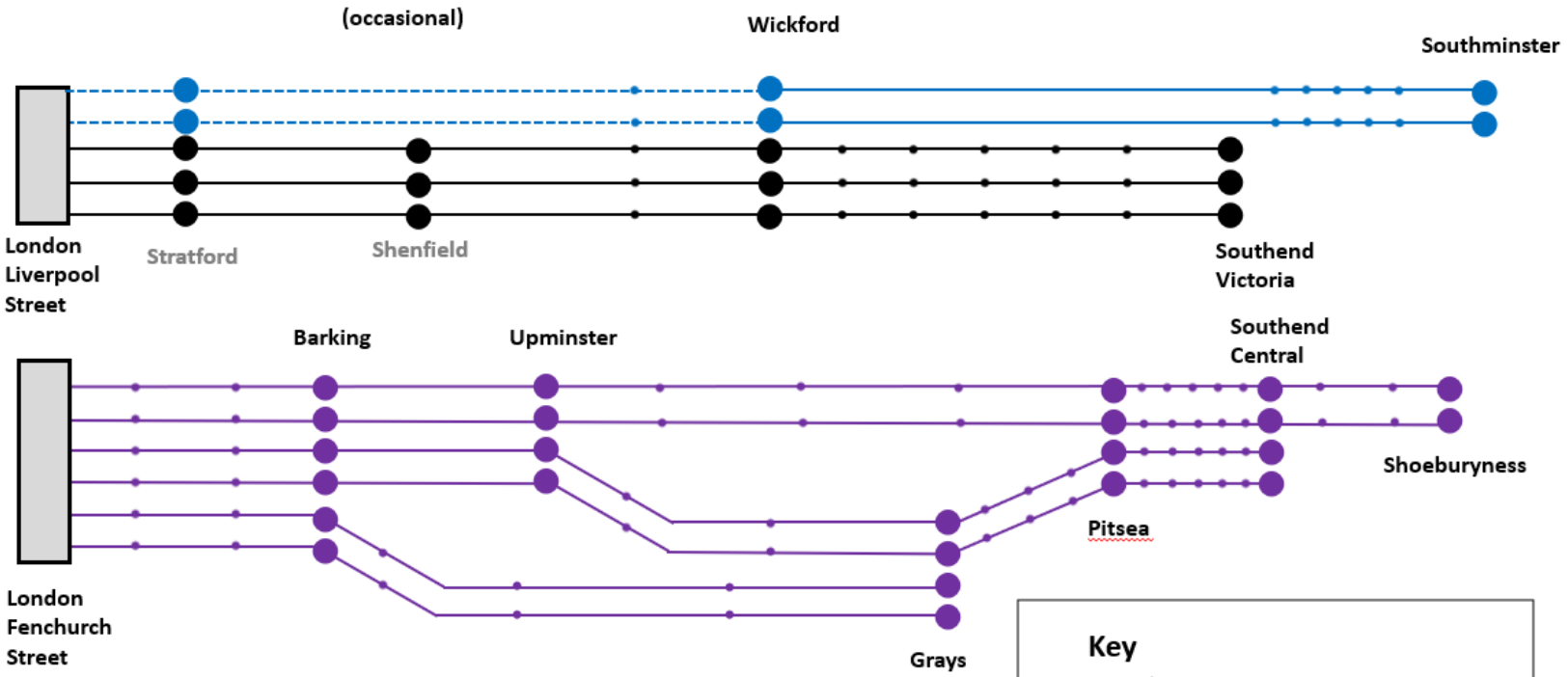
3.112 The Association of South Essex Local Authorities (ASELA) has identified the need for the predominantly East-West rail services to be supported by integrated rapid transit services providing North-South connectivity.

Indicative service outputs

The following indicative aspirations have been identified to be assessed in the development of the Rail Plan:

- The route serves a dense commuter market – service frequencies are driven by capacity but a minimum of 2 trains per hour is often desirable to provide an alternative to car travel.
- Journey time should be competitive with car for key flows, and improving on this for journey times into London is desirable.
- Integration with other modes to form a consistent South Essex network.
- Freight capacity and connectivity to markets in the Midlands and North to support port growth.

Figure 3.10: South Essex - London - Thurrock – Basildon – Southend corridor passenger service comparison. Services may not stop at all intermediate stations.



This diagram represents the typical off peak service pattern in this corridor, with each line representing one train per hour.
At peak times there are adjusted stopping patterns and additional services in the corridor providing additional commuter capacity into London.

Existing infrastructure

3.113 This corridor is served primarily by the Essex Thameside Line between London Fenchurch Street and Shoeburyness. The line serves three main routes - the main line to Southend Central and Shoeburyness via Upminster and Basildon, a loop line via Purfleet and Tilbury, and a short branch line connecting the main line at Upminster to the loop line at Grays via Ockendon. There are also services to Southend Airport station, Southend Victoria and Southminster that use the Great Eastern Main Line via Shenfield.

3.114 The line speed along the corridor is 75mph, below the 100mph capability of the rolling stock, though given the stopping nature of many services on the route the maximum speed may not always be a constraint. The corridor is wholly electrified with overhead lines, aside from some freight facilities.

3.115 The main line and loop line are two-track throughout, while the branch line via Ockendon is single-track. There is a complex running environment close to London, including parallel running with parts of the Underground and DLR networks. However, the line is largely separate from the GEML and other passenger routes.

3.116 Freight traffic on the line carries a diverse range of goods. A rail freight terminal exists at London Gateway port, which currently has three deep sea berths for ships to dock and an integrated logistics park, at a new intermodal terminal in Tilbury, and at Purfleet. These links are not electrified meaning that freight traffic is generally diesel-powered. There is also a Freightliner terminal (including the transport of waste out of London) and DB Cargo 'Eurohub' at Barking, as well as several aggregates terminals around Purfleet and Dagenham. Freight services run from these ports on to the Midlands and North via the Gospel Oak to Barking line, which is shared with passenger services (as well as freight traffic from Felixstowe) and acts as a constraint on capacity.

Industry plans

3.117 Network Rail is currently carrying out overhead line and track renewal on the route from Fenchurch Street to Pitsea via Tilbury. There is also limited planned maintenance work to railway bridges through to 2023/24 and some planned level crossing closures. No enhancement programmes are currently underway on the line.

3.118 The 2016 Anglia Route Study (Network Rail, 2016)identified increasing line speeds to 100mph as an aspiration but did not develop this further. This would potentially enable journey time savings.

3.119 In 2020 Network Rail carried out a route study of the Essex Thameside line (Network Rail, 2020). This identified that severe crowding was likely to develop without investment. They recommended that a combination of signalling improvements (ETCS 2) and some platform lengthening could provide train capacity to address this.

