



Eastern Section

Preliminary Strategic Outline Business Case



Purpose of the Preliminary Strategic Outline Business Case

This document is the Preliminary Strategic Outline Business Case (Pre-SOBC) for the East West Rail (EWR) Eastern Section scheme. The Pre-SOBC identifies the Strategic, Economic and Financial case for the proposed rail scheme in accordance with the Department for Transport's Business Case Guidance.

This document demonstrates that:

- There is a **strong business case** that justifies further development of the Eastern Section rail scheme to a full Strategic Outline Business Case, including:
 - A compelling **Strategic Case** which demonstrates that the rationale for investing in the scheme is aligned with ambitions and policies at a national, regional and local level;
 - A strong **Economic Case** which demonstrates that the scheme options meet the strategic objectives and have clear potential to deliver Value for Money; and
 - An outline identification of the **funding requirements** and potential sources.
- There is a strong rationale for **incorporating the scheme into the Rail Network Enhancements Pipeline** (RNEP) for development into a full SOBC.

The level of detail of this business case follows Green Book and TAG principles in a way that is commensurate and proportionate with the early stage in the scheme development process. It is sufficient to demonstrate there are worthwhile benefits to be secured and that further development and inclusion in the RNEP is justified to support further business case development.

Recommendation from the Preliminary SOBC

The findings of this Pre-SOBC justifies the Eastern Section's inclusion in the first stage of the RNEP gateway. At this stage of the pipeline scheme promoters should seek development funding from the Department for Transport to prepare a full SOBC on the basis the scheme delivers a compelling case for investment.

Content of the Pre-SOBC

The Pre-SOBC is divided in two main sections:

- The **Strategic Case**, which demonstrates the rationale for investing in the scheme to achieve national, regional and local ambitions and sets the scheme objectives and strategic options; and
- The **Economic and Financial Case**, which demonstrates the options which deliver the scheme objectives and represent Value for Money, and identifies the indicative funding requirements and potential sources.

The technical evidence behind the economic and financial analysis is documented in the Appraisal Modelling Report which sits alongside the Pre-SOBC.

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Eastern Section

Strategic Case



East West Rail: The Eastern Section

Key findings

- The Eastern Section completes a transformational new strategic rail link from the East of England to the West of England, supporting the Government's levelling up and sustainable growth agendas and delivering local and regional objectives.
- Delivering the Eastern Section is key to achieving economic recovery from and beyond the immediate consequences of COVID-19. It will also help to deliver the Government's carbon net zero agenda and Transport Decarbonisation Strategy by offering a significantly less carbon intensive travel option between key economic centres.

1 East West Rail and the Eastern Section

Connecting Norfolk and Suffolk to new strategic networks

1.1 Delivery of East West Rail connecting East Anglia with central, southern and western England is the shared strategic ambition of the East West Rail Consortium (a partnership of local authorities along the EWR route from East Anglia across to Oxfordshire), England's Economic Heartland and all its partners. The delivery of East West Rail in its entirety has been at the core of the region's strategic priorities for 25 years and is the single biggest opportunity for this region.

1.2 Investment in a strategic railway will be at the heart of transforming what is currently a series of discrete functional economical areas and housing markets into a better-connected region, to the benefit of businesses and residents alike. The project's transformational benefits were identified by the National Infrastructure Commission in 2017 and regarded as Arc's once-in-a-generation opportunity to unleash this region's economic potential and unlock sustainable new growth.

1.3 Such is the importance of East West Rail, the Government has subsequently established the EWR Company to take forward and accelerate the delivery of restoring rail connectivity between Oxford and Cambridge. A new East to West Mainline will :

- Create better connectivity for communities and businesses and thereby realise the Levelling Up Agenda;
- Contribute significantly to meeting the legal require achievement of net-zero carbon by 2050
- Create new investment opportunities ; and
- Enable the planned delivery of economic and housing growth.

The delivery of the full EWR scheme, including the Eastern Section, will also address national commitments made by Government, such as those made in the National Infrastructure Strategy, Levelling Up Agenda, Industrial Decarbonisation Strategy, Brexit and COVID recovery plans. Alongside the Eastern region's ambitions to move more people by rail, the announcement of Suffolk and Essex's successful Freeport East application are just some of many examples of how improved rail connections from the East of England will meet Government ambitions.

The East West Rail Main Line

1.4 The East West Rail route as promoted by the EWR Consortium, was previously promoted as three sections:

- the Western Section: linking Oxford to Bedford (due to be operational by 2024) and Aylesbury to Milton Keynes (2025);
- the Central Section: the missing rail link between Cambridge and Bedfordshire, which is expected to be operational in the late 2020s; and
- the Eastern Section: connecting the Central Section at Cambridge to Suffolk and Norfolk using the existing rail lines. The rail link to Ipswich forms part of the nationally significant Felixstowe to Nuneaton rail corridor.

The delivery of the Central and Western Sections are being led by the Government appointed East West Rail Company (EWR Co). The EWR Co will be delivering the route in three connection stages: Oxford to Milton Keynes, Oxford to Bedford and Oxford to Cambridge. For the purpose of this Pre-SOBC, the connecting sections of the EWR Main Line will be referred to as the Eastern, Central and Western Sections.

1.5 The opportunities that can be unlocked by the Eastern Section of East West Rail support the delivery of the objectives for the East West Rail scheme as a whole, this includes improving public transport connectivity east to west; improving journey times by rail; and facilitate economic, housing and employment growth.

Figure 1.1: The East West Rail route



Key findings from the Strategic Case

1.6 This Strategic Case forms part of the Pre-SOBC. It sets out the need for the enhancement of the Eastern Section of EWR. The strategic need for investment in the Eastern Section, and EWR more broadly, is being championed by the East West Rail Consortium. The Consortium works closely with the East West Rail Company.

1.7 This document builds on the Eastern Section Conditional Output Statement Study (2017) and Prospectus for Growth (2019), commissioned by the EWR Consortium. The Pre-SOBC has been developed to demonstrate the need for the Eastern Section and the role that it plays in supporting the economic, social and environmental value of the East West Rail Main Line project as a whole.

1.8 This document presents the strategic need for investing in the EWR Eastern Section and establishes why this investment is needed to support the delivery of planned economic and housing growth in a way that

supports the Government’s wider policy ambition for a Green Industrial Revolution.

Strategic context

1.9 The **economies** of Suffolk, Norfolk and Cambridgeshire have a record of strong performance, providing significant concentrations of jobs in UK leading sectors, such as life science, technology, financial services, agri-tech and academia. The area of Greater Cambridge and counties of Suffolk and Norfolk are predicted to double their economies by 2045, delivering **£77.8bn** to the UK economy. These economies have the potential to grow further by connecting with the economic centres of the Cambridge to Oxford Arc, which includes the economic centres of Bedford, Milton Keynes and Oxford, and is worth **£110bn** to the UK Treasury each year and **supports over 2 million jobs**.

1.10 Within this burgeoning local economics, the **Levelling Up Fund** guidance identifies Norfolk, South Norfolk, Ipswich and East Suffolk and Fenland as priority 2 Local Authorities, representing places where significant infrastructure investment is needed to address the levels of inequality. Investment in transport that unlocks better connectivity and the associated economic benefits, such as the EWR Eastern Section, has a direct contribution to the levelling up agenda.

1.11 The East of England is home to one of Britain’s critical global trading gateways: the Port of **Felixstowe**, Britain’s largest and busiest container port, which contributes over £2.4bn to the UK economy. The Port of Felixstowe has plans to double its handling of containers (as a consequence of UK economic growth) from the current 4.1m Twenty-foot Equivalent Units (TEU) to 8m TEUs per annum by 2030. Both the Port of Felixstowe and the Port of Harwich have recently been successful in achieving Freeport status - combined this will deliver £650m to the local economy. The award of the Freeport status further recognises the significant role the Port of Felixstowe and Port of Harwich will play to the UK economy. It is therefore imperative that the Eastern Section enhancements will build on this investment by strengthening connectivity to these international gateways; benefiting UK plc as a whole.

1.12 In this context, rail will play a significant role in delivering the net zero carbon legal requirements by removing passenger and freight traffic from the roads and contributing to achieve **net-zero greenhouse emissions** by 2050.

The challenges

1.13 **The existing road-centred transport system in the East of England is a constraint** to travel movements and the delivery of sustainable housing and economic growth. The challenges with over reliance on the road network, will become compounded further with predicted future growth. Significant housing and job growth are planned within Cambridgeshire, Suffolk and Norfolk, with 240,000 additional homes being delivered over the next 16 years, and 120,000 additional jobs.

1.14 **The delivery of East West Rail will do much to open labour markets**, enhance access to education and be an enabler of housing growth in both rural and urban areas. EWR will create wider access and connectivity opportunities to expanding labour markets and for resident's access to education employment, and leisure between areas that are currently only accessible by car.

1.15 **Rail journey times and service frequencies are not competitive** for travel between Suffolk/Norfolk and Cambridge, and a direct service to the West of the UK does not exist. As a consequence, there is now significant highway congestion which has led to worsening air quality and health risks. Without the delivery of the Eastern Section, high density road-based travel will exacerbate social, economic and environmental issues and effect productivity. There is a limitation on how additional capacity can be delivered by investment in roads. The Transport Secretary's decision to cancel the Cambridge to Oxford Expressway reinforces the critical importance of EWR and the Eastern Section as the transformational piece of infrastructure for the wider area.

1.16 **Rail connectivity across the UK needs to be improved.** The recent Rail Connectivity Review highlighted the need to better connectivity between the nations of the UK. Investment in the Eastern Section provides

wider opportunities for better connectivity with Wales, Ireland and Scotland. Coastal and rural areas across Suffolk and Norfolk are not well served by rail services, which have limited timetables and opportunities for connectivity. Improved rail services provide an opportunity to open coastal and rural areas – further supporting their tourism industry, improving access to services and improving employment and education opportunities.

The case for change

1.17 The Eastern Section will **connect people with jobs and leisure opportunities, as well as making business to business connections** between Suffolk, Norfolk, Cambridgeshire and beyond to Oxford and the rest of the UK. Such investment in the Eastern Section will increase the attractiveness of rail for new and existing residents and businesses, which will drive modal shift that will lower carbon emissions, as well as support the delivery of planned economic and housing growth and connect world-leading business clusters whilst helping to grow and share the local skills base in Suffolk and Norfolk.

1.18 Completion of the full EWR scheme will also generate a significantly positive **economic impact in the freight sector**, taken forward by investment along the Felixstowe to Midlands route to support the port's role as a global gateway. Freight handling capability would enable access to key logistic hubs in the South West, South Wales, the North West and the Midlands and create resilience for existing routes. These benefits extend wider to businesses, as acknowledged by the Government's Rail Freight Strategy (2016), which suggests that rail freight has productivity gains of £1.6bn a year for businesses in the UK.

1.19 The economic benefit of this strategic link is captured in the National Infrastructure Commission's (NIC) Cambridge - Milton Keynes - Oxford Arc study in which they cite that a rail link between Oxford and East Anglia will provide a step-change in connectivity and unlock major settlement and employment opportunity. Across the wider region,

development in local plans will deliver a further 535,000 new dwellings, increasing the housing stock by 25% by the early 2030s.

1.20 The NIC report also mentions the transformational role rail will play in connecting Suffolk and Norfolk with the South West of England: a rail connection from the East West Rail line through to Ipswich and Norwich will help unlock further benefits, over and above those identified in the Western Section business case for the East West Rail, especially as growth areas in Ipswich and Norwich alone are anticipated to deliver 82,000 jobs and over 80,000 homes over the next 15 years.

The Eastern Section objectives and deliverables

1.20 The objectives of the EWR Eastern section are to deliver:

1. Enhance connectivity between the Eastern Section (Norfolk and Suffolk) and locations along the entire EWR route;
2. Improve connectivity within the Eastern Section by making journeys faster and services more frequent, linking Norfolk, Suffolk and Cambridgeshire better;
3. Provide capacity to meet long-term rail demand growth, particularly that driven by local developments;
4. Maintain resilience and reliability of the network;
5. Enhance capacity for rail freight, especially from the Port of Felixstowe;
6. Contribute to achieving the Net Zero agenda by removing traffic from congested inter-regional highway corridors; and
7. Boost economic activity by providing attractive connectivity between economic centres and extending labour catchment areas.

1.21 In order to meet the objectives of the Eastern Section scheme, the following deliverables have been set out:

- 1, Half-hourly Ipswich/Norwich to Cambridge passenger rail service
- 2, Hourly Ipswich/Norwich to Oxford passenger rail service
- 3, Improved journey time of passenger rail services between Ipswich/Norwich and Cambridge
- 4, A rail route through to Oxford that is attractive for freight.

Rail investment in a challenging economic climate

The role of East West Rail to drive growth

1.22 The economies of Norfolk and Suffolk have been successful over the past decade, with an estimated increase in Gross Value Added (GVA) of **9% between 2010-2017**, faster than many 'powerhouse' areas¹, being net contributors to the economy. GVA is forecast to grow by £17.5bn by 2036 (2% annually) following planned growth in housing and jobs. Rail investment is seen as a pillar to drive the planned levels of growth.

1.22 Productivity is however still lower than the UK average², and there is more that can be done to maximise the region's potential and to level up its economies. Improved rail connectivity offers the opportunity to improve productivity by providing an attractive, reliable service between key economic centres.

1.23 The COVID-19 pandemic has had a significant impact on the UK (and world) economy, with the immediate public health restrictions having meant that every region is experiencing rising unemployment. The implications of Brexit present further challenges. Notwithstanding, the strategic investment in the Eastern Section will ensure economic recovery decouples car use and economic growth which has for too long blighted our towns and cities. This investment will resolve long-standing strategic connectivity issues which predated the pandemic. The local authorities

¹ Economic strategy – For growth & opportunity, November 2017. New Anglia LEP.

² Local Industrial Strategy (Draft), January 2020. New Anglia Local Enterprise Partnership.

along the EWR corridor remain committed to growth and are investigating short, medium and long-term measures to aid economic recovery and resilience.

1.24 Suffolk, Norfolk and Cambridgeshire are putting green recovery at the heart of their plans to mend the economy after the COVID pandemic. Investment in sustainable transport plays a central role to this, given that physical connectivity will continue to be important. As well as supporting direct employment through construction, improved transport infrastructure will better connect residents to employment, education and training, which will enable businesses to grow sustainably by providing improved connections to markets, collaborators, supply chains and talent pools. This is highlighted within the 12 key measures within Norfolk and Suffolk's recovery plans, the Greater Cambridge Partnership's Green Recovery Report, and the Cambridgeshire and Peterborough Combined Authority (CPCA) *Local Economic Recovery Strategy*. It is also contained in the Transport East, the regions sub-national transport body, Interim Investment Plan. Rail enhancements support the recovery to deliver a green economic recovery. The Eastern Section will create long-lasting modal shift that will contribute to net-zero.

1.25 Combined, Suffolk, Norfolk and Cambridgeshire will deliver £77.8bn in GVA to the economy, 240,000 additional homes and 120,000 additional jobs over the next 16 years.

The characteristics of the Eastern Section – which drive housing growth in a sustainable manner, support the freight and logistics sector and enable growth in high value employment – suggest that the impact of the scheme on economic recovery will be experienced beyond the Eastern Section corridor and will provide benefits to wider regional areas.

Key policy areas for transport investment

Net zero legislation, levelling up agenda and COVID-19 recovery plans

1.26 The commitment by Government to deliver the Oxford to Cambridge sections of East West Rail represents a first step in realising the full benefit of this transformative link for the region and beyond. The delivery of the Eastern Section is consistent with national policy.

Net zero emissions legislation

1.27 The UK passed laws in 2019 to legally require that all greenhouse gas emissions are brought to net zero by 2050. It is important to note that this is a legal requirement and not a target or an ambition. This means that all investment, particularly in transport will need to contribute to delivering a net-zero carbon system by 2050. This is underpinned by DfT's Transport Decarbonisation Plan which brings together the plans for transport to achieve the net zero targets, in particular investing in rail schemes that can result in modal shift from road. Investment in the Eastern Section brings the country significantly closer to achieving this legal obligations and sets a pathway from which other schemes can follow.

1.28 A Decarbonisation Strategy undertaken by Transport East, a sub-national transport body for the East of England, has found that transport is responsible for 41% of carbon emissions across the region. The report also highlights that the East of England is one of the fastest growing regions in seeing its carbon emissions grow each year. 78% of people in the region are reliant on a private vehicle for their commute to work. Modal shift, and moving more freight to rail, is therefore considered to be key to reducing carbon emissions and reaching national carbon reduction targets.

Levelling up throughout the UK

1.29 The Government has expressed firm ambitions to 'level up' the UK. This means facilitating investment which can help to address inequality in areas, including employment, productivity or access to opportunities. This commitment by Government provides a real change for urban and rural areas in Suffolk, Norfolk and Cambridgeshire to benefit from investment in

services to deliver better economic and social opportunities. Both Suffolk and Norfolk are largely rural counties, where access to services and transport is poor. Studies undertaken by Transport East demonstrate that the location of rural areas close to urban centres such as Cambridge and London are the most productive, in the top 40% nationally. Many coastal rural districts in the county are the least productive, in the bottom 20% nationally. The study demonstrates that transport creates the step-change in the prospects of those rural areas and the people that live in them. Realisation of the Eastern Section will connect these different economic and spatial geographies to the benefits of businesses and communities and support new employment opportunities. It will also support Transport East’s Transport Strategy’s three key priorities, which includes ‘Multi-Centred Connections’ and ‘Energised Coastal Communities’ – further explained in paragraph 1.31.

