Suffolk County Council

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

Option Assessment Report

70023942-WSP-RPT-OAR-001
January 2020

Suffolk County Council

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

Option Assessment Report

Supplemental Note

This document should be read in conjunction with the supplementary Option Assessment Addendum Report, reference 70023942-WSP-RPT-OAR-002

OPTION ASSESSMENT REPORT : VERSION - PUBLIC

PROJECT NO. 70023942

OUR REF. NO. 70023942-WSP-RPT-OAR-001

DATE: JANUARY 2020

WSP

62-64 Hills Road
Cambridge
CB2 1LA
Phone: +44 1223 558 050
Fax: +44 1223 558 051
WSP.com

CONTENTS

TABLES

FIGURES

APPENDICES

Supplemental Note

This document should be read in conjunction with the supplementary Option Assessment Addendum Report, reference 70023942-WSP-RPT-OAR-002 attached after Appendix C

EXECUTIVE SUMMARY

WSP was commissioned by Kier, on behalf of Suffolk County Council (SCC), to undertake a strategic study of potential Ipswich Northern Route (INR) transport study options. This Option Assessment Report (OAR) seeks to describe the existing baseline transport conditions and forecast to 2031, allowing for growth in the northern Ipswich area and neighbouring districts, based on the existing planning and future committed schemes.

This report identifies constraints and opportunities which may affect the potential design of options to be developed in the next stage of the study. The INR study aims to consider multi-modal transport opportunities, including; road, rail, bus, cycle and other strategic interventions, to facilitate and support the delivery of housing and employment growth in the north of Ipswich. Specifically, the aim of this study is to:

"Strategically review, short list and assess, the strategic viability of transport capacity improvements, in order to facilitate and support the delivery of housing and employment growth in north Ipswich and the wider Ipswich area."

The geographical scope for identification and implementation of INR options focuses on a broad arc to the north of Ipswich, covering an area between the A12 to the east and the A14 to the west, as far south as the current boundary of Ipswich and as far north as Ufford (to the east) and Coddenham (to the west). Outside of this geographical area for option delivery, the wider study area for highway impact assessment considers the regional Strategic Road Network (SRN), using the Suffolk County Transport Model (SCTM). This enables an assessment of wider impact analysis of INR options across the County.

This study identifies that Local Plans and the East Anglia Local Enterprise Partnership (LEP) expect significant growth, both in terms of housing and employment, within the wider Ipswich area. On this basis, an evidence base is identified to highlight the importance of improving the integrated transport network and to tackle congestion, in order to deliver residential and employment growth targets identified in the district Local Plans.

This report identifies the existing issues of capacity on the highway network, and gaps in public transport infrastructure and the cycle network. The current local and strategic highway networks suffer from frequent and severe delays, generating pollution, reducing safety of road users and constraining the local and regional economic market. Congestion on the A14 also has an impact on strategic areas such as the Port of Felixstowe, with particular issues related to the Orwell Bridge crossing.

Overall, the options identified in this report are intended to address adverse impact that congestion will likely have on the local and strategic highway network arising from continued future economic and residential growth in the wider Ipswich area.

1 GLOSSARY OF TERMS

Term	Description
AADF	Annual Average Daily Flow
AAJS	Annual Average Journey Speed
AAJT	Annual Average Journey Time
AGI	Above Ground Installation
ALC	Agricultural Land Class
ANPR	Automatic Number Plate Recognition
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
ASR	Appraisal Specification Report
AQMA	Air Quality Management Areas
ARS	Anglia Route Study
BCR	Benefit Cost Ratio
BRT	Bus Rapid Transit
CRF	Congestion Reference Flow
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges (published by the Department for Transport)
DrWPA	Drinking Water Protected Area
EA	Environment Agency
EAST	Early Assessment and Sifting Tool (published by the Department for Transport)
FHDC	Forest Heath District Council
HE	Highways England
IBC	Ipswich Borough Council
INR	Ipswich Northern Route
IUN	Ipswich Urban Network
LEP	Local Economic Partnership
LHP	Local High Pressure
LRT	Light Rail Transit
LTP	Local Transport Plan
MSDC	Mid Suffolk District Council
NCN	National Cycle Network
NMU	Non-Motorised User
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone

Term	Description
OAR	Options Assessment Report
OBC	Outline Business Case
ORR	Office of Rail and Road
PCU	Passenger Car Unit (a unit for the measurement of vehicle trips)
PIA	Personal Injury Accident
PM_{10}	Particulate Matter
PRoW	Public Rights of Way
RTPI	Real Time Passenger Information
SBC	St Edmundsbury Borough Council
SCC	Suffolk County Council
SCDC	Suffolk Coastal District Council
SCTM	Suffolk County Transport Model
SLTP	Suffolk Local Transport Plan
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TEMPro	Trip End Model Presentation Program
UoS	University of Suffolk
UTC	Urban Traffic Control
VfM	Value for Money
WDC	Waveney District Council
WebTAG	Transport Assessment Guidance (published by the Department for Transport)
WebTRIS	Web-based Traffic Information System
WP	Workplace Population

2 INTRODUCTION

2.1 PROJECT BACKGROUND

WSP was commissioned by Kier, on behalf of Suffolk County Council (SCC), to prepare a strategic study to assess potential transport scheme options for an Ipswich Northern Route (INR).

2.1.1 HISTORY

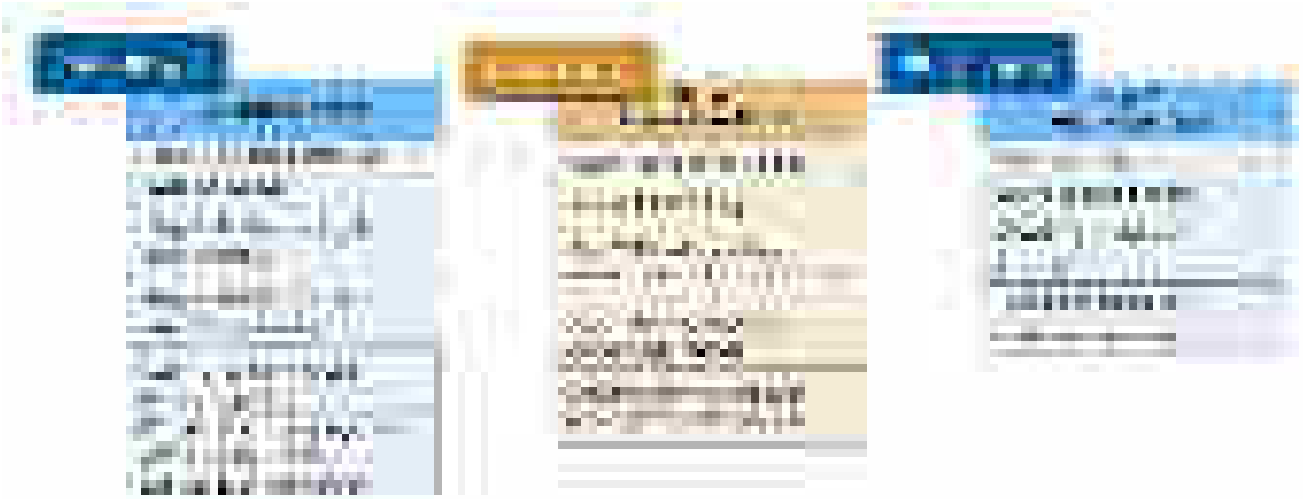
In July 2015, WSP undertook a series of high-level initial tests of a potential Ipswich northern bypass, based on outline alignments originally proposed in the 1980's and 1990's. The study used the Ipswich Traffic Model for outline testing of five variations of a northern relief road. The preliminary results illustrated the benefit of a full bypass north of Ipswich.

The findings of the 2015 study triggered the development of a Stage 1 Strategic Study report, to assess the feasibility of a highway-only scheme, linking the strategic A14-A12 road network within a confined assessment area north of Ipswich. Publication of this report in December 2016, and further engagement with key stakeholders, enabled the refinement of the scheme objectives and broadening of the study area and study scope, triggering the assessment of a wider range of multi-modal transport interventions.