3.120 A larger problem was considered to be increasing capacity at stations, particularly Fenchurch Street, Barking and West Ham. Plans for Barking have been developed by Network Rail and TfL

and are relatively well advanced; plans for Fenchurch Street and West Ham are more complex and at an earlier stage of development. One proposed option for addressing capacity at Fenchurch Street was routing more trains through Stratford and terminating at Liverpool Street, which would also give opportunities to interchange with the Elizabeth Line for onward travel. However, there is no spare capacity at Liverpool Street to enable this, and services would need to cross with Elizabeth Line services at Forest Gate Junction at grade, which would make this operationally challenging.

3.121 The Network Rail Freight Network Study (Network Rail, 2017) (2017) identified the Gospel Oak to Barking and North London Lines as key constraints on cross-London freight flows, including from the Essex Thameside ports. Growth in cross-London flows is expected as a result of London Gateway expansion, with enhancements required to provide enough capacity. Potential enhancements included in the London Rail Freight Strategy include signalling improvements, electrification of lines to London Gateway port and (unscoped) capacity enhancements, though these have not been funded (Network Rail, 2021).

Gap analysis

3.122 Pressure on capacity has reduced due to COVID-19, and this has delayed the urgency of mitigating measures or greater service frequencies. However, improvements to address station capacity constraints are likely to be required at some point to continue to meet Transport East's objectives. These need to be assessed in the round with other routes in the region, particularly in order to make the best use of the limited terminal and track capacity in London, trading off different objectives.

3.123 Line speeds on the route are relatively slow. Faster services could be beneficial to the growth of the area, increasing its attractiveness for those commuting to London, but no detailed work has yet been done to assess he feasibility or cost effectiveness of achieving this.

3.124 Freight capacity on the route itself was not identified as a problem in the 2020 Network Rail study (Network Rail, 2020). However, capacity on the routes across London is very limited, acting as a constraint to accommodating freight demand. Interventions to increase capacity have not yet been scoped or funded. Freight on the route is largely diesel despite the electric network due to gaps in electrification – such as the branch to London Gateway port, or the connection to the Midland Main Line. These gaps are acknowledged in the Traction Decarbonisation Strategy (Network Rail, 2020) and electrification recommended, but these proposals have not been developed further.

Southend Airport receives a direct service on the GEML rather than the Thameside line, although interchange between the two Southend stations is possible on foot. Service frequency is high and accommodates early and late-night flights, however it is a stopping service and therefore relatively slow. Faster express services could increase the mode share of airport travel, particularly if the number of regular scheduled services from the airport returns to the levels seen before Covid-19.

Stansted - Braintree - Colchester - Harwich and Clacton

Figure 3.11: Stansted - Braintree - Colchester - Harwich and Clacton corridor map

3.125 This corridor covers the East-West arc between Stansted Airport and Harwich/Clacton. Aside from the branches of the Great Eastern Main Line from Braintree-Witham and Colchester-Harwich/Clacton, which have been covered in the GEML corridor, East-West rail connectivity in this corridor is very limited. There are no direct rail services between Braintree/Colchester and Stansted, and rail is unlikely to be competitive with road for most journeys in the west of this corridor. This is particularly the case for travel to and from the airport, which is likely to be at uncongested times of day.

Table 3.10: Stansted - Braintree - Colchester - Harwich and Clacton connectivity summary

	Service (direct unless otherwise stated)	Rail journey time	Road journey time
Colchester-Harwich	3 direct trains per day	31 mins	30 mins
Braintree-Stansted	No direct service	2h 20, with interchange at Witham and Liverpool Street	20 mins
Colchester-Stansted	No direct service	2h 10, with interchange at Liverpool Street	45 mins
Up to 4 freight paths per day (Harwich-Colchester)			

Aspirations for the route

3.126 The TE Transport Strategy highlights that this corridor contains valuable links from economically deprived **coastal communities** into jobs and educational opportunities in Colchester. Via the GEML it also links several **international gateways** at Stansted Airport, Freeport East at Harwich, and the Port of Ipswich, and **growing towns and cities** across the corridor.

3.127 The Essex Local Transport Plan (Essex County Council, 2011) (2011) includes several strategic priorities for rail. Essex's focus is on

lobbying Government for additional capacity on main lines to accommodate growing commuter demand and an enhanced local role in the rail franchise process. 2 trains per hour is also a key aim for Essex County Council.

3.128 Improving access to Harwich port by low carbon transport is a particular focus for Essex, including rail capacity enhancements between Harwich and the Midlands via Ipswich. Essex County Council also want to facilitate a shift towards rail freight by working with district councils to safeguard existing freight facilities and promote their use.

3.129 Essex County Council has proposed the provision of rapid transit along this corridor as a flexible solution that provides sustainable connectivity and supports planned and proposed growth along the corridor

Table 3.11: Stansted - Braintree - Colchester - Harwich and Clacton corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Better connections East-West	• None currently for rail, though East-West connectivity is identified as poor
Increased frequency and capacity	• Main line capacity enhancements
Improve sustainable surface access to ports and airports	• Improve access to Harwich port and Stansted Airport
Support shift to rail freight	• Partnership working with councils and operators

Indicative service outputs

The indicative outputs for existing rail routes in this corridor have been covered in other routes. Before setting further potential rail outputs in this corridor work will need to be undertaken to determine the best modal solutions to address objectives.

Existing Infrastructure

3.130 The main rail infrastructure on this corridor is the GEML and its branches:

- Braintree to Witham
- Colchester to Colchester Town, Walton-on-the-Naze and Clacton-on-Sea (the 'Sunshine Coast' line)
- Manningtree to Harwich

3.131 There is no rail infrastructure between Braintree/Colchester and Stansted Airport.

3.132 Line speeds are generally 100mph on the GEML between Witham and Manningtree. The line speeds on the branch lines are lower: 50mph on the Braintree branch, 60mph on the Harwich branch, and 75mph on the Clacton and Walton branch (with a 50mph section as the line approaches the two coastal termini).

3.133 Along with the main line, the lines from Colchester to Clacton-on-Sea and Manningtree to Harwich International are double-track.

However, the branches to Braintree, Colchester Town and Walton-on-the-Naze are predominantly single-track, constraining timetable flexibility and the ability to run more frequent services.

Industry plans

3.134 There are no clear industry enhancement plans on the branch lines which serve the East of this corridor. Network Rail reviewed increasing frequencies on the Clacton branch in the 2016 Anglia Route Study (Network Rail, 2016), but concluded that this would be low value for money, although it would not require additional infrastructure. Moving to 2 tph on the Braintree branch was assessed as poor value for money, and would require an additional track loop in the White Notley area.

Gap analysis

The fundamental gaps in this corridor are where there are no existing rail services or infrastructure. Work will be needed to determine the best modal solution, before developing potential rail solutions.