‘Build Back Better’

1.30 The Government will invest in transport to recover from the impact of COVID-19, in particular setting up an Acceleration Unit to speed up delivery of transport projects and ringfencing £360m of investment to ‘build back better’ from COVID-19. Delivery of the EWR Eastern Section will embody this philosophy by unlocking the demand for housing and employment growth in a significantly more sustainable manner.

Figure 1.2: Decarbonising Transport: Setting the Challenge



Transport East Transport Strategy

1.31 Transport East’s Transport Strategy contains three key priorities:

- Global Gateways - Better connected ports and airports to help UK businesses thrive. Boosting the nation’s economy through greater access to international markets and Foreign Direct Investment.
- Multi-Centred Connections - Better links between our fastest growing places and business clusters. This helps the area function as a coherent economy and improves productivity.
- Energised Coastal Communities - A reinvented, sustainable coast for the 21st century. Supporting the growing importance of the energy generated along our coastline, as well as our fantastic visitor experiences.

Delivery of the Eastern Section will help to meet all three priorities through creating new and wider rail connectivity; low carbon transport solutions; providing sustainable transport links between housing employment, education, health and other key services and business to business connectivity, which creates new opportunities for

The strategic context

Key findings

- The economies of Suffolk, Norfolk and Cambridge are strong, building upon new vibrant business clusters, which can be further supported by rail.
- The port of Felixstowe is Britain's largest and busiest container port – which is due to expand further with its role, alongside the Port of Harwich, as a Freeport.
- Rail can play a significant role in enabling new economic growth in a sustainable, net zero carbon manner.

2 The strategic context

A high-growth corridor with untapped potential

Economies and markets served by EWR and the Eastern Section

2.1 EWR will address a long-standing infrastructure gap, achieving a sustainable transport link between the East of England and the West of England, which is needed to better connect communities and businesses, create new investment and underpin sustainable growth. Building on the momentum of this transformational investment, there is an opportunity to unleash the economic potential of Suffolk and Norfolk by improving connectivity across a wider geography.

2.2 Transformational growth of the scale envisioned across the EWR corridor will need to build on the breadth of existing assets and strengths. These strengths and growth opportunities are in line with Government’s *Ten Point Plan for a Green Industrial Revolution*. An example of these strengths within each county are set out below:

- **Suffolk:** as global leaders in renewable energy technologies and thriving hi-tech economy in advanced manufacturing, ICT and biotechnology. Ports at Felixstowe, Lowestoft and Ipswich provide firms with a competitive advantage for exporting products and provides the global platform the UK requires to trade.
- **Norfolk:** with a powerful energy hub on the east coast, advanced engineering and manufacturing capabilities and a world-class food, life-science and agri-tech cluster centred around the Cambridge-Norwich Tech Corridor.
- **Cambridgeshire:** the fastest growing area outside London with a dynamic business environment, high start-up rates and clusters of knowledge-intensive businesses such as biomedical and life sciences, agri-tech, digital, information technologies and artificial intelligence.

2.3 Investment, particularly in the transport network, is needed to realise the economic growth of these high value strengths and sectors (by 2036 GVA in Suffolk and Norfolk is set to increase by £17.5bn). As outlined



in the *Integrated Transport Strategy for Suffolk and Norfolk*, transport networks in the region suffer from reliability and resilience issues and have several pinch points that can contribute to the perception that Suffolk and Norfolk are a ‘long way’ from the rest of the country. The lack of resilience of the transport network restricts the growth potential of both counties. Rail can contribute to level up these areas through improved connectivity. Ensuring access to and growth of the Port of Felixstowe and other ports will also contribute to boost the international offer, investment in the region and enterprise formation.

Figure 2.1: Key business clusters within Norfolk and Suffolk



Source: Economic strategy – For growth & opportunity, November 2017. New Anglia LEP



Government’s Ten Point Plan for a Green Industrial Revolution

Freight as a catalyst for economic growth

Importance of freight and the Port of Felixstowe

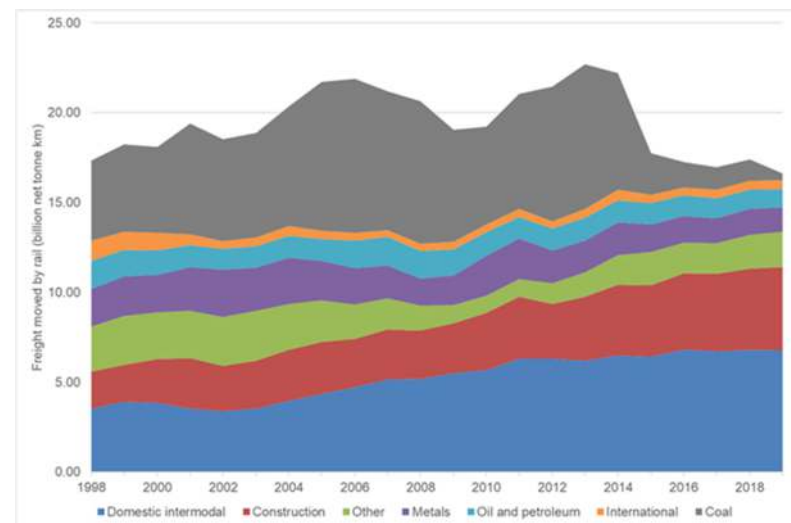
2.4 Freight movements within the UK are driven by several key industries, such as strategic warehousing, aggregates and automotive. There has been notable increase in intermodal container traffic, with increases in average length of haul driven by globalisation of production and regionalisation of distribution.

2.5 Intermodal traffic is currently the largest component of the rail freight market, having grown by over 90% between 1998 and 2019, and its rail market share having grown from 20% to 40%. Most of this growth has been generated through the ports of Felixstowe and Southampton, with the former located in Suffolk and handling over 40% of UK container traffic. Felixstowe has significantly expanded its handling facilities in recent years and is a key driver of the regional economy alongside ports at Great Yarmouth, Lowestoft and Ipswich. At the regional level, England’s Economic Heartland’s 2019 freight study sets out the policies to plan for the most efficient way of providing access to goods, that unlocks economic potential whilst protecting the environment and communities. A key policy within this report is the need to increase the capacity and reliability of the Felixstowe to Nuneaton corridor to support planned growth. Delivery of the Eastern Section will build upon the rail investment made between the East of England and West Midlands to increase the quantum of freight forecast freight movements.

2.6 COVID-19 has not changed the trends in containerised traffic and the traffic is expected to continue to grow in line with the wider economy, with further growth potential in online shopping and opportunities presented by Brexit. This demand will grow further with the Port of Felixstowe and Port of Harwich achieving Freeport Status (known as Freeport East). For Suffolk, the freeport area will focus on the Port of Felixstowe and Gateway 14 business park development in Stowmarket. Freeport East is anticipated to deliver 13,500 jobs over a 10-year period and provide £650m boost to the UK economy and attract over £500m investment. To fulfil its growth needs, the Port of Felixstowe has invested

in infrastructure to enable greater handling of containers (roll-on, roll-off capacity to increase by more than 40% in 2019) and the movement of more containers by rail. Connectivity to the region’s ports is therefore of critical strategic importance both regionally and nationally, including providing strategic movements to the Northern Powerhouse, and internationally, with Felixstowe as a strategic gateway between the UK, Europe and Asia.

Figure 2.2: Rail freight traffic in Great Britain by commodity type



Source: Department for Transport

Figure 2.3: Port of Felixstowe



Rail and the net zero agenda

The most efficient way to reach the net zero carbon legal requirements

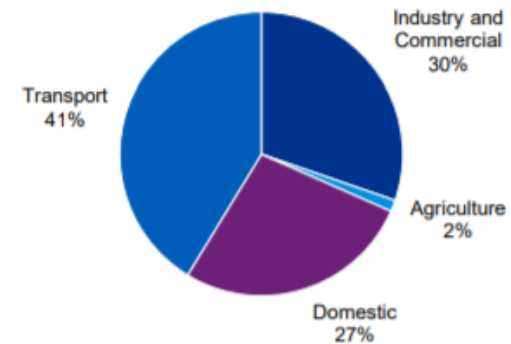
2.7 In 2019, the UK passed laws to end its contribution to global warming by bringing its greenhouse gas emissions to net zero by 2050. Comparable to other sectors, transport is now the largest contributor to UK domestic greenhouse gas emissions and places an impetus on the need to dramatically reduce its share of CO₂ emissions. The “current pattern of travel and consumption of resources [in the region] is incompatible with delivering the national requirement to achieve net-zero greenhouse emissions”³. Investment in attractive and viable green alternatives to private car are therefore necessary to achieve Government’s net zero requirements.

2.8 There is increasing scrutiny on the use of diesel and petrol road vehicles due to the air quality issues. The largest contributor of carbon emissions in the Transport East region (including Suffolk and Norfolk) in 2018 was transport (41% of total emissions of 7.7 mega-tonnes CO₂e). Road transport accounted for 90% of these emissions.

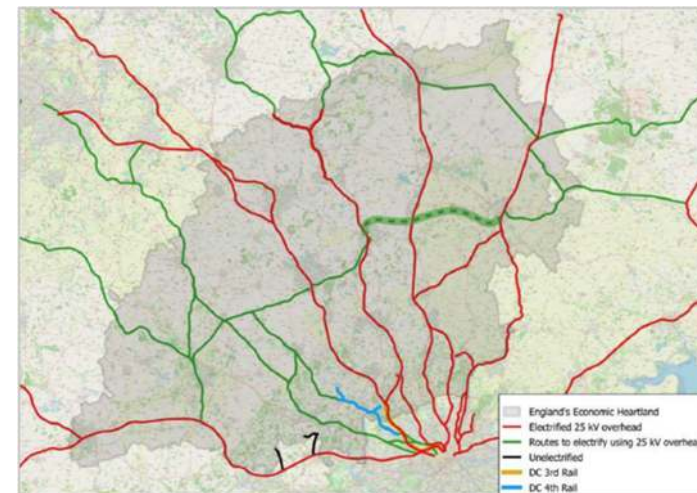
2.9 Rail generates less emissions and must continue to develop to play a key role in promoting attractive modal shift to support the decarbonisation of the transport industry, through a shift of passenger trips made by car and freight trips made by lorries towards rail trips.

2.10 Network Rail has also stated in their *Traction Decarbonisation Network Strategy* that electrification schemes are the optimum transport solution to achieve decarbonisation in Anglia. In line with this, Network Rail and England’s Economic Heartland have identified the rail routes to electrify in Suffolk, Norfolk and the Oxford-Cambridge Arc as shown in Figure 2.5, including EWR, and are committed to the decarbonisation of the network in line with the *Anglia Route Strategic Plan* (2018).

Figure 2.4: CO₂ emissions by sector in Transport East Regions in 2018



Source: Transport East Decarbonisation Evidence Base, November 2020



³ Transport Strategy, 2021. England’s Economic Heartland.

Source: Passenger Rail Study, 2020. Network Rail (for England's Economic Heartland).

The challenges

Key findings

- Investment in Eastern Section is essential to support delivery of planned economic and housing growth to improve connectivity between economic centres.
- There is a need to invest in the rail industry to improve the viability of rail freight to support the decarbonisation of our transport system.

3 The challenges

Population growth and access to employment

Connecting high value places and employment with new housing

3.1 Significant housing and job growth are planned across Suffolk, Norfolk and Cambridgeshire with 240,000 additional homes being delivered over the next 16 years (New Anglia Economic Strategy), and 120,000 additional jobs over the same period. Adequate connectivity between residents and jobs, and among businesses, will be needed to enable the planned levels of growth, both in terms of overall GVA growth and also productivity growth, through more efficient access to jobs.

3.2 Investment in rail will be fundamental in enabling economic growth as well as enabling the delivery of housing and jobs. Corridors for growth have been identified along the Cambridge-Norwich corridor (along the A11) and the east-west A14 corridor between Felixstowe and Cambridge. Much of the growth is located within towns that have rail stations and so delivery of the Eastern Section is able to provide a competitive alternative to single occupancy car use. This means there is a major opportunity for rail to harness demand to connect people and jobs, as well as for rail to better connect business and attract investment across the new rail corridors between Suffolk, Norfolk, Cambridge and Oxford.

3.3 Enhancing the Eastern Section also provides a key opportunity to better connect Suffolk and Norfolk to other areas of growth across the UK, and for other areas to access expertise and industries that exist in both counties. The need for improved connectivity is driven in part by the need for more favourable locations for new development and by doing so widening labour market catchments for employers.⁴ Current commitments in Local Plans across England’s Economic Heartland will deliver a total of 535,000 new homes by the early 2030s, increasing the region’s housing stock by around 25% which is above the national average. However, high-

quality affordable housing in Norfolk and Suffolk will remain unattractive to workers unless journey times and reliability improve, so there is an opportunity to connect the high-growth centres of population in Suffolk, Norfolk and Cambridgeshire with the skilled jobs they seek, as well as give local businesses the connectivity they need to trade.

Figure 3.1: Large employment and housing sites within Suffolk Local Plans

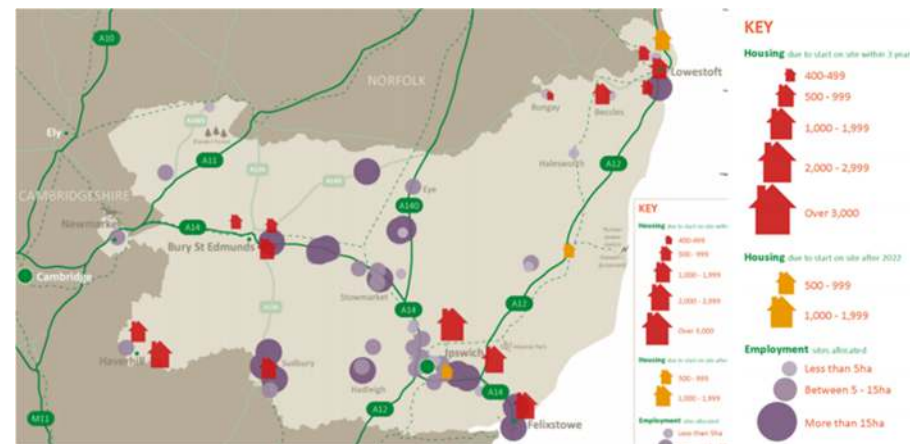
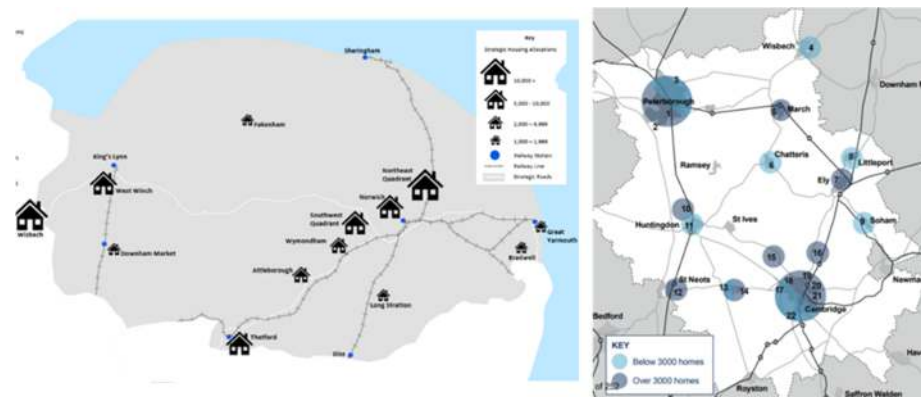


Figure 3.2: Spatial distribution of housing in Norfolk (left) and Cambridgeshire (right)



⁴ A new deal for the Cambridge–Milton Keynes–Oxford Arc, 2017, NIC

Reliance on highways for residents and freight

Restricting growth and access to jobs

3.4 Most people in the region currently travel to work by car, accounting for over 70% of trips according to the Integrated Transport Strategy for Norfolk and Suffolk (2019). Car dominance is still prevalent when considering commuters travelling between the employment centres of Ipswich, Norwich and Cambridge. This both acts as a barrier for the workforce accessing jobs for residents without a private vehicle and brings environmental and congestion disbenefits.

3.5 The high use of private vehicles results in highway congestion around regional centres, which will continue as population grows and people continue to choose car over more sustainable options. This will result in more congestion, slower and less reliable trips, and further damage to the environment, as well as limiting the economic potential of the region and likewise the achievement of the net zero carbon goals.

3.6 Congestion along the A14 also causes issues for road freight, which comprises up to 16-22% of total traffic in sections north-west of Cambridge (for example Ellington and Fen Ditton)⁵. This congestion and associated delay have a direct impact on business productivity and carbon emissions. In order to realise the ambition to decarbonise the transport system, investment in the Eastern Section is required to provide a practical and viable alternative to the private car and lorries.