3.135 Where there are train services on this route, such as access from the coast to Colchester, frequencies are poor. Options to address this should be investigated. However, the wider problem is journey times for longer distance flows, where reliance on interchange makes journey times poor.

3.136 Rail access to Stansted from most of the region is via London – this is an unattractive option compared to road services by car or coach, taking at least twice as long. Options for addressing this are limited; the original alignment from Bishops Stortford to Braintree is now the Flitch Way, a linear Country Park and active travel link, and reinstatement of infrastructure would be challenging. In the shorter term, options should be considered to make these interchanges as straightforward as possible, and to improve intermodal connections to maximise the benefits of the existing rail network including with Essex County Council's proposals for Bus Rapid Transit (BRT).

Midlands - King's Lynn - Norwich – Great Yarmouth/Lowestoft

Figure 3.12: Midlands - King's Lynn - Norwich – Great Yarmouth/Lowestoft corridor map

Table 3.12: Midlands - King's Lynn - Norwich – Great Yarmouth/Lowestoft connectivity summary

	Service (direct unless otherwise stated)	Rail journey time	Road journey time
Norwich-Great Yarmouth	1 tph (2 tph peak)	33 mins	30 mins
Norwich-Sheringham	1 tph	59 mins	55 mins
Norwich-King's Lynn	No direct service	1h 44 with interchange at Ely	1h
Norwich-Peterborough (continues to Liverpool)	1 tph	1h 30 (stops at Thetford and Ely)	1h 40
Up to 1 freight path per hour (Norwich-Ely)			

3.137 This corridor covers an East-West arc across the north of the region. As well as 'connecting growing towns and cities' at King's Lynn, Norwich, Great Yarmouth and Lowestoft, the corridor also includes several rural and coastal communities. As a result, 'energising rural and coastal communities' is a particularly relevant priority pathway for this corridor, where many residents live in 'transport deserts' with poor access to public transport.

Aspirations for the route

3.138 As noted in the Transport Strategy, there is very little rail infrastructure on this corridor; King's Lynn, Norwich, Great Yarmouth and Lowestoft are connected to the rail network, but the network is optimised for longer distance journeys and services

are infrequent. As a result, rail is unlikely to be competitive with road for most journeys, making it difficult to achieve the regional strategic objectives for rail.

3.139 Even so, some rail priorities have been set out on a local level in the Norfolk County Council Draft Rail Prospectus (Norfolk County Council, 2020) (2020). Reduced journey times, a half-hourly frequency and a new station at Broadland Business Park are long-term objectives for the Bittern Line (Norwich to Sheringham), while objectives for the Wherry Line (Norwich to Great Yarmouth) include better connections at Norwich. Aspirations for Norwich to the Midlands include faster journey times, better connections with the ECML at Peterborough and maintaining a good connection to Liverpool when the direct service ceases. These improvements fit with the Transport East aspiration for a world-class rail network connecting growing towns and cities.

3.140 Improved stations are a priority for Norfolk County Council across the entire area, which could contribute towards decarbonisation objectives by making rail more attractive and creating sustainable transport hubs for zero carbon development. Finally, a long-term ambition is to consider the feasibility of operating passenger services on private rail lines (initially to Dereham), which could help to connect more rural and coastal places to the strategic rail network. Several bids were made to the Restoring Your Railway Fund but these were unsuccessful.

Table 3.13: Midlands - King's Lynn - Norwich – Great Yarmouth/Lowestoft corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Better connections East-West	• Reduce journey times on Bittern and Wherry Lines • Better connections at Norwich
Station hubs	• Create sustainable transport hubs
Support transport needs of rural areas	• Feasibility study of passenger services on private line to Dereham

Indicative service outputs

The following indicative aspirations have been identified to be assessed in the development of the Rail Plan:

- At least 2 tph frequency is often desirable, to provide journey flexibility compared with car and to secure modal shift
- Journey time should be competitive with car for key flows – notably between Norwich, Lowestoft, Great Yarmouth, King's Lynn and Peterborough

- Better connections need to be provided to the North and Midlands so that journey times are competitive with car. This includes both direct journey times and improving interchanges to provide a faster overall journey.

Existing infrastructure

3.141 There is very little rail infrastructure on this corridor; King's Lynn, Sheringham, Norwich and Great Yarmouth are connected to the rail network (on the WAML, GEML and Wherry Lines respectively) but these connections largely run North-South rather than East-West. The main East-West line between Norwich and Cambridge is covered in the Norfolk and Suffolk to Cambridge - Midlands - the North and South corridor.

3.142 On the Wherry Lines, which link Norwich to Great Yarmouth and Lowestoft, the maximum line speed is 60mph. The line from Norwich to Lowestoft is double-track throughout, but the two Great Yarmouth branches via Acle and Berney Arms are single-track. The signalling system was modernised in 2018-19.

3.143 The Bittern Line links Norwich with Sheringham. The line is double-track from Norwich to Hoveton & Wroxham, where it becomes single-track. There is a passing loop at North Walsham and two platforms at Cromer also allow passing. The line is diesel with a maximum line speed of 75mph.

Industry plans

3.144 The Bittern and Wherry lines are barely mentioned in the 2016 Anglia route study (Network Rail, 2016); frequency improvements are reviewed but it concludes this would be poor value for money, in part due to the track doubling and additional platforms they determined would be required to deliver them. The evidence behind this is not clear. These lines are classed as part of the GEML but were not included in the scope for the GEML route study in 2019 (Network Rail, 2019), so there is a gap in more recent evidence.

3.145 The Network Rail Traction Decarbonisation Strategy (Network Rail, 2020) suggested that hydrogen could be a preferred option for decarbonising Wherry and Bittern lines due to the relatively low density of traffic, but this is untested.

Gap Analysis

3.146 Rail connectivity is extremely limited on this corridor, and there are currently no industry plans to improve this. More frequent services on the Bittern and Wherry Lines, and better interchanges at Norwich, could increase the use of these services for leisure and commuting, but this would require additional infrastructure.

Freight

Figure 3.13: Felixstowe to Nuneaton and North London Line routes, Tilbury to MML route

3.147 This section provides an overview of the rail freight market in the Transport East area. The rail network in the Transport East area accommodates a range of nationally important freight movements, and freight services use a variety of the rail routes described in other chapters of the report. The largest freight flows in terms of volume are the movement of intermodal containers from ports at Felixstowe, London Gateway and Tilbury (the Thames Ports).

3.148 The Eastern region (including Cambridgeshire and Hertfordshire) accounts for 18% of UK road haulage, largely due to the Felixstowe Port and the Thames Ports. Within the Transport East region, the main rail freight corridors are:

- Felixstowe to the West Midlands and North (via Ely) (36% of regional rail freight)
- Felixstowe to the West Midlands and North (via the GEML and London) (27% of regional rail freight)
- London, Tilbury & Southend (LTS) route from Stratford to Tilbury and London Gateway (35% of regional freight)

3.149 The majority of traffic (91%) is intermodal containers, with construction materials such as aggregate making up the majority of the remaining traffic.