3.7 Improving the Eastern Section and connecting it to EWR will significantly improve sustainable connectivity between Suffolk, Norfolk and the Oxford-Cambridge Arc, serving populations of urban and rural areas along the corridor, where car remains the main transport mode. This aligns with the national and regional targets for a post-carbon economy.

Figure 3.3: Proportion of commuters by mode

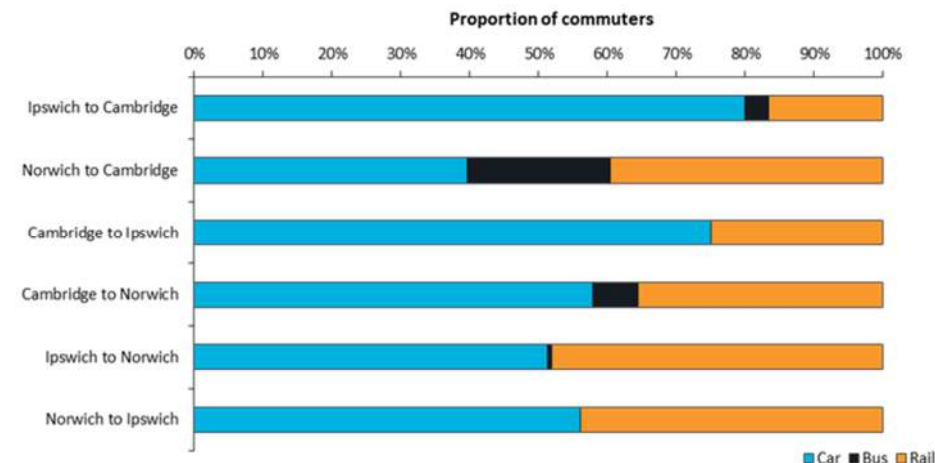


Figure 3.4: Road network congestion in 2040 (volume to capacity ratio)



Sources: Journey to work data (Census 2011), Eastern Section Prospectus for Growth

⁵ A14 Study Output 1, 2011. Department for Transport.

Slow rail journey times and low frequencies

Uncompetitive relative to other transport modes

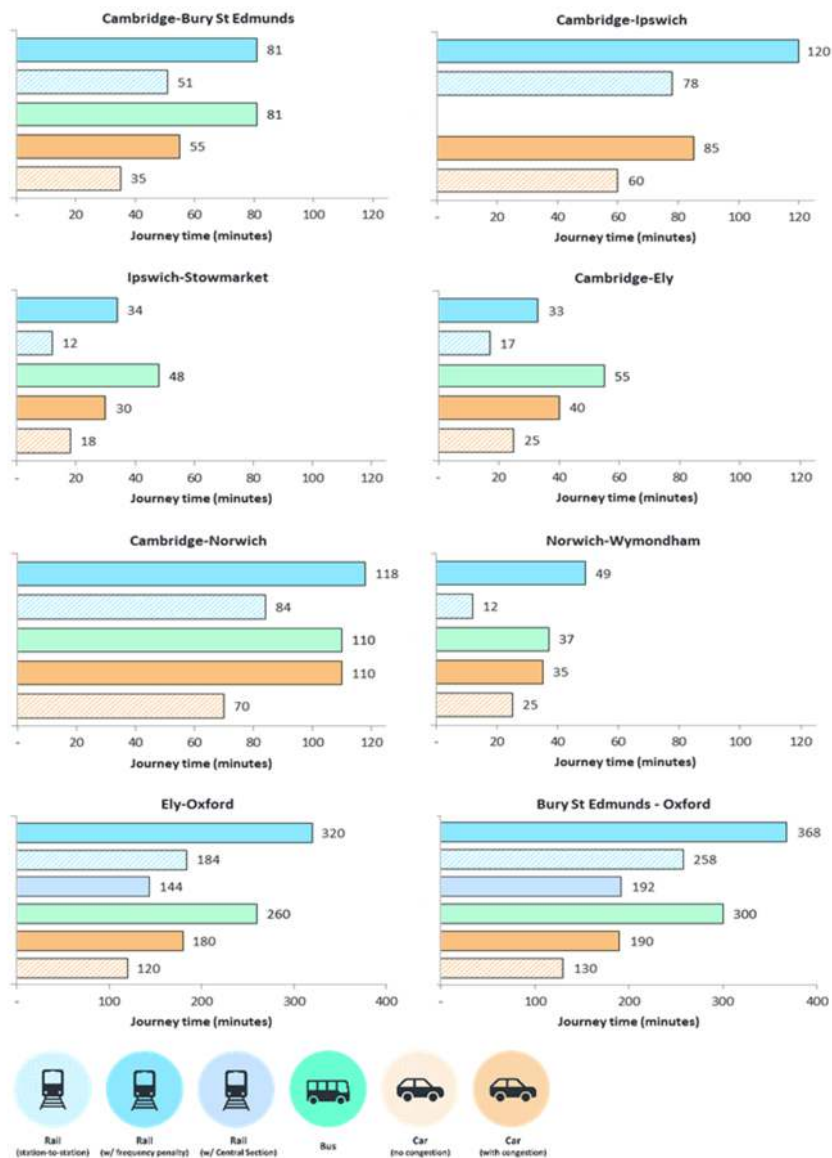
3.8 The journey times and frequency of service offered by rail in the region are not competitive with car, and sometimes bus. Figure 3.5 (on page 18) presents a comparison of journey times for key origin-destination pairs in the region, showing car journey times as a range, and rail journey times with and without the impact of service frequency.

3.9 Uncompetitive rail journey times are partially a result of existing constraints on the infrastructure line speed along the corridors. Whereas the existing Class 755 rolling stock can operate at 100mph, the current infrastructure only allows speeds of between 50mph and 70mph along the corridors. This means there is untapped potential to realise journey time gains, and therefore to make rail journey times more competitive, by enhancing the infrastructure line speed while utilising the existing rolling stock. Increasing frequency of the service can also provide better overall journey time for users, as well as accommodate future demand growth when required, but this may require investment to provide additional infrastructure capacity.

3.10 Where rail competes with car (e.g. longer-distance routes or centre to centre journeys), journey time improvements helps to create modal shift, particularly for journeys that currently have much longer rail journey times, such as Cambridge to Ipswich. The analysis has demonstrated that existing traffic conditions on the road network are unacceptable. This is having negative environmental, social and economic consequences. Without achieving significantly greater use of rail, realised through the delivery of Eastern Section, we can expect new growth to increase the demand on the highway network, taking the region further away from the carbon net-zero target. The closer the comparative travel time, the higher potential to attract demand from car – this potential is shown in Figure 3.5. Rail trips from Suffolk and Norfolk beyond Cambridge (for instance to Oxford or Milton Keynes) are not practical by rail, even when taking into account the benefits of the Central Section. Such journeys are also lengthy by car, which also does not offer the opportunity to be productive whilst

travelling. Enhancing the Eastern Section can generate rail trips beyond Cambridge, whilst enabling travellers to productively use their journey time by rail, for instance, to work. Movement to rail as a primary mode of transport for commuters can be encouraged further with investment in first mile/last mile routes to and from rail stations, which also needs to be a primary focus. This can be achieved through Active Travel and bus investment.

Figure 3.5: Comparison of journey times by mode on selected origin-destination pairs



Source: MOIRA for rail and Google Maps for car and bus, 2020

Rail capacity constraining freight

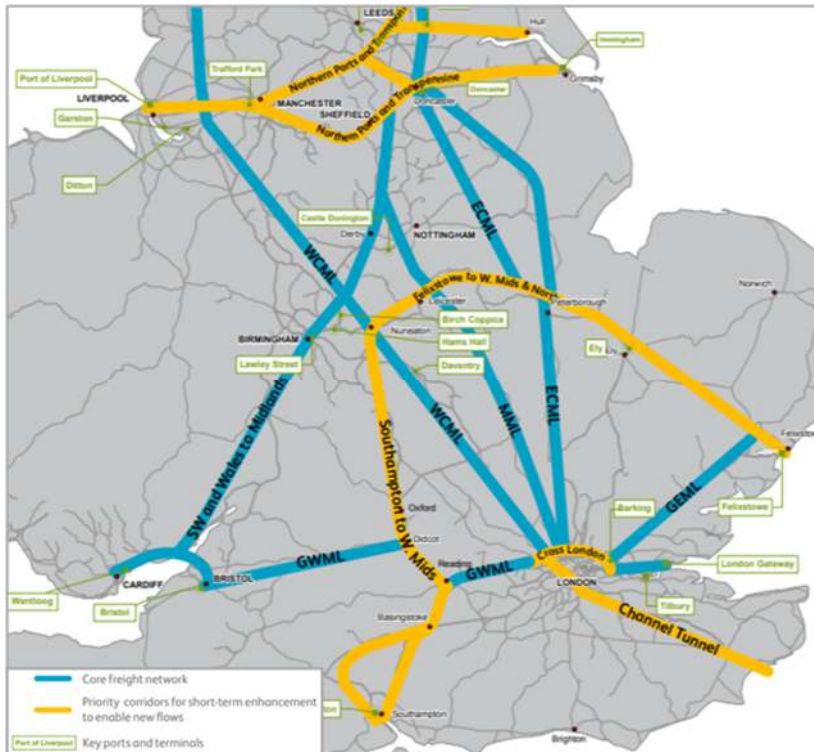
Limiting growth of key ports and sending freight to highways

3.11 The Felixstowe to Nuneaton (F2N) freight corridor provides key connectivity between the Suffolk ports and distribution centres in the Midlands, such as Daventry or Nuneaton. Investment in this corridor is nationally important and the Eastern Section scheme is complementary to that investment in its ability to strengthen connectivity by rail, to the benefit of both people and goods. Both the Port of Felixstowe and Port of Ipswich have ambitions to expand further, but this is constrained by rail capacity to and from each port, even with the recent upgrades to the Felixstowe Branch to increase capacity. In addition, the direct F2N rail route is only cleared for 600m long trains, while other London routes have capability for 775m. These constraints are recognised by Network Rail’s Freight Market Study which predict 48 and 60 daily paths from Felixstowe by 2033 and 2043. This is driving a ‘programme’ approach to infrastructure along the Felixstowe to Midlands and North. Without additional capacity, freight will be distributed inefficiently through the highway network with associated congestion and environmental impacts, as well as a reducing sustainable access to new distribution and warehousing centres such as Milton Keynes.

3.12 Supported by separate investment in the Felixstowe to Nuneaton corridor, EWR, in conjunction with HS2, has the potential to move containers from these strategic ports via rail, avoiding congested cross-London routes and enabling the UK to further capitalise on the economic opportunities associated with increasing volumes of rail freight. EEH and its regional Transport Strategy highlight that EWR is also an important development as it links Southampton to the ‘Golden Triangle’ between Birmingham, Nottingham and Bedford, where multiple National Distribution Centres are located, (making rail more competitive against road) and potentially provides a more direct route from Felixstowe to the Golden Triangle (bypassing other routes through London), relieving the congested London routes.

3.13 The EWR Eastern Section will also contribute to the Government’s decarbonisation agenda and DfT’s Transport Decarbonisation Plan. It is estimated by Network Rail that one freight train can remove 76 HGVs off the highway, meaning for instance that capacity increases from 36 to 47 trains per day could remove up to 215,000 and 250,000 HGV off the road per year if all of these were new services.

Figure 3.6: Core freight network corridors and key priorities



Source: Freight Network Study – Long Term Planning Process, 2017. Network Rail

Figure 3.7: Forecast growth in trains through England’s Economic Heartland and Golden Triangle



Source: England’s Economic Heartland – Freight Study, 2019. WSP.

The case for change

Key findings

- The Eastern Section will play a critical role in supporting growth and connecting people with employment in an attractive and sustainable manner.
- A freight capable EWR can provide resilience to the national rail freight system by complementing the investment made in the Felixstowe-Nuneaton route.

4 The case for change

Contributing to meet growth

Accessing a wider workforce, lowering emissions and supporting freight

4.1 Investment in enhancing the Eastern Section will connect people with jobs and leisure opportunities and will improve business to business connections in Suffolk and Norfolk and throughout the Cambridge to Oxford Arc. This will increase the attractiveness of rail for new and existing residents and facilitate modal shift that will lower emissions. Enhancing the connectivity between the dynamic and growing regional centres will also expand the labour market catchment area with other markets along the Oxford-Cambridge Arc (e.g. Bedford and Oxford), improving access to a £160bn GVA economy (i.e. the Central and Western Sections). This will create new opportunities and wider economic benefits through housing growth, connectivity for jobs and access to a wider workforce across the entire rail corridor.

4.2 The benefits of the scheme will directly contribute to the strategic aims for Suffolk and Norfolk, particularly in terms of residents engaging with the labour market and growth to the economy and will close the gap in productivity between neighbouring regional centres. Figure 4.2 illustrates the economic gap, pre-COVID-19, with GVA per capita (positive axis) and labour productivity (negative axis) for the local authorities within Norfolk, Suffolk, Cambridgeshire and Peterborough. It shows large variations, with some areas performing 50% higher than other areas. When compared to the UK average GVA per capita (for 2017 it was £27k) it shows that parts of Suffolk, Norfolk and Cambridgeshire are underperforming.

4.3 A full EWR scheme that connects South Wales and Bristol to Ipswich and Norwich will generate a significant economic impact in the freight sector, with the key benefits of linking:

- Felixstowe to the South West and South Wales, bypassing the existing routes through London; and

- Felixstowe to the Midlands and North West, bypassing the existing route through Leicester.

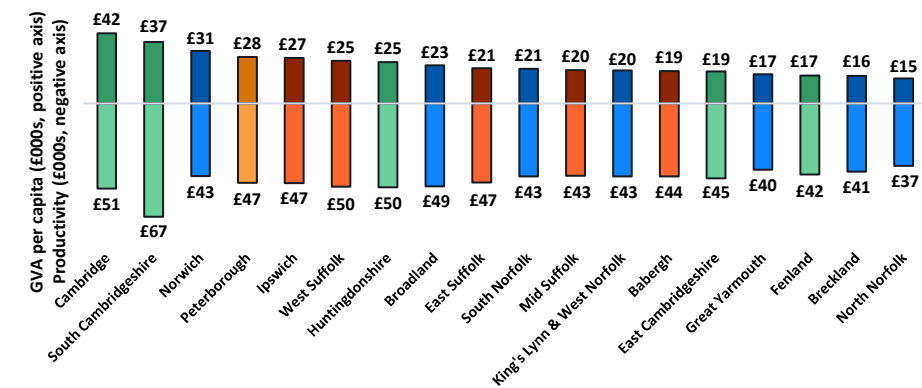
4.4 It would similarly provide capacity relief for services on the Great Eastern/Great Western main lines between Felixstowe and Reading (e.g. freight services from North Thameside) and for services on the East Coast/West Coast main lines between Sandy and London and Bletchley and London.

Figure 4.1: Strategic aims for Norfolk and Suffolk by 2036 (above) and GVA per capita and labour productivity in 2019 (£000s), by local authority (below)



Source: Economic strategy – For growth & opportunity, November 2017. New Anglia LEP.

Figure 4.2: 2017 GVA and Productivity levels in local authority areas



Source: East of England Forecasting Model (EEFM), 2017 baseline results

The objectives and strategic options

Key findings

- Enhancements to the Eastern Section will create new connectivity for passengers and freight.
- It provides an opportunity to capitalise and further deliver value for money from investment in the Central and Western sections.
- Strategic options focus on delivering rail line speed and capacity enhancements and direct connectivity - all of which will be essential to support existing passenger rail demand and create new demand.

5 The objectives and strategic options

The Eastern Section objectives

Aligning the strategic policy goals with the scheme objectives

5.1 Overall, the ambition of the EWR Consortium is to promote and secure a strategic economic rail corridor connecting East Anglia with Central and Western England, including a spur to Aylesbury. This has been the primary objective that has led to funding for the Western and Central Section and is of no less importance for the Eastern Section.

5.2 However, to date, enhancement of the Eastern Section has not been included in business cases and funding decisions. Enhancing the Eastern Section will not only improve passenger service frequency within the region – it also provides a realistic opportunity to improve connectivity of Suffolk and Norfolk wider to the rest of the UK, as well as meeting local, regional and national policies (see Figure 5.1). The following interventions aligns with the objectives of the Eastern Section, as set out on page 7 of this document.

- Improve rail connectivity by making rail journeys faster and easier within the EWR Eastern Section and beyond the corridor;
- Provide capacity to meet passenger and freight long-term demand;
- Contribute to tackling climate change and congestion by removing traffic from inter-regional highway corridors (e.g. from A14); and
- Improve connectivity between economic centres and extend labour catchment areas.

5.3 The Eastern Section objectives align with the relevant local, regional and national policies (outlined in Figure 5.1). The policies have been distilled into themes of Sustainable Economic Growth and Development, Net Zero Agenda and Resilience, and Promoting Equity and

Equality, as shown in Table 5.2, and the Eastern Section objectives have been aligned.