Aspirations for the route

3.150 The Felixstowe to Nuneaton and the Midlands rail corridor is one of the UK's major freight routes. Capacity has been improved on the Felixstowe branch itself, but there are still constraints elsewhere on the route; this leads freight to be unnecessarily routed via London and the North London Line, which is itself congested. Particular pinch points are around Ipswich, Haughley Junction, Ely Junctions, the single line section between Soham and Ely and through Leicester.

3.151 There is potential to move more freight to and from the fast-growing Tilbury and London Gateway ports, part of the Thames Freeport. However, there are constraints to capacity through London for rail freight traffic to access the West Coast Main Line and Midland Main Line which limit this growth. If rail freight traffic was to increase above current projections capacity on the Essex Thameside itself could also be a constraint.

3.152 Taking more freight off the roads and onto rails is a key part of Transport East's decarbonisation strategy, as well as reducing congestion at pinch points on the region's roads and at the ports. Fully decarbonising rail freight itself is also crucial; the only option to do this for freight is electrification.

3.153 Alongside the TE Transport Strategy the Essex Local Transport Plan (2011) (Essex County Council, 2011) includes several strategic priorities for rail. For freight, the focus is on facilitating a shift towards rail freight by:

- Supporting improvements to rail freight access to international ports, including the proposed capacity enhancements between Harwich Haven Ports and the Midlands and the planned rail freight hubs in Thurrock at London Gateway and West Thurrock
- Working with district councils to safeguard existing rail freight facilities and promote their use by encouraging nearby development

Existing Infrastructure

3.154 The GEML and Essex Thameside lines are electrified. However, the branch connections to Felixstowe port and London Gateway are not, preventing the operation of fully electric services. It is possible for freight to be diesel hauled from Felixstowe to Ipswich and then transferred to electric traction, which sometimes happens – however most traffic from Felixstowe instead travels west via Ely due to limited capacity across London. The Felixstowe to Nuneaton (F2N) route is not electrified.

3.155 Line speeds are adequate for the majority of freight services, at a minimum of 40-75mph. Freight routes have a designated loading gauge, giving the clearance for certain sizes of container. The core freight routes in the region are W10 cleared and can carry standard height containers, but many of the branch lines and alternative connections are not. This potentially limits the ability to divert services or provide additional capacity.

3.156 Previous schemes including the Trimley Loop and the Bacon Factory Curve have increased the capacity of the Felixstowe branch line to 45 trains per day. There are currently 38 tpd operating: the branch line infrastructure is not currently a major constraint on growth, compared to other bottlenecks on the route.

Bottlenecks on the key Felixstowe to Nuneaton freight route, as well as Gospel Oak-Barking, are restricting the use of capacity which was delivered by previous infrastructure schemes.

Industry Plans

3.157 Schemes on the individual routes used by freight are covered on each corridor. A series of projects are currently being developed as part of Network Rail's Felixstowe to the Midlands and the North programme, which is in the process of developing an SOBC.

3.158 This includes electrification of the route. Network Rail also proposed a series of infill electrification schemes as part of the Traction Decarbonisation Strategy, including the connections to London Gateway and Tilbury ports. The next steps for this work are, however, currently unclear.

Gap Analysis

3.159 Awareness of the importance of freight, and the Felixstowe to Nuneaton route in particular, has grown in recent years. However there's currently a gap between the aspirations set out and funding committed.

Table 3.14: Felixstowe to Nuneaton corridor summary table

Underlying corridor objectives	Linked local and TE identified interventions
Support shift to rail freight	• Improve capacity on Felixstowe-Nuneaton route • Ely Area Capacity Enhancements and Haughley Junction enhancements • Improve capacity on Gospel Oak and Barking Line to link Thames ports to the WCML
Improve sustainable surface access to ports and airports	• Infrastructure to enable more rail freight from Tilbury and London Gateway alongside passenger services • Encouraging development of rail freight facilities
Switch away from diesel	• Electrification

Wider Passenger Considerations

Introduction

3.160 The previous sections of this report have set out considerations of the connectivity offered by passenger services and how this may contribute to passengers' decisions to travel, and by which mode to travel. In addition, the cost of travel and quality of service offer will be both be integral parts of passengers' overall travel choices. This section provides a summary of evidence setting out challenges around the current fares structure and the quality of service offered.

Cost of Travel

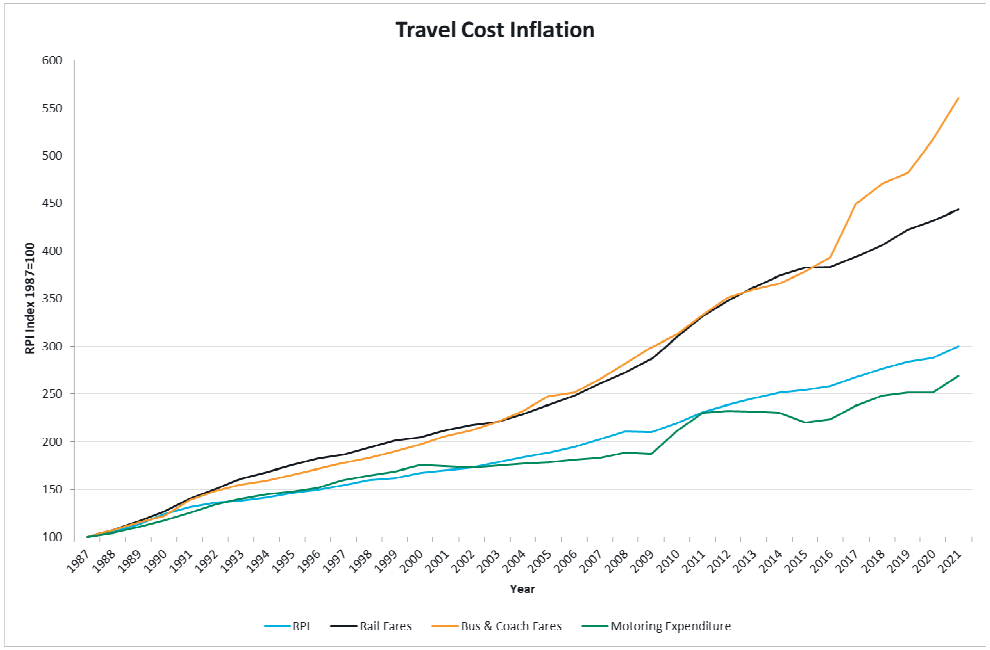
3.161 There are understood to be two key concerns facing passengers connected with the cost of rail travel. The first overarching concern, affecting the whole of the country, is the absolute cost of travel. The following figure illustrates the growth in public transport fares relative to motoring expenditure and general Retail Price Inflation since 1987.