Figure 5.1: Policy framework

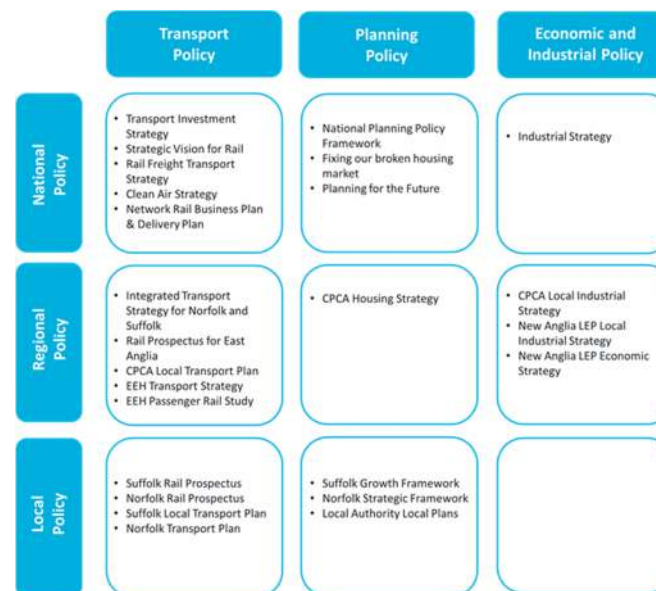


Table 5.2: Eastern Section scheme objectives

Theme	Objectives
Sustainable Economic Growth & Development	Enhance connectivity between the Eastern Section (Norfolk and Suffolk) and locations along the entire EWR route
	Improve connectivity within the Eastern Section by making journeys faster and services more frequent, linking Norfolk, Suffolk and Cambridgeshire better
	Enhance capacity for rail freight, especially from the Port of Felixstowe
	Contribute to achieving the Net Zero agenda by removing traffic from congested inter-regional highway corridors
	Boost economic activity by providing attractive connectivity between economic centres and extending labour catchment areas

Net Zero Agenda	Maintain resilience and reliability of the network
Equity & Inclusion	Provide capacity to meet long-term rail demand growth, particularly that driven by local developments.
Rail Resilience	Maintain resilience and reliability of the network
	Provide capacity to meet long-term rail demand growth, particularly that driven by local developments.

Capitalise on committed rail investment

Maximising the benefits of the Central and Western section

5.4 The EWR Central and Western Sections open a window of opportunity to extend services from Norwich and Ipswich beyond Cambridge to Bedford, Milton Keynes and Oxford, with the potential to expand labour markets and create additional agglomeration. The Central Section, in particular, will enable more direct rail connectivity between Suffolk and Norfolk and the West Coast Main Line and the East Coast Main Line to the south and north of England.

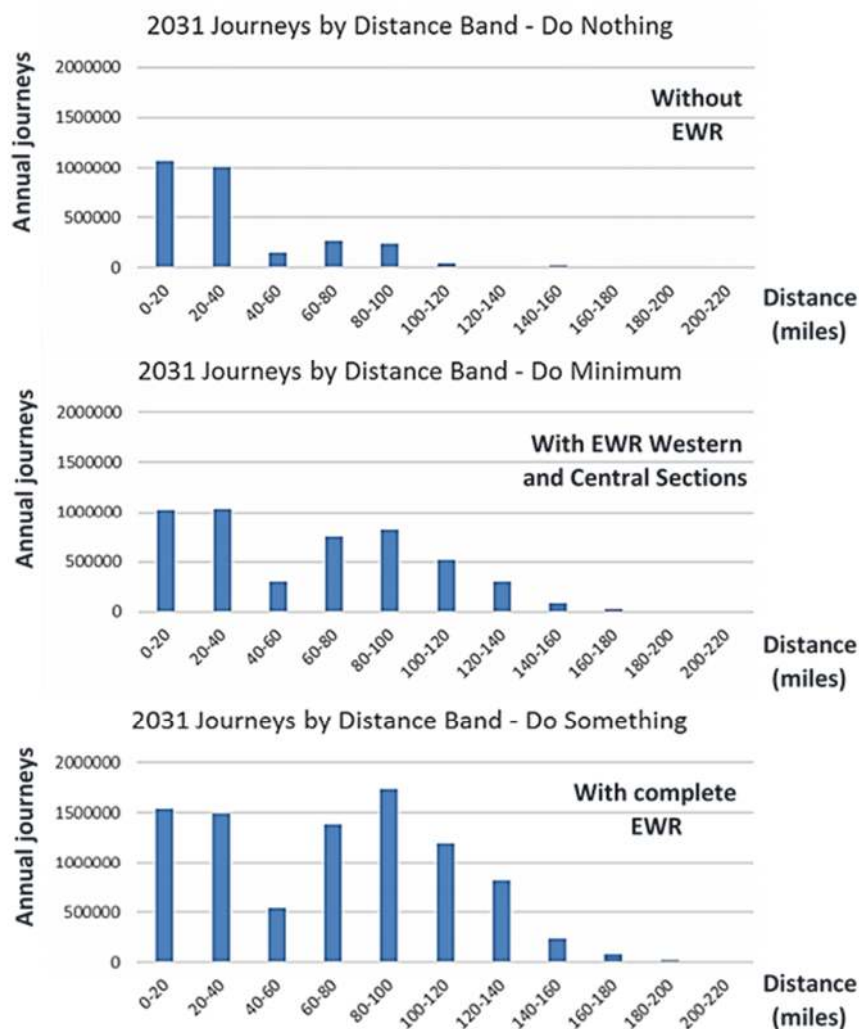
5.5 Current direct rail travel alternatives from Suffolk and Norfolk beyond Cambridge and to other locations are non-existent and involve a much less competitive journey time than that provided by car. This is shown in Figure 5.3, which illustrates the forecast impact on journeys from/to Suffolk and Norfolk with no EWR service (Do Nothing), the Central and Western Section only (Do Minimum), and with the full delivery of the Eastern Section (Do Something). Figure 5.3 clearly shows the transformative impact on longer trips both within and beyond the region with the full EWR scheme.

5.6 Connecting any enhanced services within the Cambridge-Norwich and Cambridge-Ipswich corridors to employment and activity centres served by EWR will also provide more attractive travel opportunities and will expand the catchment area for employers along the corridor, resulting in economic and employment growth and contributing to levelling up. Critically, it also offers the potential for freight traffic from Felixstowe to access the EWR route, bringing with it new trade opportunities for the rest

of the UK. Continued growth in traffic from the deep seaports is placing pressure on cross-London routes between Reading and Ipswich, suggesting an increasingly significant opportunity for EWR to accept off-peak intermodal services to relieve existing pressure. Without rail improvements, the only option for the movement of freight is by road, which contributes to road congestion and safety issues.

5.7 Other committed investments, such as the capacity scheme at Ely and corridor improvements along Felixstowe-Nuneaton delivered to support UK plc, should also seek to capitalise on the benefits of the Eastern Section, either through direct or interchanging services. Investment in rail now will ensure that the goals we want to achieve can be realised, building on this other investment. Enhancement to the Eastern Section also provides an opportunity for other rail schemes to come forward such as improving connectivity from economic centres located on the Western and Central sections of the East West Rail corridor to Suffolk and Norfolk. It will also maximise the enhancement of new rail schemes, such as Soham Station through interconnectivity via Kennet Station and the possibility of further benefits being delivered through a rail link from Suffolk and Norfolk to Cambridge South station.

Figure 5.3: Impact of EWR Eastern Section on longer distance trips by rail (annual journeys by distance band)



Source: East West Rail – Eastern Section: Conditional Outputs Statement, July 2017. Atkins.

Strategic options

Committed schemes and potential package of works

5.8 Investment will be required to address the existing constraints on the Eastern Section to unlock the economic benefit, improve connectivity and meet local, regional and national policies as identified in this document. Four groups of strategic options have been identified that, at this early stage of development, could be considered independently. The packages are considered as follows:

- **Option 1: Line speed improvement** – to support improved journey times, and to take advantage of 100mph rolling stock where the current line speed is typically between 50-70mph (Do Something scenario only)
- **Option 2: Direct connectivity with EWR Central and Western Sections** – to consider the relative costs and benefits of delivering either through-services onto the Central Section instead of interchanging at Cambridge (this is included in the Do Minimum scenario without infrastructure and the Do Something scenario with infrastructure)
- **Option 3: Infrastructure capacity and capability** – to facilitate freight access to EWR and/or more frequent passenger services between Ipswich/Norwich and Cambridge to deliver perceived journey time and passenger capacity improvements (noting the solutions could be quite different).
- **Option 4: Electrification** – the potential for further journey time, operating cost and environmental benefits from the utilisation of electric rolling stock.

5.9 The following groups of scenarios are developed on the basis of these strategic options, which are assessed in the Economic and Financial Cases. These are:

- **Do Nothing** scenario: this includes the current infrastructure and timetable assumptions without any proposed enhancements.
- **Do Minimum** scenario: this adds to the Do Nothing scenario all committed schemes (i.e. those with great certainty of being delivered)

and includes the assessment of a half-hourly Ipswich/Norwich to Cambridge service for all or part of the day on existing infrastructure. It also includes a cross-platform change at Cambridge to access the Central Section and the Haughley Junction and Ely Area Capacity Enhancement Scheme.

- **Do Something** scenarios: these test the impact of the four packages of strategic options above. The assumptions for each scenario are described in further detail in the Economic Case.

Table 5.1: EWR Eastern Section business case scenarios

Scenarios	Assumptions
Do Nothing	<ul style="list-style-type: none"> • Infrastructure as of December 2019 • Timetable as of December 2019
Do Minimum	<ul style="list-style-type: none"> • December 2019 timetable and committed infrastructure: <ul style="list-style-type: none"> – EWR Western and Central section – Ely Capacity Scheme – Haughley Junction improvement • December 2019 timetable and committed timetables (noting the uncertainty around the timetable implications of the EACE scheme)
Do Something	<ul style="list-style-type: none"> • Planned infrastructure: <ul style="list-style-type: none"> – Line speed improvements – Capacity enhancements – Route electrification • Planned timetables: <ul style="list-style-type: none"> – Changes in journey times and frequencies • Connecting services at Cambridge



Eastern Section

Economic and Financial Case



Options to meet the strategic objectives

Key findings

- Delivery of the Eastern Section meets national, regional and local objectives, such as Levelling Up, Low Carbon Growth, net zero carbon, strengthening local and regional economies and enabling a growth in skills and education.
- Investment in the Eastern Section will deliver new housing and open industries in East Anglia to greater investment from businesses across the UK.
- Improvements to rail capacity and journey time on the Eastern Section will complement other rail infrastructure schemes being planned in the region, such as Ely Area Capacity Enhancement, Haughley Junction improvement, and Great Eastern Main Line speed and capacity project.

1 Options to meet the objectives

EWR Eastern Section and its objectives

1.1 EWR will resolve a nationally strategic long-standing connectivity gap, delivering a fast, high-quality railway linking communities and business along the corridor and underpinning sustainable population and employment growth.

1.2 Enhancing the Eastern Section rail connection presents an opportunity to deliver significant transformational benefits along the entire corridor, throughout the route between Oxford and Ipswich and Norwich, opening up new rail connections to economic centres for people and businesses across the entire East West rail route.

1.3 The ambition to deliver this level of enhanced connectivity is directly aligned with and contributes to current Government and HM Treasury priorities:

- **Levelling up:** The Levelling Up Fund guidance published jointly by HM Treasury, the Department for Transport and the Ministry of Housing, Communities & Local Government in March 2021 classify the Local Authorities in the UK by priority grade. Norfolk, South Norfolk, Ipswich and East Suffolk are all priority 2 Local Authorities. Investment in transport that unlocks better connectivity and the associated economic benefits, such as the EWR Eastern Section, has a direct contribution to the levelling up agenda.
- **Net zero emissions and decarbonisation:** the UK is legally required that all greenhouse gas emissions are brought to net zero by 2050. From a transport investment perspective, this is underpinned by

DfT's Transport Decarbonisation Plan. Investment in the Eastern Section directly contributes to the net zero agenda.

- **Changes to the Green Book:** the review of the Green Book, in line with the levelling up agenda and investment-led ambitions for recovery, placed greater emphasis on ensuring that investment focuses on delivering objectives in line with national and regional priorities. The Strategic Case for the Eastern Section presented a strong rationale for delivering transformational connectivity from Ipswich and Norwich through to Oxford, contributing directly to the development of housing and jobs along the corridor.
- **Felixstowe Freeport and Budget 2021:** The Budget 2021 announced an investment-led recovery from the challenges posed by COVID-19, Brexit and the increasing inequality along the UK. As part of this, Felixstowe has been declared a Freeport, which will create 13,000 new jobs and generate £500m for the UK. Delivery of the Eastern Section will contribute to the economic output linked to this decision, by providing greater connectivity for rail freight from the port across to logistic hubs across the UK.

1.4 The EWR Consortium therefore has the ambition that investment is targeted at the Eastern Section so that it can fulfil the following objectives:

1. Enhance connectivity between the Eastern Section (Norfolk and Suffolk) and locations along the entire EWR route;
2. Improve connectivity within the Eastern Section by making journeys faster and services more frequent, linking Norfolk, Suffolk and Cambridgeshire better;
3. Provide capacity to meet long-term rail demand growth, particularly that driven by local developments;
4. Maintain resilience and reliability of the network;

5. Enhance capacity for rail freight, especially from the Port of Felixstowe;
6. Contribute to achieving the Net Zero agenda by removing traffic from congested inter-regional highway corridors; and
7. Boost economic activity by providing attractive connectivity between economic centres and extending labour catchment areas.

1.5 In addition to these objectives there are also opportunities to extend the EWR rail link wider to the growth areas of North Essex, such as Colchester.

Alignment between options and scheme objectives

1.6 The Strategic Case for delivering the Eastern Section of the East West Rail Main Line has identified a need, and opportunity, to increase frequency and journey times, and provide direct connectivity between Suffolk, Norfolk and locations along the entire EWR route.

1.7 In doing so, the Strategic Case for the Eastern Section has considered the constraints that represent a barrier for the delivery of the service enhancements to the passenger rail services. The strategic options developed as part of this business case seek to address these constraints to achieve the objectives described above.

1.8 These options comprise infrastructure and operational enhancements. They include:

- Line speed improvements to achieve quicker journey times;
- Capacity enhancements to achieve more frequent passenger services between Ipswich/Norwich and Cambridge and to allow for freight services;

- Through services at Cambridge to achieve direct connectivity with the EWR Central and Western Sections; and
- Route electrification to contribute to meeting Net Zero targets.

These interventions constitute the core options which have been assessed and are presented in this document. Table 1.1 shows how the options support the delivery of the Eastern Section objectives. All of the options support national ambitions to reduce transport carbon emissions.

1.9 Table 1.1 below illustrates how these interventions are aligned to the objectives.

Compatibility and complementarity with forthcoming investment

1.10 The options identified to deliver the objectives of the EWR Eastern Sections are compatible and complementary with committed and forthcoming rail investment along the EWR corridor. Enhancement to the Eastern Section will work together and deliver synergies to address capacity and capability shortcomings in the area. This is key to ensure that the additional benefits of the Eastern Section add to those of existing investment.

1.11 The principal rail schemes which are complementary and can benefit from enhancement to the Eastern section are below:

- Felixstowe to Nuneaton (F2N) scheme;
- Ely area capacity enhancement (EACE) programme;
- Haughley Junction doubling scheme;
- Wider signalling programmes in the area, including resignalling involved in the above schemes;
- New Cambridge South Station near Addenbrookes Hospital, which would enable a direct link with the hospital from the Norwich corridor; and
- EWR Central and Western Sections.

1.12 The remainder of this Economic and Financial Case is structured as follows:

- Chapter 2: Options and Approach
- Chapter 3: Economic and Financial Appraisal
- Chapter 4: Conclusion and Next Steps.

Table 1.1 shows how the options support the delivery of the Eastern Section objectives. All of the options support national ambitions to reduce transport carbon emissions.

Table 1.1: East West Rail Eastern Section objectives and options

No.	Eastern Section Objective	Improvement category				
		Journey time Improvements	Passenger service frequency	Freight service frequency	Direct connection to Central and Western Sections	Route electrification
1	Enhance connectivity between the Eastern Section (Suffolk and Norfolk) and locations along the entire EWR route	●	●		●	
2	Improve connectivity within the Eastern Section by making journeys faster and services more frequent, linking Suffolk, Norfolk and Cambridgeshire better	●	●			
3	Provide capacity to meet long-term rail demand growth, particularly that driven by local developments		●			
4	Maintain resilience and reliability of the network		●	●		
5	Enhance capacity for rail freight, especially from the Port of Felixstowe			●	●	
6	Contribute to delivering the Net Zero carbon emissions agenda by removing traffic from congested inter-regional highway corridors	●	●	●	●	●
7	Boost economic activity by providing attractive connectivity between economic centres and extending labour catchment areas	●	●	●	●	

Summary of options and approach

Key findings

- Value for money and strategic objectives can be achieved from investment in enhancing the existing rail lines that comprise the Eastern Section.
- Further studies will show the wider economic benefits, which will build upon an already strong business case demonstrated in this Pre-SOBC for investment in the Eastern Section.

2 Summary of options and approach

2.1 This chapter summarises the options appraised and sets out how the analysis has been conducted, describing the approach to assess passenger and freight benefits along with the operating and capital costs that have been included.

Summary of options and scenarios

2.2 The economic appraisal of rail enhancement options on the Eastern Section assesses the economic impact of each scheme option, monetising the value of these impacts where possible. These impacts include rail user benefits (e.g. journey time or frequency benefits), non-user benefits (e.g. environmental or decongestion benefits), operator financial impacts (e.g. additional costs and revenues generated by the scheme) and capital costs of the option.

2.3 The benefits presented in this document are assessed against costs and are incremental to the baseline scenario. The baseline scenario is typically named “Do Minimum” scenario and the scenarios which include the planned interventions are named “Do Something” scenarios. These are described in more detail in the following section.

2.4 Table 2.1 presents the rail enhancement scenarios which have been included in the Economic and Financial Case analysis.

Limitations of the analysis

2.5 It should be noted that the latest update to Green Book guidance highlights the importance of both monetised and non-monetised benefits in the Value for Money assessment, which extends beyond the Benefit Cost Ratio (BCR).

2.6 The purpose of the Pre-SOBC is to demonstrate the strategic rationale and the Value for Money potential for enhancing the Eastern Section, informing the decision to take the scheme to the next development stage. Therefore, the level of detail of the economic analysis fits with the Green Book guidance. The Pre-SOBC provides the first step to understanding whether a transport scheme has a business case. This means it provides a foundation on which subsequent business cases can interrogate data in more detail. This includes:

Use of MOIRA

2.7 The economic appraisal of ‘Level 1’ benefits (journey time, frequency and non-user benefits) is based on MOIRA, which is the industry tool to assess the impact of incremental benefits i.e. where there is an existing viable rail option and an established market. This is a robust and well-established tool for incremental impacts on existing routes such as between Cambridge, Ipswich and Norwich.

2.8 However, MOIRA may not accurately represent the demand and benefits of new rail links, as is the case for tracking demand between Suffolk/Norfolk and the EWR Central and Western Section. While there is some evidence available from a gravity model developed by the East West Rail Company in the context of the Central and Western Section, there was no access to it as part of this work and it is not used in the economic appraisal. Therefore, the benefits of journeys between Suffolk and Norfolk beyond Cambridge are likely to be under-represented in MOIRA and the Value for Money assessment presented in these scenarios is likely to be a lower bound estimate.

Timetable and performance analysis

2.9 The Pre-SOBC has been based on indicative timetable analysis, proportionate to the level of development of this business case and sufficient to highlight the potential of the different options. Likewise,

performance analysis has not been performed as part of this business case.

2.10 Subsequent stages of the business case will consider in more detail the timetabling and performance of trains as a result of infrastructure proposals. Road network congestion

2.11 Under “Do Minimum” scenario conditions, the road network level of service will increasingly deteriorate as a result of planned growth and rising pressures on the roads. This would result in making rail services more attractive, especially as enhanced connectivity is provided by investment in the Eastern Section.

2.12 This is not explicitly modelled in the economic appraisal, beyond TAG’s standard approach to estimate road decongestion benefits which are based on a UK-wide level of road congestion. Any context-specific evidence for higher levels of road congestion would result in higher benefits and would increase the Value for Money categorisation of the scheme.

Wider Economic Impacts

2.13 Direct connectivity between Ipswich and Norwich through to Oxford would result in transformational impacts in the levels of connectivity for people and businesses and the associated benefits on the economy and levels of productivity.

2.14 This will result in Wider Economic Impacts (e.g. agglomeration, labour supply and imperfect competition benefits). However, these have not been appraised at this stage of the scheme development process. Therefore, the Value for Money categorisation of the options are likely to be higher if Wider Economic Impacts were considered.

Scenarios

Do Minimum Scenario

2.15 The Do Minimum scenario is a combination of the existing rail services, committed rail enhancements and other proposed interventions that have a reasonable likelihood of progressing.

2.16 The benefits associated with these interventions have already been considered as part of other business case work for different schemes. This includes rail enhancements to deliver capacity improvements at Ely for freight and passenger rail services and for improving the operation of Haughley Junction. Both schemes are committed schemes that will be able to benefit from and support the Eastern Section scheme. Therefore, the benefits for those schemes are captured as part of the Do Minimum scenario.

2.17 The existing services and committed enhancements considered in the Do Minimum are the following:

- Existing services as of December 2019 with a half-hourly Ipswich/Norwich to Cambridge passenger rail service assessed using current infrastructure.
- Committed frequency enhancements to Ipswich to Peterborough services, which see the service increase to one train per hour.
- Haughley Junction capacity improvement.
- Felixstowe to Nuneaton (F2N) rail route enhancement for freight traffic, given that it is a national, regional and local aspiration for the corridor.
- The EWR Central Section between Cambridge and Bedford. While funding for the Central Section is not yet committed and there is still uncertainty over the precise route, there is reasonable likelihood that it will go ahead, therefore the potential connectivity benefits for the Eastern Section have been represented in the Do Minimum

scenario. Four trains per hour between Oxford and Cambridge via Bedford have therefore been considered in the Do Minimum scenario.

- In relation to the EWR Central Section, it is worth highlighting that the Do Something options that consider direct services between Ipswich and Norwich to Oxford are based on extending two of the services planned in the Central Section towards Ipswich and Norwich. Therefore, no additional services are assumed on the Central Section. It is acknowledged that scope clarity around Cambridge is currently being developed and this will need to be factored into future iterations of the business case.

2.18 In addition to the above committed enhancements, it should be noted that there are historic infrastructure constraints that have not yet been committed but which are part of ongoing discussions. These include platform capacity at Ipswich and Norwich, as well as Trowse Bridge capacity improvements. Likewise, certain level crossing interventions might already be covered by the F2N rail enhancement scheme, however, this is not taken into account in this analysis.

2.19 Whilst they are not explicitly included in the Do Minimum scenario, as they are not committed, it is likely they these interventions will be triggered beyond the needs of the Eastern Section. Exclusion of the capital costs for these interventions, which are currently included in the economic appraisal for the Eastern Section, would significantly improve the Value for Money categorisation of the scheme. This should be explored in more detail as part of the next stage of scheme development.

2.20 The business case has assumed committed growth identified in Local Plans. Equally, subsequent stages of the business case will need to explore with respective local planning authorities the impact of longer-term spatial options for growth. This might include consideration of a

large development near Six Mile Bottom, which has not been included in this economic appraisal.

Do Something Scenario

2.21 The Do Something scenario options includes the four strategic options as set out on page 30 for line speed improvements, passenger rail service frequency improvements and capacity enhancements and electrification. Likewise, these interventions are matched with their expected benefits, which are presented on the bottom row of the table header.

2.22 In addition to the options in the Do Something scenario, a further option is tested on the Norwich-Cambridge route. It includes a semi-fast service between these two locations via Bury St Edmunds. This service would run on an entirely new route, following the Cambridge-Ipswich line until Haughley Junction where it would use a short section of new track to join the Great Eastern Main Line to Norwich via Diss.

2.23 This option provides additional benefits which have not been monetised as part of this document, which should be taken into account when looking at the Value for Money assessment for the option, including monetised and non-monetised benefits.

2.24 These additional benefits include providing a better rail service provision to places with high planned development and population growth (e.g. Diss), while avoiding the need to run additional trains through the congested Ely area, resulting in reliability and performance benefits around Ely. However, in combination with some of the Suffolk options, this option may place additional constraints onto the Ipswich corridor. The Strategic Options are set out on page 29 of this document.

2.25 Consistent with the level of detail of this Pre-SOBC, a number of infrastructure assumptions were used for the Value for Money

assessments, as explained on page 47. Subsequent business cases will need to consider these assumptions in more detail. They include:

- Any infrastructure enhancements around Cambridge or at the station, which are assumed to be delivered as part of the EWR Central;
- Gauge clearance requirements for the Newmarket tunnel and land requirements;
- Stabling infrastructure costs;
- A cost allowance for enhancing level crossings has only been considered in relation to higher line speeds, but not in relation to additional frequency. This will need to be considered further at stages of the business case. It is thought that there is an opportunity to combine level crossing and signalling assessments being undertaken between Ipswich and Ely as part of the Ely Area Capacity Rail Study. Discussions are ongoing between Suffolk County Council, Network Rail and the Department for Transport;
- Additional platforms at Ipswich and Norwich Station.

Table 2.1: Summary of Strategic Options

- Connectivity with EWR Central & Western Sections
- Connectivity within EWR Eastern Section
- Capacity to meet passenger growth
- Capacity to meet freight growth
- Network resilience and reliability
- Achieve Net Zero agenda
- Boost economic activity

No	Rail service Option	Stopping pattern	Objectives met by each scenario	Strategic Options					
				Direct Connection to EWR Central & Western Sections	Line Speed Improvements	Passenger Capacity Enhancement	Freight Capacity Enhancement	Electrification	Infrastructure capability
Ipswich – Cambridge									
1	Existing service frequency – reduced journey time from LSI. *	Existing stopping pattern		✗	✓	✗	✗	✗	✗
2	Additional semi-fast train to/from Cambridge. **	One stopping, one semi-fast		✗	✓	✓	✗	✗	✗
3	Additional semi-fast train to/from Oxford to Ipswich. **	One stopping, one semi-fast		✓	✓	✓	✗	✗	✗
4	As per option 3 with electrification journey time benefits.	One stopping, one semi-fast		✓	✓	✓	✗	✓	✗
5	As per option 3 with additional freight path benefits.	One stopping, one semi-fast		✓	✓	✓	✓	✗	✗
Norwich – Cambridge									
1	Existing service journey time decreased by LSI.	Existing stopping pattern		✗	✓	✗	✗	✗	✗
2	Additional semi-fast train to/from Cambridge and LSI benefits.	One stopping, one semi-fast		✗	✓	✓	✗	✗	✗
3	Additional semi-fast train to/from Oxford to Norwich and LSI benefits.	One stopping, one semi-fast		✓	✓	✓	✗	✗	✗
4	As per the option above with electrification journey time benefits.	One stopping, one semi-fast		✓	✓	✓	✗	✓	✗
5	Additional train to/from Cambridge via Bury St Edmunds and LSI benefits.	One stopping, one semi-fast		✗	✓	✓	✗	✗	✓
* This option, as a standalone option, was excluded from the economic and financial appraisal as initial analysis shows that 100mph operation on this route does not generate benefits for existing services.									
** These options have three sub-options (a, b, and c) which incorporate different infrastructure solutions for the Newmarket Capacity Scheme. These are explained in greater detail in Table 2.3.									

Approach to economic and financial appraisal

2.26 Analysis of the options are consistent with DfT’s Transport Appraisal Guidance (TAG). The costs and benefits of each option have been collated in an economic and financial appraisal model which applied TAG methodology and parameters, consistent with the most recent release in July 2020, in order to process the outputs and calculate a benefit cost ratio (BCR) and financial affordability of each option.

2.27 Although the economic benefit modelling has monetised non-user benefits, i.e. marginal external costs, the ‘full cost’ of carbon emission reduction has not been quantified at this stage and will be the subject of further analysis as part of the full SOBC development.

2.28 The methodology, assumptions and results of the economic and financial appraisal are described in more detail in the Appraisal Modelling Report, which is attached as an appendix to this document.

2.29 Table 2.2 shows the components that make up the BCR and whether they are included as a benefit or a cost. It should be noted that incremental revenue is included on the cost side of the BCR in line with TAG guidance, as it partially offsets the additional operating cost incurred.

Table 2.2: Components of the BCR

Line item	Benefit/cost	Notes
Timetable benefits	Benefit	The time benefits to existing and new passengers resulting from changes in journey time, frequency and direct services.
Marginal external costs (MECs)	Benefit	Changes impacting non-rail users driven by mode transfer between road and rail. These include road congestion, road accidents, local air quality, noise and greenhouse gases.

Line item	Benefit/cost	Notes
Freight benefits	Benefit	The environmental benefits of moving freight from road to rail. Calculated as a Marginal External Cost (MEC).
Indirect tax	Benefit	Changes in indirect tax driven by mode shift between road and rail and change in rail traction power. This is typically a negative benefit through reduced fuel tax payments.
Operating costs	Cost	Changes in operating costs driven by timetable, rolling stock fleet, etc.
Capital costs	Cost	The capital cost of constructing the Eastern Section.
Fare revenue	Cost	Changes in fare revenue driven by timetable benefits. Negative cost assumed to offset operating costs.

2.30 The following sections summarise how three key aspects of the BCR are calculated: timetable benefits (including demand and revenue), freight benefits and cost estimates (operating and capital).

Timetable benefits, demand and revenue

2.31 MOIRA has been used to forecast the demand, journey time and revenue impacts of the proposed EWR Eastern Section options. However, as noted in paragraphs 2.7 and 2.8, MOIRA presents a number of limitations particularly in the case of new rail links (e.g. journeys from Ipswich/Norwich towards Oxford using the EWR Central Section), so the impacts estimated using MOIRA are likely to be underestimates.

2.32 MOIRA calculates a Generalised Journey Time (GJT) between every station pair in the Do Minimum and Do Something timetables. GJT is a measure of journey time which comprises:

- The journey time between stations;

- A frequency penalty which increases as the interval between services increases; and
- An interchange penalty if passengers need to change trains to reach their final destination.

2.33 A change in GJT as a result of the Do Something option is calculated through comparison with the Do Minimum GJT data. MOIRA combines this with existing demand data to calculate a journey time benefit/disbenefit for existing users of the rail network.

2.34 Improvements in the service offered attract new rail demand. To calculate this new demand, MOIRA uses demand elasticities sourced from the Passenger Demand Forecasting Handbook (PDFH). In calculating this benefit, and the additional revenue generated by new passengers, the 'rule of a half' is used as per TAG guidance. The 'rule of half' benefit calculation assumes new railway users derive the full benefit and existing users derive half the benefits.

2.35 The additional revenue generated through an increase in rail journeys is also calculated in MOIRA, based on a combination of the forecast generated demand and existing average yields (i.e. revenue per journey) for each pair of stations on the network.

2.36 Exogenous growth in rail demand - that is, growth driven by external factors including population and economic development - has been estimated and applied to the demand data. Planned housing developments have also been considered.

2.37 New rail demand associated with these housing developments has been assumed to have a similar characteristics of travel as current demand (i.e. same number of trips per head of population around the station). This assumption plans for the 'worst case scenario' as in the context of a deteriorating road network and an increasingly attractive rail

service, the levels of travel are likely to be higher than assumed, improving the Value for Money of the scheme.

Freight benefits

2.38 A key objective presented in the Strategic Case is to enhance capacity for rail freight, especially from the key port of Felixstowe which could gain additional capacity from the EWR Eastern Section scheme.

2.39 The monetised benefit of additional freight capacity has been included in the appraisal through the DfT Marginal External Costs approach, which calculates the non-user benefits of freight being transported on rail instead of road. This includes annual lorry kilometres avoided, a highway decongestion benefit, and other external benefits including reductions in accidents.

2.40 It is noted that the delivery of freight services onto the EWR Central Section is likely to require an additional chord at Bletchley and potentially at Shepreth Junction. There is therefore an opportunity to capture this requirement in future rail freight projects that may come forward along the corridor as well as in the context of wider rail freight strategies.

Cost estimates

2.41 The costs of each option depend on the interventions required to enable service improvements such as higher line speeds, improved service frequencies or electrification.

2.42 Operating costs vary based on the mileage and hours of service involved in each option, which are combined with known operating prices of existing rolling stock to forecast the incremental cost. As a result, service patterns which include higher frequencies, or which take longer routes, incur greater staff, rolling stock lease and maintenance, track

access and fuel costs. Electrification also impacts operating costs due to changes in fuel costs and fuel duty.

2.43 The capital costs of each option vary based on the infrastructure improvements required to enable higher line speeds, improved service frequencies or electrification. Because of the high costs of infrastructure investment, this variable has a large impact on whether an option constitutes value for money.

2.44 Table 2.3 provides a summary of the infrastructure interventions that have been considered for the Eastern Section (both on the Ipswich line and Norwich line), the purpose which they serve, and the options which require them. These interventions make up the Do Something scenario and are additional to the improvements assumed to be part of the Do Minimum.

2.45 However, while these signalling programmes are acknowledged, a detailed assessment of signalling needs has not yet been undertaken. The approach assumes a cost allowance to address signalling needs, recognising that there might be a degree of overlap with existing investments, to be investigated at subsequent stages of the work.

2.46 Table 2.4 summarises the capital costs, tested under the Do Something scenario, by option, broken down by intervention and provided in 2020 prices. These costs are prior to inclusion of optimism bias, which is typically added to capital cost estimates at early development stages to reflect the uncertainty inherent to early cost estimates.

2.47 It should be noted that three alternative options to deliver additional capacity between Ipswich and Cambridge have been assessed: a dynamic loop near Six Mile Bottom, double tracking between Cambridge and Newmarket and double tracking including doubling the Newmarket Tunnel.