3.162 The graph clearly shows that public transport fares, including rail, have risen significantly in their own right and relative to both RPI and motoring expenses. This reflects the long-term government policy towards passengers, rather than tax payers, contributing to the cost of public transport. More importantly the graph illustrates that the cost of rail travel has increased at a much greater rate than the cost of motoring, with the later becoming cheaper in real terms since 1987.

3.163 This provides an ongoing challenge to securing mode shift to more sustainable public transport modes. This is particularly true for discretionary and leisure journeys where the car journey time may be more competitive, for example longer distance journeys that are not to London and short distance journeys into nearby regional centres.

3.164 Further work will be needed as part of the rail plan to understand the extent to which the absolute cost of travel may be a barrier to rail use of passengers.

Figure 3.14: Travel cost inflation, RPI, 1987=100



3.165 As noted above, the disparity between rail and car travel costs is perhaps most noticeable for long distance trips, particularly for leisure purposes where groups of people may be travelling together. The following table illustrates the fares disparity on three example routes from the Transport East area.

Table 3.158: Example long distance fares (NimbleFins, 2022)

	Norwich to Manchester	Ipswich to Birmingham	Colchester to Bristol
Drive distance (miles)	155	205	195
Anytime rail fare	**£109.40**	**£145.70**	**£140.60**
Lowest flexible off-peak fare	**-**	**£75.00**	**£79.40**
Total Motoring Cost[4]	**£73**	**£96**	**£92**
Fuel Cost (£)	£32	£42	£40

3.166 The table illustrates that the cost of a fully flexible anytime single for each journey is materially more expensive than the marginal fuel cost as well as the average total cost of driving. The gap in price will be significant where more than one person is travelling. Cheaper flexible off-peak fares are available for the Ipswich-Birmingham and Colchester-Bristol journeys, which are cheaper than the full cost of driving, though still more expensive than the marginal fuel costs, which many drivers may perceive when making travel decisions. Further advanced purchase tickets, available only for specific trains, are also available.

Table 3.16: Example medium distance fares (NimbleFins, 2022)

	Norwich to Chelmsford	Southend to Colchester	Ely to Norwich
Drive distance	82	41	65
Anytime rail fare	**£71.50**	**£31.90**	**£32.40**
Lowest flexible off-peak fare	**£45.60**	**£27.10**	**£19.70**
Total Motoring Cost	**£39**	**£19**	**£31**
Fuel Cost	£17	£8	£13

3.167 The picture is less clear for these shorter journeys, for the cost of rail compared to the total cost of driving. However, where more than one person is travelling there will still be a substantial gap in price. These are also flows where the availability of advance fares is limited, so there are fewer opportunities for cheaper rail travel.

3.168 The regions rail connected airports, Stansted, and Southend, provide important international gateways for people traveling to and from London and the Transport East Region. The following table provides a comparison of the cost of rail travel to these airports from Central London.

[4] Total motoring cost includes fuel, maintenance, insurance, taxes, and the depreciation of the vehicle. Fuel costs were collected in November 2022.

Table 3.2017: Example airport fares (NimbleFins, 2022)

	Colchester to Stansted	Norwich to Stansted	Chelmsford to Southend
Drive distance	32	84	20
Anytime rail fare	**£85.40**	**£60.10**	**£28.40 (two singles)**
Lowest flexible off-peak fare	**£60.30**	**£39.50**	**£16.80**
Total Motoring Cost	**£15**	**£39**	**£31**
Fuel Cost	£7	£17	£4

3.169 The cost of rail travel to Stansted Airport from London is the most expensive of London Airports. The limited direct routes across the region mean that many travellers also have to pay for expensive journeys into London, increasing the cost compared to road. This places the airports at a disadvantage in terms of attractiveness, as well as limiting the mode share of rail for access.

Passenger experience

Stations

3.170 The quality of stations in the region are highly variable. Larger stations such as Norwich, Ipswich, Stansted, Chelmsford and Colchester have a range of facilities. However, many smaller stations are very basic, with minimal facilities. Some are unstaffed and others have limited staffed hours, although most have some ticket buying facilities and passenger information. Particularly in rural areas with infrequent services, station information and perceived safety has a substantial impact on passengers. Reviewing the accessibility of all stations is a currently being reviewed by Network Rail.

3.171 Station improvements have been named as a priority in several local and regional strategies reviewed as part of this report. The TE Transport Strategy includes a goal focused on creating *"integrated transport networks with customers at the heart",* which includes ensuring transport gateways such as rail stations are accessible, pleasant and attractive public spaces that act as multi-modal hubs for the community. Rail is one part of end-to-end journeys, making intermodal connectivity and sustainable access particularly important.

3.172 Local transport and rail strategies also note the importance of rail stations to achieving strategic objectives. For example, the Norfolk Draft Rail Prospectus (Norfolk County Council, 2020) (2020) sets out the minimum standards of facilities that stations should have, again focusing on interchange, accessibility and creating a pleasant waiting environment. The Essex and Southend Local Transport Plans (Essex County Council, 2011) (Southend-on-sea Council, 2015) (2011/2015) also highlight the importance of safety and perceptions of safety at rail stations, including good quality lighting, information and cycle parking. New stations are suggested at several locations in the Transport East region, some of which have formed part of Restoring Your Railway Fund bids.

A station audit to assess where improvements are needed should be included as part of the Rail Plan. This could also review the wider areas around stations, in terms of pedestrian and public transport access, to maximise the value of stations as part of a multimodal transport network. It should also include a consideration of Network Rail's accessibility review, linking with Suffolk Growth work on accessibility across the visitor economy.

This should also consider the case for Transport Hubs at some stations to improve the integration of stations with other modes of transport.

Rolling stock

3.173 Greater Anglia began a scheme of rolling stock replacement from 2019 onwards, which replaced the entire fleet with brand new trains. Long-distance, regional and Stansted Express services are operated by Class 745 electric and Class 755 bi-mode trains. Local and commuter services out of Liverpool Street are operated by Class 720 electric units.

3.174 Following this scheme, journey quality is more consistent and generally good. The new stock has greater seating capacity, air conditioning, and improved passenger information compared to the previous service, as well as better accessibility and accessible toilets. London-Norwich services largely have intercity specification rolling stock with first class and catering services, whereas other services are a more regional specification.

3.175 Essex Thameside services are operated by Class 357 and Class 387 'Electrostar' trains. This fleet is older than the Greater Anglia trains, although is still considered modern and high quality, with air conditioning and in train passenger information. c2c have ordered some new Class 720 trains to replace the Class 387 units which are gradually entering service.