2.48 Although 100mph line speeds were not modelled as a standalone option on the Ipswich-Cambridge route due to physical limitations preventing 100mph operation, the engineering assessment determined that a small number of line speed improvements could be made. Therefore, a small capital cost associated with these improvements has been included in the capital cost estimates for all options on this route.

2.49 Consistent with the level of detail of this Pre-SOBC, a number of capital cost assumptions were used for the Value for Money assessments. Subsequent development stages will need to consider these in more detail:

- Any infrastructure enhancements around Cambridge or at the station are assumed to be delivered as part of the EWR Central Section and, therefore, are not included in this assessment.
- Gauge clearance requirements for the Newmarket tunnel, land requirements, as well as timetable flexibility benefits offered by each of the additional capacity interventions, will need to be further explored.
- Stabling infrastructure costs have not been included.
- A cost allowance for enhancing level crossings has only been considered in relation to higher line speeds, but not in relation to additional frequency. This will need to be considered further at stages of the business case, it is thought that there is an opportunity to combine level crossing and signalling assessments being undertaken between Ipswich and Ely as part of the Ely Area Capacity Rail Study. Discussions are ongoing between Suffolk County Council, Network Rail and the Department for Transport.
- Platform interventions at both Ipswich and Norwich will need to be assessed in more detail at the next business case stage.

Table 2.3: Description of infrastructure interventions relating to the four strategic options

Intervention	Purpose	Ipswich-Cambridge							Norwich-Cambridge					
		+1tph to Cambridge Connectivity (Option 2 & 3)			+1tph to Oxford Connectivity (Option 2 & 3)			Electrification (Option 4)	Freight (Option 3)	Line speed impr. (Option 1)	+1tph to Cambridge Connectivity (Option 2 & 3)	+1tph to Oxford Connectivity (Option 2 & 3)	Electrification (Option 4)	+1tph via Bury
		Loop	Double track	Double track & tunnel	Loop	Double track	Double track & tunnel							
Line Speed Improvement (100mph)	Infrastructure works to upgrade line speed. Includes relaying track, increasing curve radii, level crossing improvements, etc.	●	●	●	●	●	●	●	●	●	●	●	●	●
Newmarket Capacity (Option A) ⁶	Doubling a small section of track around Six Mile Bottom to provide a dynamic loop. Allows services in opposing directions to pass each other without stopping.	●			●									
Newmarket Capacity (Option B)	Doubling all track between Cambridge-Newmarket, excluding the Newmarket tunnel. Provides more timetable and operational flexibility.		●			●								●
Newmarket Capacity (Option C)	Doubling all track between Cambridge-Newmarket, including the Newmarket tunnel. Provides more timetable and operational flexibility and makes space for Overhead Line Electrification and freight gauge clearance in the tunnel.			●			●	●	●					
Chippenham to Haughley Jct. Signalling	Upgrading signalling to European Rail Traffic Management System (ERTMS) standards. May be required to provide timetable flexibility to improve frequency.	●	●	●	●	●	●	●	●					●

⁶ Three capacity options are presented around the Newmarket section of the route. These include the delivery of a dynamic loop (option A), double tracking excluding Newmarket tunnel (option B) and including Newmarket tunnel (option C). While in principle all the options enable frequency enhancements along the corridor, option B generates further operational resilience and option C provides scope for additional freight services and electrification to run on the corridor, subject to a more detailed assessment of whether this would be possible under options A or B.

Table 2.4: Capital costs by option, prior to including optimism bias (£m, 2020 prices, rounded to the nearest £5m)

Intervention	Ipswich-Cambridge								Norwich-Cambridge				
	+1tph to Cambridge			+1tph to Oxford			Electrification	Freight	Line speed impr.	+1tph to Cambridge	+1tph to Oxford	Electrification	+1tph via Bury Loop
	Loop	Double track	Double track & tunnel	Loop	Double track	Double track & tunnel							
Line Speed Improvement (100mph)	5	5	5	5	5	5	5	5	20	20	20	20	5
Newmarket Capacity (Option A)	5	-	-	5	-	-	-	-	-	-	-	-	-
Newmarket Capacity (Option B)	-	30	-	-	30	-	-	-	-	-	-	-	30
Newmarket Capacity (Option C)	-	-	135	-	-	135	135	135	-	-	-	-	-
Chippenham to Haughley Jct. Signalling	15	15	15	15	15	15	15	15	-	-	-	-	15
Haughley Jct. North-West Chord	-	-	-	-	-	-	-	-	-	-	-	-	10
Coldham Jct. to Haughley Jct. Electrification	-	-	-	-	-	-	65	-	-	-	-	-	-
Ely to Trowse Jct. Signalling	-	-	-	-	-	-	-	-	-	25	25	25	-
Trowse Jct. Capacity	-	-	-	-	-	-	-	-	-	60	60	60	60
Trowse Swing Bridge Doubling	-	-	-	-	-	-	-	-	-	60	60	60	60
Norwich Platform Capacity	-	-	-	-	-	-	-	-	-	30	30	30	30
Ely North to Trowse Jct. Electrification	-	-	-	-	-	-	-	-	-	-	-	100	-
Design and development costs (20%) ⁷	5	10	30	5	10	30	45	30	5	40	40	60	40
Total capital scheme costs	30	70	185	30	60	185	265	185	25	235	235	355	250

⁷ These additional costs include Network Rail Management Costs, inflation, consultant fees, but exclude land costs. A 20% allowance has been assumed for the Pre-SOBC.

Economic and financial appraisal

Key findings

- Additional direct semi-fast services from Ipswich and Norwich to Oxford via Cambridge represents High Value for Money.
- Investment in the Eastern Section has benefits for the delivery of other rail projects in the region.

3 Economic and financial appraisal

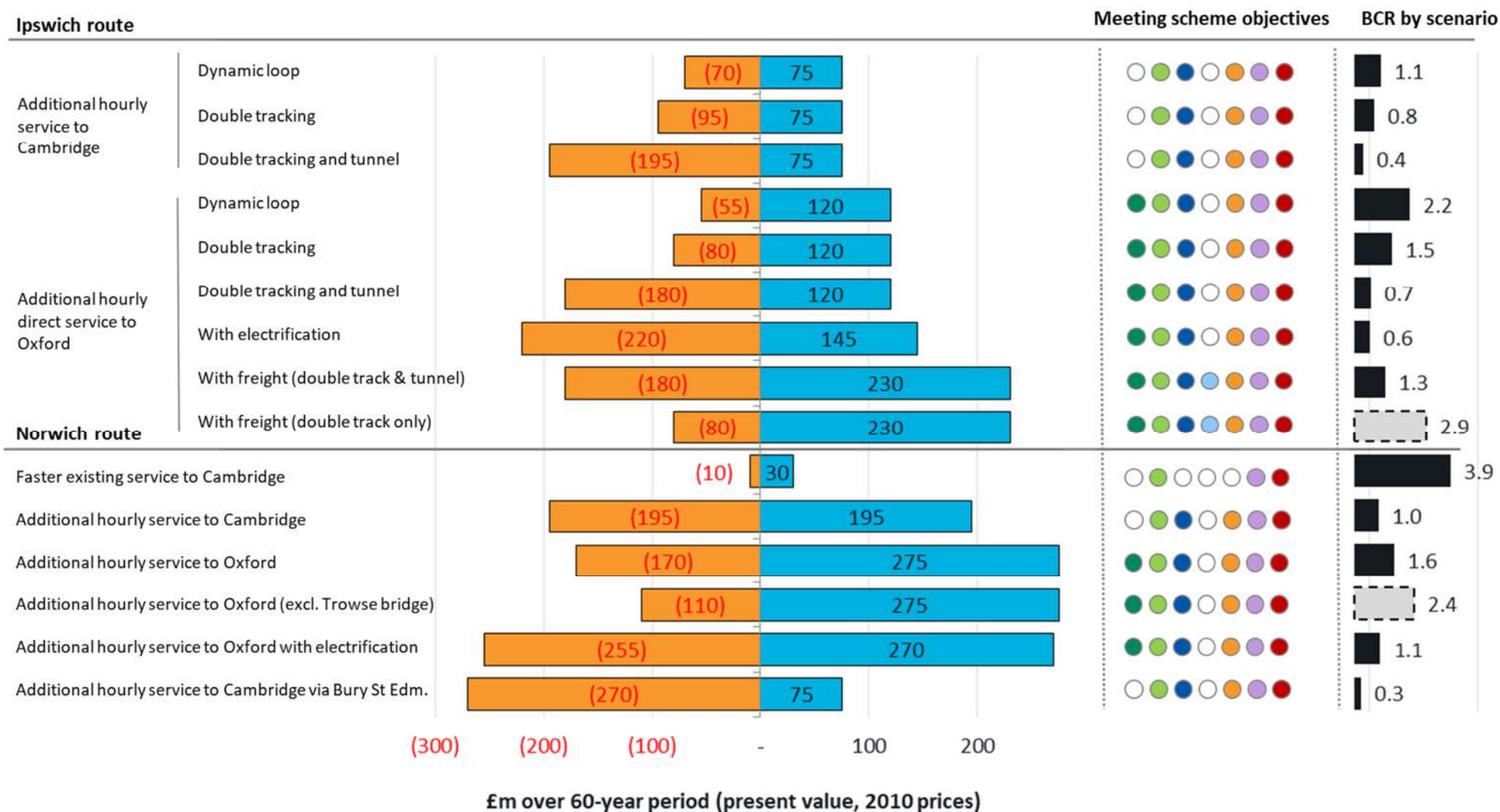
3.1 This chapter summarises the overall results of the economic and financial appraisal, before presenting the results for each option in more detail.

Appraisal results

3.2 Figure 3.1 summarises the results of the economic and financial appraisal, including Benefit Cost Ratios (BCRs) for each option. Where the Present Value Benefits (PVB) is larger than the Present Value Costs (PVC), the BCR is greater than 1.

3.3 The subsequent pages explain the results for each option in more detail, summarising benefits, costs and appraisal results. They also present the financial balance for each option, with revenues compared to costs.

Figure 3.1: Summary of economic appraisal results (£m, Present Value 2010 prices over 60 years)



■ Benefits (PVB) ■ Costs (PVC) ■ Benefit Cost Ratio (BCR) [---] Sensitivity test

- Connectivity with EWR Central & Western Sections
- Network resilience and reliability
- Connectivity within EWR Eastern Section
- Achieve Net Zero agenda
- Capacity to meet passenger growth
- Boost economic activity
- Capacity to meet freight growth

Additional train per hour between Ipswich and Cambridge: This option includes increased service frequencies, with an additional semi-fast service every hour between Ipswich and Cambridge in addition to the existing stopping service. Three different infrastructure options to deliver additional infrastructure capacity have been tested.

Summary of key benefits and costs for service between Ipswich and Cambridge

3.4 The majority of the journey time and frequency benefits are expected to be experienced by passengers travelling between **Cambridge and Ipswich, Newmarket and Bury St Edmunds**, resulting from **reductions in journey time of 20% to 25%**. Figure 3.2 presents demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand of around 190,000 passengers** and would result in socioeconomic **benefits of £77m** over 60 years (present value).

3.5 The proposed interventions would incur a **capital expenditure** ranging from **£21m** (loop), **£45m** (double tracking) to **£145m** (double tracking including Newmarket tunnel). The additional services would require ongoing operating subsidy: for 2035, additional **operating costs** are **£11m** whilst additional **revenue** is **£2m**, with a resulting **£9m** which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

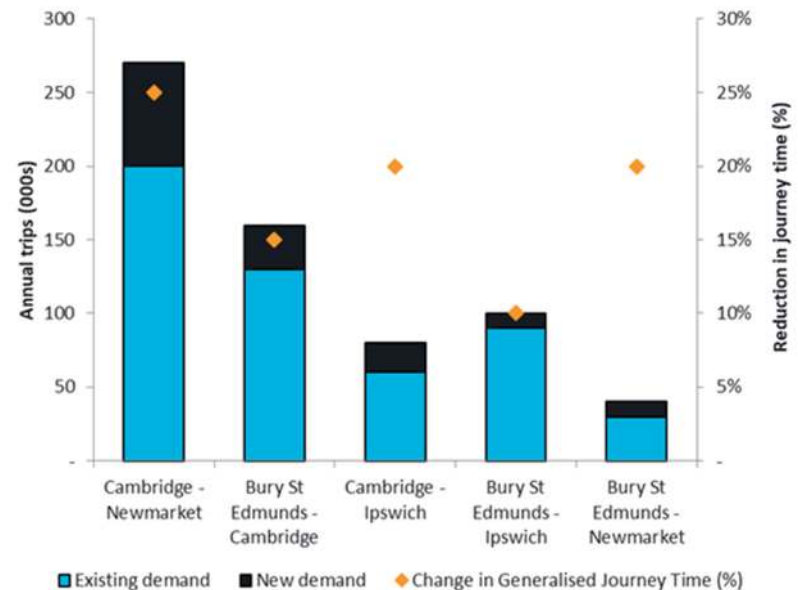
Economic appraisal results

The economic appraisal results are shown in Table 3.1

Table 3.1: 60-year economic appraisal (£m, 2010 present value) 1tph Cambridge-Ipswich

Component	Dynamic loop	Double track	Track & tunnel
Present Value Benefits	£77m	£77m	£77m
Present Value Costs	£73m	£97m	£197m
Capital costs	£21m	£45m	£145m
Operating costs	£76m	£76m	£76m
Revenue	(£24m)	(£24m)	(£24m)
Benefit Cost Ratio	1.1	0.8	0.4

Figure 3.2: Demand/journey time change for top 5 flows (1tph Cambridge-Ipswich)



Value for Money assessment

3.6 Capacity enhancements along the Ipswich-Cambridge corridor enabling an additional fast train an hour contribute to meeting the connectivity and capacity objectives of the EWR Eastern Section.

3.7 Economic appraisal of the proposed intervention has resulted in BCRs of 1.1, 0.8 and 0.4 for each of the three capacity scheme options (low to poor Value for Money). These interventions would also need additional operating subsidy.

Summary of key benefits and costs- through-service between Ipswich and Oxford

3.8 Journey time and frequency benefits are similar to the previous option, with additional benefits taking place between Suffolk and locations within the EWR Central Section (e.g. Oxford) and beyond. Figure 3.3 presents demand and journey time changes for key flows. The proposed rail service changes would generate an annual increase in demand of around 210,000 passengers and would result in socioeconomic benefits of £120m over 60 years (present value).

3.9 The proposed interventions would incur a capital expenditure ranging from £21m (loop), £45m (double tracking) to £145m (double tracking including Newmarket tunnel).

3.10 The additional services would require ongoing operating subsidy: for 2035, additional operating costs are £11m whilst additional revenue is £3m, with a resulting £8m which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs is not a true figure of the level of revenue that is likely to generate.

Economic appraisal results

The economic appraisal results are shown in Table 3.2.

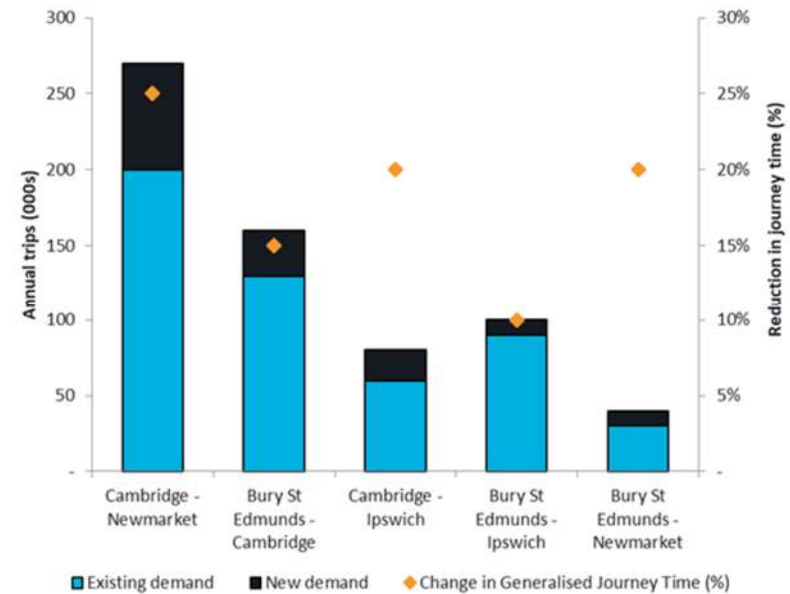
Table 3.2: 60-year economic appraisal (£m, 2010 present value) 1tph Oxford-Ipswich

Component	Passing loop	Double track	Track & tunnel
Present Value Benefits	£120m	£120m	£120m
Present Value Costs	£56m	£80m	£180m
Capital costs	£21m	£45m	£145m
Operating costs	£76m	£76m	£76m

Revenue	(£41m)	(£41m)	(£41m)
Benefit Cost Ratio	2.2	1.5	0.7

3.11

Figure 3.3: Demand/journey time change for top 5 flows (1tph Oxford-Ipswich)



Value for Money assessment

3.12 Capacity enhancements along the Ipswich-Cambridge corridor enabling an additional fast train per hour direct to Oxford contribute to the connectivity and capacity objectives along the entire EWR route. The double track option may ensure greater operational resilience for the network than the passing loop, though this resilience was not modelled.

3.13 Economic appraisal of the proposed interventions has resulted in BCRs of 0.7, 1.5 and 2.2 for each of the three capacity scheme options (poor

to high Value for Money). These interventions would also need additional operating subsidy.

Additional train per hour between Ipswich and Oxford plus electrification: This option includes the service patterns in the previous option, plus the journey time

Summary of key benefits and costs – Ipswich to Oxford through-service with electrification

3.14 Electric trains reduce journey times thanks to faster acceleration, with a further **5% reduction in journey times** experienced by passengers travelling **to and from Bury St Edmunds** on top of the benefits from the previous option. Figure 3.4 presents demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand** of around **240,000 passengers** and would result in socioeconomic **benefits of £143m** over 60 years (present value).

3.15 The proposed interventions would incur a **capital expenditure of £205m**, including double tracking within the Newmarket tunnel. Operating costs savings result from lower lease costs for electric trains and energy savings fuel duty. The additional services would require ongoing operating subsidy: for 2035, additional **operating costs** are **£10m** whilst additional **revenue** is **£3m**, with a resulting **£7m** which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

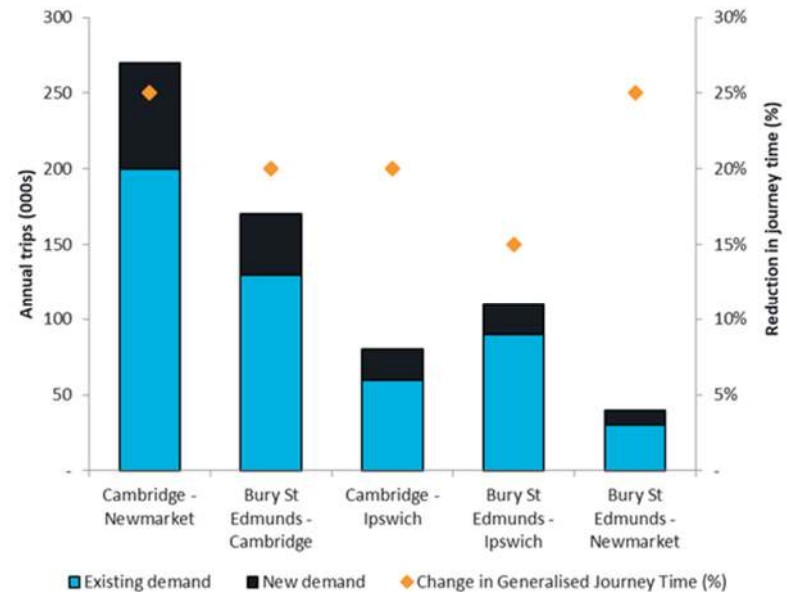
Economic appraisal results

The economic appraisal results are shown in Table 3.3

Table 3.3: 60-year economic appraisal (£m, 2010 present value) 1tph Oxford-Ipswich with electrification

Component	Electrification
Present Value Benefits	£143m
Present Value Costs	£224m
Capital costs	£205m
Operating costs	£69m
Revenue	(£50m)
Benefit Cost Ratio	0.6

Figure 3.4: Demand/journey time change for top 5 flows (1tph Oxford-Ipswich plus electrification)



Value for Money assessment

3.16 Capacity enhancements and electrification along the Ipswich-Cambridge corridor contribute to meeting the connectivity, capacity and Net Zero objectives of the EWR Eastern Section.

3.17 Economic appraisal of the proposed intervention has resulted in a BCR of 0.6 (Poor Value for Money). Although the benefits are greater than previous options, they are outweighed by high capital costs associated with electrification. This intervention would need additional operating subsidy. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs is not a true figure of the level of revenue that is likely to generate.

Additional train per hour between Ipswich and Oxford plus freight benefits: This option includes additional fast services extended to Oxford along the EWR Central Section, plus improved capacity for freight. Because accommodating extra freight paths requires the Newmarket track and tunnel option to be carried out, there are no sub-options.

Summary of key benefits and costs – Ipswich to Oxford through-service with freight benefits

3.18 This option has the same passenger benefits as one train per hour between Oxford-Ipswich plus additional freight benefits. Capacity enhancements could deliver up to **11 additional freight paths per day from Felixstowe** to Daventry and Milton Keynes, delivering growth from the port of Felixstowe supported by its freeport status, building on and complementing existing investment in the Ely area as well as the Felixstowe to Nuneaton scheme, and supporting the burden of future growth from being reliant on Ely and the Great Eastern Main Line.

3.19 The proposed rail service changes would avoid around **70 million road freight kilometres annually** and would result in socioeconomic **benefits of £229m** over 60 years (present value).

3.20 The proposed interventions for additional capacity would incur a **capital expenditure of £145m**, including double tracking within the Newmarket tunnel. The additional services would require ongoing operating subsidy: for 2035, additional **operating costs are £11m** whilst additional **revenue is £3m**, with a resulting £8m which would need to be subsidised. Potential operating cost savings for transporting freight on rail instead of on the road have not been taken into account and will be explored in subsequent stages of the business case.

Economic appraisal results

The economic appraisal results are shown in Table 3.4: Table 3.4: 60-year economic appraisal 1tph Oxford-Ipswich with additional freight capacity Component	Freight (with tunnel)	Freight (without tunnel)
Present Value Benefits	£229m	£229m
Passenger Benefit	£120m	£120m
Freight Benefit	£109m	£109m
Present Value Costs	£180m	£80m
Operating Cost	£76m	£76m
Capital Cost	£145m	£45m
Revenue	(£41m)	(£41m)
Benefit Cost Ratio	1.3	2.9

Value for Money assessment

3.21 Capacity enhancements along the Ipswich-Cambridge corridor enabling an additional fast train per hour and additional freight paths contribute to meeting the connectivity, capacity and freight objectives of the EWR Eastern Section.

3.22 Economic appraisal of the proposed intervention has resulted in a BCR of 1.3, representing Low Value for Money. However, a more detailed operational and infrastructure capability assessment could indicate that the tunnel doubling might not be required to operate additional freight trains, for instance, where these freight trains operate outside peak hours (e.g. evening or early morning). This would increase the BCR to 2.9, representing High Value for Money.

Summary of key benefits and costs – line speed improvements between Norwich and Cambridge

Line speed improvement between Norwich and Cambridge: This option includes 100mph line speed improvements to existing services between Cambridge and Norwich, with no frequency changes.

3.23 Journey time benefits resulting from 5% reductions in journey times are expected to be minor for large volumes between Cambridge and Ely and more significant on longer distance flows between Cambridge and Norwich, Thetford and Brandon. Figure 3.5 presents demand and journey time changes for key flows. The proposed rail service changes would generate an annual increase in demand of around 41,000 passengers and would result in socioeconomic benefits of £30m over 60 years (present value).

3.24 The proposed intervention would incur capital costs of £18m.

3.25 The additional services require no additional operating costs on top of existing services because there are no frequency changes, whilst additional revenue for 2035 is around £600,000. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs is not a true figure, it is not a true figure of the level of revenue that is likely to generate.

Economic appraisal results

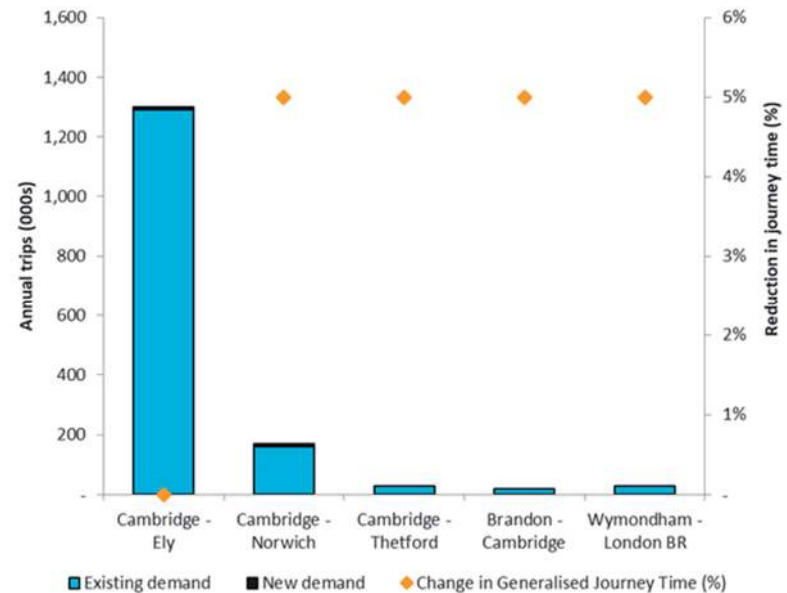
The economic appraisal results are shown in Table 3.5.

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Table 3.5: 60-year economic appraisal (£m, 2010 present value) 100mph Cambridge-Norwich

Component	100mph Cambridge-Norwich
Present Value Benefits	£30m
Present Value Costs	£7m
Capital costs	£18m
Operating costs	-
Revenue	(£11m)
Benefit Cost Ratio	3.9

Figure 3.5: Demand/journey time change for top 5 flows (100mph Cambridge-Norwich)



Value for Money assessment

3.26 Line speed improvements along the Norwich-Cambridge corridor contribute to meeting the connectivity objective of the EWR Eastern Section to a certain extent, but at a smaller scale than other options.

3.27 Economic appraisal of the proposed intervention has resulted in a BCR of 3.9 (High Value for Money) with no additional operating subsidy required. However, as mentioned above, the absolute value of benefits is significantly lower than the other options.

Additional train per hour between Norwich and Cambridge: This option includes line speed improvements and increased service frequencies, with additional fast services to and from Cambridge to accompany the existing stopping service.

Summary of key benefits and costs – additional train between Norwich and Cambridge

3.28 The majority of journey time and frequency benefits are expected to be experienced by passengers travelling between **Cambridge and Norwich, Thetford and Ely**, resulting from **reductions in journey time of 10% to 25%**. Figure 3.6 presents demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand of around 430,000 passengers** and would result in socioeconomic **benefits of £195m** over 60 years (present value).

3.29 The proposed intervention would incur a **capital expenditure of £181m** in order to provide the necessary capacity for additional services.

3.30 The additional services would require ongoing operating subsidy: for 2035, additional **operating costs** are **£12m** whilst additional **revenue** is **£4m**, with a resulting **£8m** which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

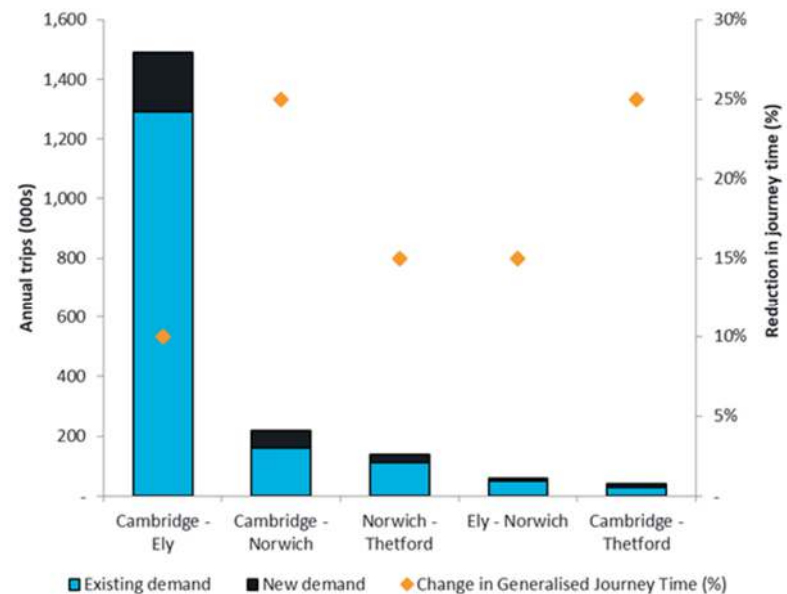
Economic appraisal results

The economic appraisal results are shown in Table 3.6.

Table 3.6: 60-year economic appraisal (£m, 2010 present value) 1tph Cambridge-Norwich

Component	1tph Cambridge-Norwich
Present Value Benefits	£195m
Present Value Costs	£194m
Capital costs	£181m
Operating costs	£80m
Revenue	(£67m)
Benefit Cost Ratio	1.0

Figure 3.6: Demand/journey time change for top 5 flows (1tph Cambridge-Norwich)



Value for Money assessment

3.31 Line speed and capacity enhancements along the Norwich-Cambridge corridor enabling an additional fast train per hour contribute to meeting the connectivity and capacity objectives of the Eastern Section.

3.32 Economic appraisal of the proposed intervention has resulted in a BCR of 1.0 (Low Value for Money). This intervention would also need additional operating subsidy.

Additional train per hour between Norwich and Oxford: This option includes line speed improvements and increased service frequencies, with the fast services to and from

Summary of key benefits and costs – Norwich to Cambridge through-service

3.33 Journey time and frequency benefits are similar to the previous option, with additional benefits taking place between **Norfolk and locations within the EWR Central Section (eg Oxford)** and beyond. Figure 3.7 presents demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand** of around **470,000 passengers** and would result in socioeconomic **benefits of £273m** over 60 years (present value).

3.34 The proposed interventions would incur a **capital expenditure of £181m** in order to provide the necessary capacity for additional services.

3.35 The additional services would require initial operating subsidy but become profitable by the end of the appraisal period. For 2035, additional **operating costs** are **£11m** whilst additional **revenue** is **£6m**, with a resulting **£5m** which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

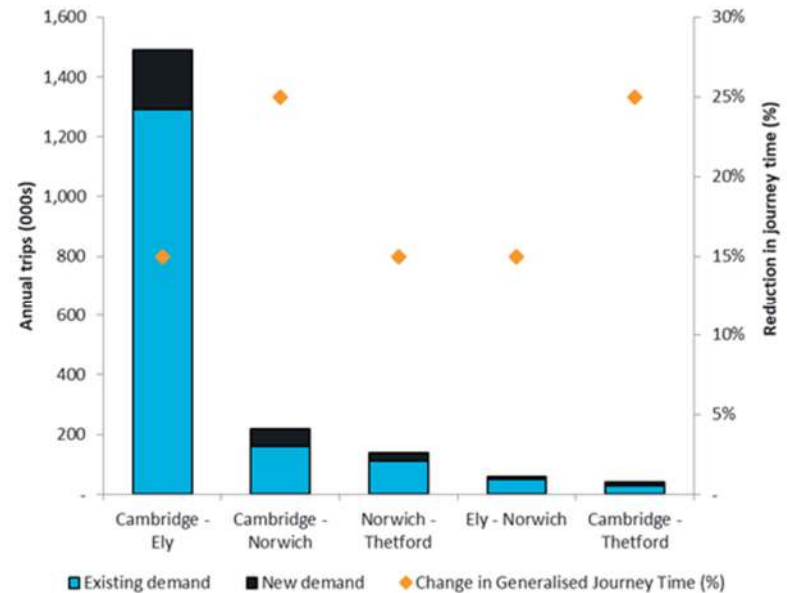
Economic appraisal results

The economic appraisal results are shown in Table 3.7.

Table 3.7: 60-year economic appraisal (£m, 2010 present value) 1tph Oxford-Norwich

Component	1tph Oxford-Norwich
Present Value Benefits	£273m
Present Value Costs	£166m
Capital costs	£181m
Operating costs	£80m
Revenue	(£94m)
BCR	1.6

Figure 3.7: Demand/journey time change for top 5 flows (1tph Oxford-Norwich)



Value for Money assessment

3.36 Capacity enhancements along the Norwich-Cambridge corridor enabling an additional fast train per hour direct to Oxford contribute to the connectivity and capacity objectives of the EWR Eastern Section.

3.37 Economic appraisal of the proposed intervention has resulted in a BCR of 1.6 (Medium Value for Money). This intervention would also need initial operating subsidy, although it is expected to become profitable during the appraisal period.

Additional train per hour between Oxford and Norwich plus electrification: This option includes increased service frequencies, with additional fast services to and from Oxford to accompany the existing stopping service. It also includes the journey time benefits and capital costs of electrification.

Summary of key benefits and costs – Norwich to Oxford through-service with electrification

3.38 Electric trains reduce journey times thanks to faster acceleration, with a further **5% reduction in journey times** experienced by passengers travelling **to and from Norwich** on top of the benefits from the previous option. Figure 3.8 shows demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand** of around **470,000 passengers** and would result in socioeconomic **benefits of £268m** over 60 years (present value).

3.39 The proposed interventions would incur a **capital expenditure of £276m**, including additional capacity and electrification.