3.176 Due to these fleet upgrades and renewals, and the resulting high quality of rolling stock in the Transport East region, rolling stock is not generally an urgent concern among stakeholders for these services.

3.177 However, there are some areas where rolling stock is a concern. In particular, this includes the 2-3 car sets used for the Cross Country Stansted-Birmingham services, which need additional capacity, as well as the East Midlands Norwich-Liverpool service which uses 2-car trains.

4 Summary and Conclusions

4.1 This report has identified gaps on the rail network in the East, both in terms of direct connectivity and the speed and quality of journeys.

4.2 In the broadest terms, rail enhancements will need to be considered to deliver Transport East's strategic priorities:

- Service frequency to provide connectivity and passenger capacity
- Journey time and/or direct services to provide connectivity
- New stations to connect underserved locations and support new development
- Service quality and performance to attract people to rail from road
- Capacity and capability to handle freight

A key gap in the strategic evidence base is the specific outputs rail needs to deliver, at a regional and corridor level, to address these wider strategic objectives. For example, while improved frequency or reduced journey times are clearly desired outputs, it is not clear what the specific frequency or journey time should be to maximise benefits.

4.3 Establishing these specific outputs is critical to definitively establish the gap in what the rail service needs to deliver, and to identify the specific operational and/or infrastructure changes which would be needed to address this. Given likely financial constraints in the short to medium term, it would also enable the identification of routes where enhancements are a priority.

4.4 We have identified where the existing rail network may be a constraint to enhancing services across the region, as an initial stage to developing this work.

4.5 Across the network, bottlenecks on the key Felixstowe to Nuneaton freight route are restricting the use of capacity which was delivered by previous infrastructure schemes. The delivery of proposed schemes, and identification of where there may be further issues, is crucial.

Corridor Summaries

London – Chelmsford - Colchester - Ipswich - Norwich - Suffolk Coast

Challenges

- Branch line services are often infrequent
- Norwich in 90 and Ipswich in 60 minute schemes have not been delivered.
- There is limited capacity to expand existing significant freight movements from Felixstowe and the Thames ports

Infrastructure

4.6 The double-track main line route is a key capacity constraint, preventing faster services overtaking slower services. Given the mix of fast passenger, semi-fast passenger and freight services

using the route, the double-track route restricts the ability to run either faster and/or more frequent services.

4.7 The single-track nature of branch lines on the route, together with at-grade junctions, restrict the ability to operate more frequent services on these routes. Haughley Junction is a single line at-grade junction, placing significant constraints on capacity and the flexibility of paths.

4.8 Bow Junction near Stratford is highly complex, and is a critical constraint, with no ability to accommodate growth in the number of peak time services coming into Liverpool Street without remodelling.

Norfolk and Suffolk to Cambridge - Midlands – the North and South

Challenges

- Hourly services on routes connecting Ipswich/Norwich to Cambridge and 2-hourly services Ipswich to Peterborough
- Rail journey times are similar to car, making rail a less attractive option for end-to-end journeys
- New stations could be considered to serve developments to the east of Cambridge
- There is limited capacity to expand the existing significant freight movements from Felixstowe

Infrastructure

4.9 All trains (both passenger and freight) on this route are being operated by diesel traction, limiting rail's contribution to overall decarbonisation targets.

4.10 The single track route between Chippenham Junction and Cambridge mean it is not possible to enhance the frequency on this corridor. Further, Haughley Junction is a single line at-grade junction, placing significant constraints on capacity and the flexibility of paths on both this and the GEML routes. The single track section between Soham and Ely route provides a further constraint on capacity and timetable flexibility for the enhancement of freight and passenger services in the corridor.

4.11 The ability to operate freight services from Felixstowe to Nuneaton and the Midlands via Ely is Limited by the at-grade junctions connecting the Great Eastern Main Line and the Felixstowe branch at Ipswich, and the single track sections of the route. These remaining restrictions limit the full use of recent infrastructure imprvoements and limit passenger services between Felixstowe Town and Ipsiwhc, and Ipswich to Peterborough.

King's Lynn – Cambridge - Harlow – London

Challenges

- Hourly off peak service to and from Kings Lynn
- Stansted Express services are operating at 2 tph, half their pre-Covid frequency
- Rail journey times are similar to car. Faster journeys on Stansted Express should be considered.

Infrastructure

4.12 The two-track section south of Broxbourne, where a busy timetable of stopping and non-stopping services shares the same

infrastructure, is a severe constraint on capacity for the whole route.

4.13 The Northern section of Crossrail 2 was designed to alleviate this through providing additional tracks between Tottenham Hale and Broxbourne.

4.14 Delivery or further development of Crossrail 2 now appears extremely unlikely. Identifying and developing standalone options which would enable higher frequency, such as those suggested in the WAML Route Study, is crucial to delivering strategic ambitions for the route.

South Essex -London – Thurrock – Basildon – Southend

Challenges

- c2c routes to/from London Fenchurch Street have 2 tph off peak, compared with 3 tph from Greater Anglia between London Liverpool Street and Southend Victoria.
- The Southminster route has a train every 40 minutes
- Rail journey times are similar to car making rail a less attractive option for end-to-end journeys
- There is a proposed new station at Beam Park (in London) to serve new developments.
- There is limited capacity to expand the existing significant freight movements from the Thames ports

Infrastructure

4.15 The line speed along the corridor is 75mph, below the 100mph capability of the rolling stock, though given the stopping nature of many services on the route the maximum speed may not always be a constraint.

4.16 Freight services run from Tilbury and London Gateway ports on to the Midlands and North via the Gospel Oak to Barking line, which is shared with passenger services and acts as a constraint on capacity.

Stansted - Braintree - Colchester - Harwich and Clacton

Challenges

- The fundamental gap in this corridor is the lack of existing rail infrastructure to provide east west connectivity
- Rail access to Stansted from the east is via London – this is an unattractive and high cost option compared to road services by car or coach, taking at least twice as long

Infrastructure

4.17 The fundamental gaps in this corridor are the lack of rail services or infrastructure. Work will be needed to determine the best modal solutions, before developing potential rail solutions.

Midlands - King's Lynn - Norwich – Great Yarmouth/Lowestoft

Challenges

- Hourly services on routes connecting Norwich to Peterborough, Sheringham and Great Yarmouth.

- There is no rail infrastructure to support direct east-west services to Kings Lynn
- Rail journey times are similar to car making making rail a less attractive option for end-to-end journeys

Infrastructure

4.18 There is very little rail infrastructure on this corridor; King's Lynn, Sheringham, Norwich and Great Yarmouth are connected to the rail network (on the WAML, GEML and Wherry Lines respectively) but these connections largely run North-South rather than East-West.