3.40 The additional services would require initial operating cost subsidy but become profitable by the end of the appraisal period. For 2035, additional **operating costs** are **£11m** whilst additional **revenue** is **£6m**, with a resulting **£5m** which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

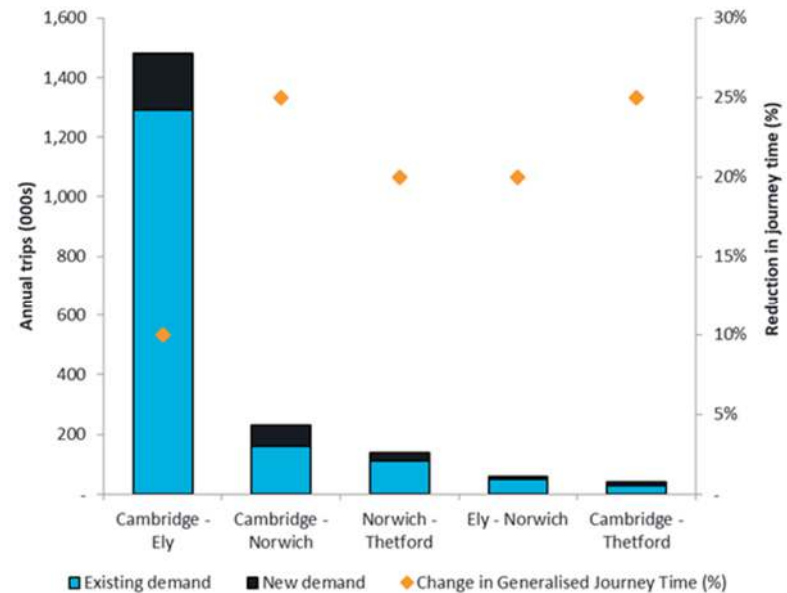
Economic appraisal results

The economic appraisal results are shown in Table 3.8.

Table 3.8: 60-year economic appraisal (£m, 2010 present value) 1tph Oxford-Norwich with electrification

Component	Electrification
Present Value Benefits	£268m
Present Value Costs	£254m
Capital costs	£276m
Operating costs	£72m
Revenue	(£94m)
BCR	1.1

Figure 3.8: Demand/journey time change for top 5 flows (1tph Oxford-Norwich plus electrification)



Value for Money assessment

3.41 Capacity enhancements and electrification along the Norwich-Cambridge corridor contribute to meeting the connectivity, capacity and Net Zero objectives of the EWR Eastern Section.

3.42 Economic appraisal of the proposed intervention has resulted in a BCR of 1.1 (Low Value for Money). This intervention would also need initial operating subsidy, although it is expected to become profitable during the appraisal period.

Additional train per hour via Bury St Edmunds: This option includes increased service frequencies, with an additional service between Cambridge and Norwich via Diss and

Summary of key benefits and costs – Norwich – Cambridge service via Bury St Edmunds

3.43 The majority of journey time and frequency benefits are expected to be experienced by passengers travelling between **Bury and Cambridge, Norwich and Diss**. Figure 3.9 shows demand and journey time changes for key flows. The proposed rail service changes would generate an **annual increase in demand** of around **250,000 passengers** and would result in socioeconomic **benefits of £73m** over 60 years (present value).

3.44 The proposed interventions would incur a **capital expenditure of £192m** in order to provide the necessary capacity for additional services.

3.45 The additional services would require ongoing operating subsidies: in 2035, additional **operating costs** are **£15m** whilst additional **revenue** is **£1m**, with a resulting £14m which would need to be subsidised. However, these calculations are based on MOIRA, which does underestimate passenger rail demand, so although an indication of costs, it is not a true figure of the level of revenue that is likely to generate.

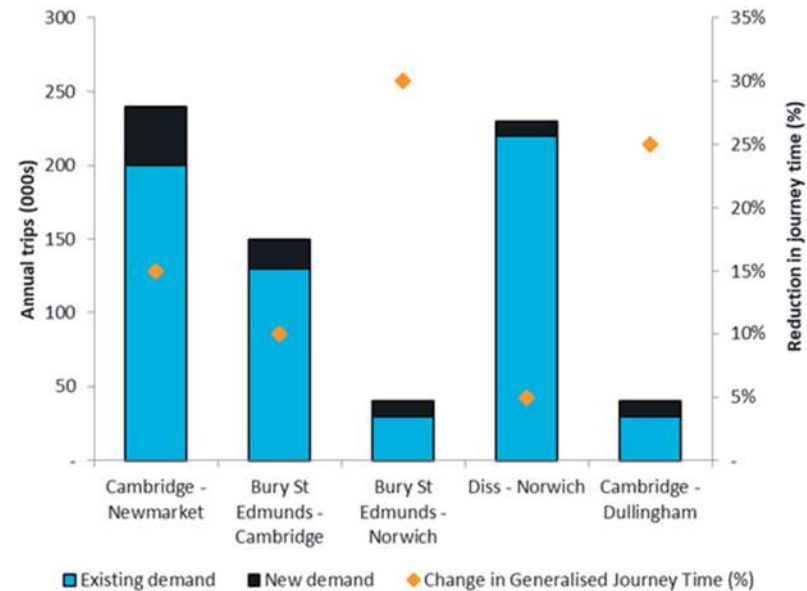
Economic appraisal results

The economic appraisal results are shown in Table 3.9 below:

Table 3.9: 60-year economic appraisal (£m, 2010 present value) 1tph Cambridge-Norwich via Bury St Edmunds

Component	1tph via Bury St Edmunds
Present Value Benefits	£73m
Present Value Costs	£270m
Capital costs	£192m
Operating costs	£101m
Revenue	(£23m)
BCR	0.3

Figure 3.9: Demand/journey time change for top 5 flows (Cambridge-Norwich via Bury)



Value for Money assessment

3.46 Capacity enhancements along the route enabling a new service from Cambridge-Norwich via Bury contribute to meeting the connectivity and capacity objectives of the EWR Eastern Section.

3.47 Economic appraisal of the proposed intervention has resulted in a BCR of 0.3 (Low Value for Money). Although large benefits are achieved for flows to and from Bury St Edmunds, the absolute value of this benefit is low. This intervention would also need additional operating subsidy.

Extension of services to Colchester

3.48 A variation of the options appraised for the Ipswich-Cambridge/Oxford corridor has been considered, involving extending the services to Colchester. Three options have been considered:

- **Option 1:** extension of the existing Ipswich-Cambridge service to Colchester;
- **Option 2:** extension of the proposed additional semi-fast hourly service between Ipswich and Cambridge to Colchester; and
- **Option 3:** extension of the proposed additional semi-fast hourly service between Ipswich and Oxford to Colchester.

3.49 These options do not require, in principle, any additional capital expenditure beyond what is considered in the options presented earlier in this report. In addition, these options are expected to be operationally simpler than those requiring terminating services at Ipswich, therefore removing the need for an additional platform at Ipswich.

3.50 Option 1 delivers Poor Value for Money (a BCR of 0.9). However, a service between Oxford and Colchester via Ipswich (as presented in Option 3) contains an infrastructure option that provides High Value for Money (See Table 3.11). The BCRs for Options 2 is presented in the Table 3.10.

Table 3.10: Appraisal results for hourly services Cambridge-Colchester (Option 2)

1tph Cambridge to:	Ipswich	Colches.	Ipswich	Colches.	Ipswich	Colches.
	Dynamic loop		Double track		Track & tunnel	
Present Value Benefits	£77m	£108m	£77m	£108m	£77m	£108m
Present Value Costs	£73m	£87m	£97m	£112m	£197m	£212
Capital costs	£21m	£21m	£45m	£45m	£145m	£145m
Operating costs	£76m	£101m	£76m	£101m	£76m	£101m
Revenue	(£24m)	(£35m)	(£24m)	(£35m)	(£24m)	(£35m)

Benefit Cost Ratio	1.1	1.2	0.8	1.0	0.4	0.5
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Table 3.11: Appraisal results for hourly services Oxford-Colchester (Option 3)

1tph Oxford to:	Ipswich	Colches.	Ipswich	Colches.	Ipswich	Colches.
	Dynamic loop		Double track		Track & tunnel	
Present Value Benefits	£120m	£158m	£120m	£158m	£120m	£158m
Present Value Costs	£56m	£67m	£80m	£91m	£180m	£191m
Capital costs	£21m	£21m	£45m	£45m	£145m	£45m
Operating costs	£76m	£101m	£76m	£101m	£76m	£101m
Revenue	(£41m)	(£55m)	(£41m)	(£55m)	(£41m)	(£55m)
Benefit Cost Ratio	2.2	2.4	1.5	1.7	0.7	0.8

3.51 The limitations from MOIRA linked to flows beyond Cambridge, highlighted earlier in the document, also apply to the results in Table 3.11.

3.52 It is therefore recommended that the option to extend services to Colchester is explored in further detail as part of the SOBC.

Conclusions

Key findings

- There is a strong case for further investigation in connecting the Eastern Section with the East West Rail Main Line.
- The findings of this Preliminary-Strategic Outline Business Case confirm the findings of the 2017 Eastern Section Conditional Output Statement that the Eastern Section plays an integral role to the East West Rail Link and delivers High Value for Money.
- The Eastern Section still delivers an economic return for HM Treasury, even with high levels of investment in infrastructure.

4 Conclusions

Key overall findings of the Interim SOBC

4.1 The objective of this Economic and Financial Case is to demonstrate how the different rail options meet the scheme strategic objectives, show how they deliver Value for Money and indicate the financial implications of delivering them.

4.2 These options generate economic benefits associated with enhancing rail connectivity between Ipswich and Norwich (known as the Eastern Section) with the East West Rail Main Line through to Oxford and beyond, enabling passenger rail service connectivity from the Eastern Section to the Central and Western Sections.

4.3 This analysis has been developed in the context of a Preliminary Strategic Outline Business Case, therefore its conclusions seek to highlight the potential for options to represent Value for Money and be affordable, which would subsequently be further explored in a complete Strategic Outline Business Case.

4.4 The main conclusions of the analysis are the following:

- Overall, **there is a strong Strategic and Economic Case for investment** and it is recommended that the scheme is progressed to the next stage of business case development.
- **The options analysed address the scheme strategic objectives.** These include providing rail connectivity between Ipswich and

Norwich with the EWR Central Section in a sustainable manner, providing rail capacity for passenger and freight services and contributing to the net zero agenda, the Levelling Up ambitions and the economic recovery following the COVID-19 recovery plans and the awarding of Freeport status to the port of Felixstowe and Harwich.

- **The options which provide direct connectivity between Ipswich/Colchester and Norwich with the EWR Central Section deliver Value for Money (VfM).** A direct service between Ipswich and Oxford would deliver **High VfM**, if freight services can be delivered without doubling Newmarket tunnel (Medium VfM if the tunnel requires doubling). A direct service between Norwich and Oxford would deliver **Medium VfM**, however exclusion of the capital costs associated with Trowse Bridge⁸ would deliver **High VfM**.
- **It is likely that there is scope for further uplift for the Value for Money analysis of the scheme.** While MOIRA is a robust tool for assessing the benefits from existing rail services, in the case of direct services through to the EWR Central Section, use of other tools (e.g. the existing gravity model) might provide a better representation of the impact of the scheme on flows between the Eastern Section and Oxford. Likewise, associated with the transformational potential of the Central Section, Wider Economic Impacts, which have not been considered at this stage, will provide additional benefits to the scheme. Further cost savings may also be identified through a more detailed timetable and performance assessment, which will be necessary as part of the next stages of business case development.

⁸ It is acknowledged that addressing capacity issues at Trowse Bridge is a historic long-standing issue and, while no funding has been committed to the scheme yet, a separate business case for Trowse Junction appears appropriate given the

potential impact of the scheme on a wide range of service beyond the Eastern Section services in the scope of this business case.

- **A range of funding options could be available for the Eastern Section.** These will be explored in more detail at later stages of the business case and include:
 - Central Government funding via the Rail Network Enhancements Pipeline (RNEP): in order to be eligible to this funding source, the business case should be admitted in the RNEP. This is the main goal of the Pre-SOBC.
 - Levelling Up Fund following the Government announcement in March 2021. This Pre-SOBC has demonstrated the contribution of the Eastern Section to the Levelling Up agenda, so Levelling Up funding can be envisaged.
 - East West Rail Company funding, if the arm's length body set up by Government gets its remit extended to include the Eastern Section.
 - Regional/local funding through Local Transport Plans (LTP) of the key stakeholders of the scheme.
 - Financial contributions linked to housing, such as Section 106, Community Infrastructure Levy (CIL) or Housing Infrastructure Fund, however, in order to secure such funding sources dependency between housing delivery and the Eastern Section needs to be demonstrated. This should be explored at later stages of the business case (e.g. Six Miles Bottom development).
 - Third party funding linked to the benefits received, for instance, by businesses, through business rate levies or supplements.

Findings by corridor

4.5 The conclusions for each of the two corridors under analysis are presented in paragraphs 4.6 – 4.20.

Ipswich/Colchester-Cambridge/Oxford

4.6 On the Ipswich-Cambridge/Oxford route, capacity enhancements to deliver through connectivity with the Central Section result in a **BCR ranging from 0.7 to 2.2** (additional capacity delivered through dynamic passing loop or track doubling excluding Newmarket tunnel). Interchanging services at Cambridge would reduce the BCR by between 0.4 and 1.1.

4.7 Allowance for additional freight paths from/to the port of Felixstowe on this corridor would probably involve, subject to a more detailed assessment, double tracking the Newmarket area and might involve doubling the Newmarket tunnel. Additional **freight benefits** would offset the additional infrastructure costs, resulting in a **BCR of around 2.9** (with double tracking only) **and 1.3** (with tunnel doubling). This would also generate additional timetable resilience and potential performance benefits beyond the dynamic loop option, which have not been quantified and would further increase the BCR.

4.8 The option to extend services beyond Ipswich to Colchester provide a higher Value for Money than the options terminating at Ipswich.

4.9 The case for electrification results in poorer Value for Money, with a BCR of 0.6 for the electrification of the corridor. This is because the capital costs for electrification exceed the environmental benefits and operating cost efficiencies.

4.10 Capital costs⁹, prior to including optimism bias, range between £30m (dynamic loop) and £60m (track doubling) for the less capital-intensive infrastructure interventions to between £185m (tunnel doubling) and £260m for those involving more electrification works.

4.11 From a financial perspective, all options would require additional operating subsidy, estimated at £9m - £10m in 2035.

Norwich-Cambridge/Oxford

4.12 On the Norwich-Cambridge/Oxford route, a combination of capacity enhancements, line speed improvements and direct connectivity through to the Central Section results in a **BCR of 1.6**, which increases to **2.4** if the costs associated with Trowse Bridge are excluded. The BCR decreases to 1.0 where an interchange at Cambridge is considered.

4.13 Line speed improvements in their own right, while resulting in a higher BCR, do not contribute to the same extent to achieve all the strategic objectives of the scheme, namely connectivity for people and businesses. Therefore, they do not represent as good Value for Money.

4.14 Equally, the case for electrification is poorer than alternative options, with a BCR of 1.1.

4.15 Alternative routings for trains between Norwich and Cambridge have also been assessed. The route via Diss and Bury St Edmunds results in a BCR of 0.3, significantly lower than via the existing route.

4.16 Capital costs, prior to including optimism bias, add up to around £240m for line speed and capacity enhancements and up to £365m

including electrification. Capital costs for the alternative route (via Diss) are around £260m.

4.17 From a financial perspective, additional capacity (and line speed) would require additional operating subsidy, estimated at £7m - £9m in 2035, and £14m for the route via Diss.

Sensitivity tests

4.18 Two sensitivity tests were undertaken to test the robustness of the Value for Money of the options:

- Including the capital cost of an additional platform at Ipswich (£15m), reflecting the fact that the Eastern Section may trigger the need for additional capacity.
- Excluding the capital cost of doubling Trowse Swing Bridge and an additional platform at Norwich, reflecting the fact that there may be a need to address current constraints at these locations regardless of the Eastern Section.

4.19 On the Ipswich-Cambridge/Oxford route, adding an additional cost to the capital expenditure has a negative impact on the BCRs, reducing its Value for Money categorisation to Medium. The additional hourly train to Oxford options result in BCRs between 0.6 and 1.6, compared to 0.7 to 2.2.

4.20 On the Norwich-Cambridge/Oxford route, all options benefit significantly from the reduced capital expenditure. An additional hourly train to Cambridge would represent Medium VfM (BCR of 1.8), while the

⁹ Capital costs are expressed in 2020 prices, excluding allowance for inflation and land costs, but including a 20% allowance for consultancy and design fees.

case for an additional hourly train to Oxford now represents High VfM (BCR of 3.4).

Next steps

4.21 The Interim SOBC has concluded that there is a strong Strategic and Economic Case for developing the EWR Eastern Section scheme.

4.22 It is therefore **recommended** that:

- **A Strategic Outline Business Case is developed**, where options can be refined and explored in further detail; and
- The scheme is put forward for **incorporation into the Rail Network Enhancements Pipeline** (RNEP).

4.23 As part of the future SOBC, a number of actions which will need to be undertaken to confirm the robustness of the business case, including:

- Establishing the technical and operational feasibility of the options presented in this document, including looking in more detail at timetable and performance considerations, stabling provisions, level crossings and route gauge;
- Refining the demand growth assumptions, including a more detailed consideration of the synergies and opportunities generated in relation with the EWR Western and Central Sections and considering use of the EWR gravity model to estimate the transformational impact of EWR;
- Assessing any Wider Economic Impacts that the scheme might generate;
- Refining the capital cost estimates on the basis of a more detailed assessment; and
- Undertaking a more detailed funding and financing analysis for the scheme.