Conclusions

4.19 **A key objective of the rail plan will be to collate the strategic evidence needed to justify developing options to address these constraints. Existing planned infrastructure is not enough to address these constraints.**

4.20 There are only a small number of schemes currently being delivered, shown in green on Figure 4.2. A larger number of projects have been previously developed and could be delivered reasonably quickly (shown in orange), but even if all of those were taken forward this would leave substantial gaps in provision for which no schemes have yet been developed in detail.

4.21 These gaps, shown in yellow, reflect improvements that would be required to resolve gaps identified in the Transport East strategy and other local and regional transport plans. These are expected to change following more detailed development of the outputs rail needs to deliver on each corridor, alongside other modes, as part of the Rail Plan.

4.22 The two regional taskforces have set a range of ambitions for the key corridors of the GEML and WAML (shown in blue) and the rail plan will need to consider what further work could be required to deliver on them.

Figure 4.1: Key output gaps identified.

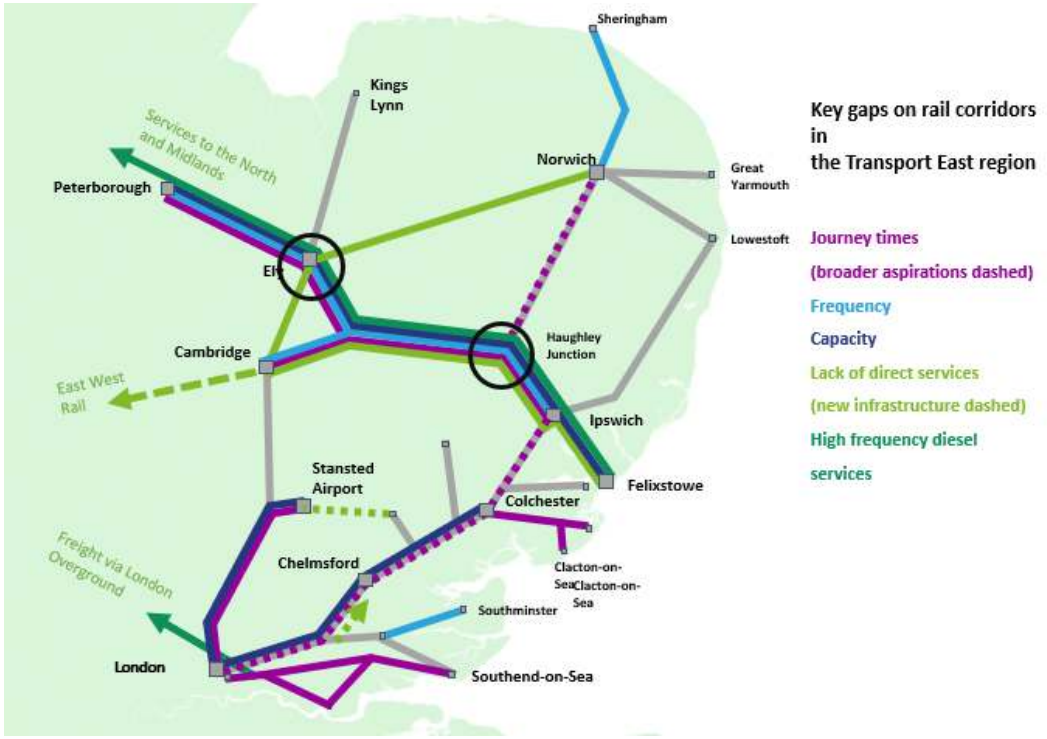


Figure 4.2: Existing and Planned infrastructure projects

Table 4.1: schemes shown on map

Committed and funded	Developed Scheme – not funded	Identified gaps – scheme to be developed	Further regional aspirations
1. Beaulieu Park Station	1. Stratford Station capacity upgrade	1. Bow Junction remodelling	GEML Taskforce aspirations
2. Cambridge South Station	2. Haughley junction remodelling	2. Journey time improvement to Stansted Airport	WAML Taskforce aspirations
	3. Ely Area Capacity Enhancement Programme	3. Passing loops on GEML to support Norwich in 90	
	4. Trowse Bridge junction improvement	4. Double tracking Wickford to Southminster	
		5. Double tracking Braintree branch	
		6. EWR Eastern Leg	
		7. Double tracking or passing loop Newmarket - Cambridge	
		Double tracking Soham Branch	

Evidence gaps

4.23 As the full rail plan is developed it would be beneficial to seek further information on areas including:

4.24 **Network Rail's renewals and maintenance plans for the next control period (CP7, 2024-2029).** This could potentially be a useful source of information on upcoming works, on top of which minor enhancements could potentially be added.

4.25 From engagement with Network Rail, their internal systems do not make it straightforward to collect this information, although they are working to collate it in response to a specific request from the WAML Taskforce. The Taskforce have access to the CP6 plan, which covers the next two years, but not CP7.

4.26 **Performance data for the Transport East routes.** This is a crucial element of rail service quality for passengers and freight, with the frequency of delays having a major impact on user confidence - although anecdotally, performance has improved in the East region since the introduction of new rolling stock.

4.27 **Identification of particular areas of infrastructure which are frequently causing delays**. This could be a useful addition to the evidence sources for the Rail Plan, but data availability in this area is challenging.

4.28 **End to end journey data to understand issues such as 'rail heading' and latent demand**. Affordability is a concern in the Transport East strategy, and local evidence suggests that there are some areas where 'rail heading' - driving to stations inside TfL boundaries or with cheaper fares to save money - is common due to the fares structure. Rail heading makes it more difficult to accurately model current transport patterns and is a less efficient use of transport capacity, as well as having environmental impacts due to increased private car use. There is limited systematic evidence on where this could be having significant effects, meaning this is an evidence gap.

Short term priorities for Transport East

4.29 There are three key constraints to delivering major rail upgrades in the short term: funding sources are uncertain, the availability of funding is likely to be highly constrained, and the lead time between an initial plan and delivery is substantial. Some of these conditions may change in future, but the development of major projects is inevitably a substantial and long term exercise.

4.30 However, in parallel to major programmes such as East West Rail, there are other areas where improvements to the network could potentially be delivered in the shorter term. These fall into the following broad categories:

4.31 **Continuing to make the case for the delivery of planned and developed schemes which are ready for delivery,** with accepted business cases: these could be delivered fairly quickly once funding is confirmed. Transport East should work with Network Rail to ensure these schemes, such as Ely, remain 'shovel ready' and can be delivered with minimal delay once funding is confirmed.

4.32 **Identifying opportunities to deliver network enhancements which could be delivered quickly.** This is likely to be schemes which are smaller (and therefore easier to fund) and more self-contained (and therefore less affected by uncertainty on major projects), such as the line speed improvements to Stansted suggested in the West Anglia Route Study. This could also include customer experience improvements such as investment in station facilities.

4.33 There are potential opportunities for minor enhancements to be delivered alongside planned maintenance and renewals: Network Rail should be encouraged to do this where possible, and to identify opportunities local partners could potentially fund, to deliver additional benefits for passengers and freight while minimising disruption.

4.34 **Beginning to develop the strategic case evidence for upgrading key routes and other potential schemes**. There are few projects in the Transport East region which are ready for substantive business case development at this point. However, much strategic and economic evidence is 'scheme agnostic': a strong and well evidenced narrative of the benefits which rail delivers to the region, and the potential gains from further improvements, could then be applied to a number of different schemes within the region. This can also be used more reactively, to make the case for the region's needs to national projects and organisations such as Great British Railways.

4.35 The Rail Plan will ultimately set out what rail needs to deliver to achieve the East's wider objectives, and how Transport East can cement their role and function to engage properly and effectively deliver change. It will provide the strategy for delivering rail infrastructure and services that will deliver the four strategic priorities for Transport East, as set out in the Transport Strategy.

4.36 Focusing on these initial areas will ensure Transport East can deliver benefits for passengers and freight, while also setting out a broader plan for the future of rail in the region.

5 References

Cambridge and Peterborough Combined Authority. (2020). *Local Transport Plan*. Retrieved from http://cambridgeshirepeterborough-ca.leadgenerastaging.com/wp-content/uploads/documents/transport/local-transport-plan/LTP.pdf

DfT. (2021). Retrieved from https://www.gov.uk/government/publications/transport-decarbonisation-plan

DfT. (2021). Retrieved from https://www.gov.uk/government/publications/great-british-railways-williams-shapps-plan-for-rail

DLUHC. (2022). Retrieved from https://www.gov.uk/government/publications/levelling-up-the-united-kingdom

England's Economic Heartland. (2021). *Passenger Rail Study*. Retrieved from https://eeh-prod-media.s3.amazonaws.com/documents/Passenger_Rail_Study_Phase_One.pdf

England's Economic Heartland. (2021). *Regional Transport Strategy*. Retrieved from https://www.englandseconomicheartland.com/documents/405/Connecting_People_Transforming_Journeys_av.pdf

Essex County Council. (2011). *Essex Local Transport Plan*. Retrieved from https://www.essexhighways.org/uploads/downloads/essex_ltp.pdf

EWR Consortium. (2018). *Eastern Section Prospectus*. Retrieved from https://www.eastwestrail.org.uk/wp-content/uploads/2018/07/East-West-Rail-Consortium-14062018-Item-7b-Eastern-Section-Prospectus.pdf

EWR Consortium. (2021). *Interim Strategic Outline Business Case*.

Intermodality. (2022). *Transport East Rail Freight baseline information.*

Network Rail. (2016). *Anglia Route Study*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2016/11/Anglia-Route-Study-UPDATED-1.pdf

Network Rail. (2017). *Freight Network Study*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2017/04/Freight-Network-Study-April-2017.pdf

Network Rail. (2019). *Cambridgeshire Corridor Study*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2016/12/Cambridgeshire-Corridor-Study-2019.pdf

Network Rail. (2019). *GEML Study*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2019/08/Network-Rail-Great-Eastern-Main-Line-Study-2019.pdf

Network Rail. (2020). *Essex Thameside Study*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2021/02/Essex-Thameside-Study.pdf

References

Network Rail. (2020). *Traction Decarbonisation Strategy*. Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2020/09/Traction-Decarbonisation-Network-Strategy-Interim-Programme-Business-Case.pdf

Network Rail. (2021). *London Rail Freight Strategy Summary Report.* Retrieved from https://www.networkrail.co.uk/wp-content/uploads/2021/05/London-Rail-Freight-Strategy-Summary-Report.pdf

Network Rail. (2021). *WAML Study*. Retrieved from https://sacuksprodnrdigital0001.blob.core.windows.net/regional-long-term-planning/Eastern/West%20Anglia%20Main%20Line%20Study%202021.pdf

Network Rail. (2022). *East West Mainline Strategic Statement*. Retrieved from https://sacuksprodnrdigital0001.blob.core.windows.net/regional-long-term-planning/North,%20West%20and%20Central/East%20West%20Main%20Line%20Strategic%20Statement%202022.pdf

Network Rail. (2022). *Ely Area Capacity Enhancement Programme Outline Business Case.* Retrieved from (unpublished)

NimbleFins. (2022). *Average Cost to Run a Car UK 2022.* Retrieved from https://www.nimblefins.co.uk/cheap-car-insurance/average-cost-run-car-uk#:~:text=How%20much%20does%20it%20cost%20per%20mile%20to%20run%20a,of%207%2C600%20miles%20per%20year.

Norfolk County Council. (2013). *Norfolk Rail Prospectus*. Retrieved from https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-transport/norfolk-rail-prospectus-2013.pdf

Norfolk County Council. (2020). *Draft Rail Prospectus*. Retrieved from https://norfolk.citizenspace.com/consultation/norfolk-rail-prospectus-2020/supporting_documents/DRAFTNorfolkRailProspectus2020.pdf

Norfolk County Council. (2022). *Norfolk Local Transport Plan*. Retrieved from https://www.norfolk.gov.uk/-/media/norfolk/downloads/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-transport/local-transport-strategy-2021-2036.pdfRoad, O. f. (2020). *Regional Rail Usage*. Retrieved from https://dataportal.orr.gov.uk/statistics/usage/regional-rail-usage/

Southend-on-sea Council. (2015). *Local Transport Plan*. Retrieved from https://www.southend.gov.uk/downloads/file/3491/local_transport_plan_3_-_strategy_document_2012-2026_-_revised_january_2015

Suffolk County Council. (2011). Retrieved from https://www.suffolk.gov.uk/assets/Roads-and-transport/public-transport-and-transport-planning/2011-07-06-Suffolk-Local-Plan-Part-1-lr.pdf

Suffolk County Council. (2014). *Suffolk Rail Prospectus*. Retrieved from https://www.suffolk.gov.uk/assets/Roads-and-transport/public-transport-and-transport-planning/Suffolk-Rail-Prospectus.pdf

References

Thurrock Council. (2013). *Transport Strategy*. Retrieved from https://www.thurrock.gov.uk/sites/default/files/assets/documents/strategy_transport_2013.pdf

Transport East. (2022). Retrieved from https://www.transporteast.org.uk/wp-content/uploads/TE_Strategy-July22..WEB_-1.pdf

West Anglia Taskforce. (2016). *A case for investment in rail*. Retrieved from http://www.gcgp.co.uk/wp-content/uploads/2016/07/TaskForce_Brochure_A4_LowRes.pdf

WSP. (2019). *Transport East Regional Evidence Base*. Retrieved from https://www.transporteast.org.uk/wp-content/uploads/Transport-East-Regional-Evidence-Base-2-1.pdf

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