2.1.2 THIS REPORT

Previous studies, and a broadening of intervention objectives, have led to the production of this Option Assessment Report (OAR), following the Department for Transport's (DfT) Transport Analysis Guidance (WebTAG) Stage 1 & Stage 2 option development and assessment process (Steps 1-8), as illustrated in **Figure 1**:

Figure 1 DfT WebTAG Staged Approach to Option Development and Assessment



Step 9, 'Clarifying Modelling and Appraisal Methodology' will be covered by the Appraisal Specification Report (ASR) to be produced at the commencement of Stage 3.

This OAR seeks to assess the existing demographic, socioeconomic and transport conditions in and around Ipswich, and forecasted changes in these conditions up to 2031. Forecasted growth is derived from an uncertainty log approach in collaboration with the local authorities within Suffolk, which is considered to be a proportionate approach for this stage of the scheme development. Through analysis of this data, the OAR forms an evidence base for the need for intervention.

As noted above, through refinement of the scheme objectives, a wider range of options are being considered within this OAR. The scheme objectives, developed with key stakeholders, are defined in **Table 1**, and form the basis for the assessment of the potential inventions throughout this OAR.

Table 1 Scheme Objectives

Objective
Provide additional transport capacity to support planned growth and enable future residential and employment growth in the wider Ipswich area
Reduce congestion within Ipswich Town Centre, including along the A12-A14 corridor
Positive impact on the Strategic Road Network (SRN) including between the Copdock Roundabout – Junction 55, the Orwell Bridge, and Sevens Hills Roundabout – Junction 58, and improve the connection between the A14 and A12 for vehicles transiting to the north of Suffolk and Norfolk
Improve resilience of road network when the Orwell Bridge is shut
Improve sustainable methods of transport within the east to west corridor to the north of Ipswich and links from the north of Ipswich to the Town Centre
Improve air quality and reduce noise on existing corridors
Enable economic growth for the wider Ipswich area by improving connectivity and accessibility
Support economic growth and better connectivity to the Suffolk Energy Coast

A Long List of options has been developed within this report that are subject to assessment through an initial strategic appraisal against the scheme objectives, and subsequently by the DfT Early Assessment and Sifting Tool (EAST).

DfT guidance describes the EAST as a:

"Decision support tool that has been developed to quickly summarise and present evidence on options in a clear and consistent format. It provides decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The tool itself does not make recommendations and is not intended to be used for making final funding decisions.

The tool can be used to:

- *help refine options by highlighting adverse impacts or unanticipated consequences;*
- *compare options, for example, within or across modes, geographical areas and networks;*
- *identify trade-offs between objectives aiding package development;*
- *filter the number of options, i.e. discount non-runners early on to ease the appraisal burden and avoid resources being spent unnecessarily; and*
- *identify key uncertainties in the analysis and areas where further appraisal effort should focus.*

EAST has been designed so that it can be applied without having to obtain detailed evidence as is usually required to support funding applications, consistent with Transport Business Case principles."

Further information and guidance on EAST can be found through the following documents:

- Early Assessment and Sifting Tool (PDF, 1.41MB)
- EAST Guidance (PDF, 252KB)

Following option sifting, this report identifies potential feasible intervention options which would contribute to the delivery of the scheme objectives, following a preliminary study of their strategic, economic, social, environmental and financial impacts.

This OAR supports a future Outline Business Case (OBC) for the INR study. Initial consultation with local authority stakeholders has been undertaken, and full consultation with the public will be in 2019.

2.2 GEOGRAPHICAL CONTEXT

Ipswich is the county town of Suffolk and is a key regional centre in the East of England. It occupies a strategically significant position at the crossroads of the A12 London to Lowestoft route and the nationally important A14 trunk route linking the Port of Felixstowe (which is the UK's largest container port handling over 40% of the UK's containerised trade) with the Midlands. Ipswich is also an important rail interchange on the London to Norwich main line. **Figure 2** shows Ipswich in the context of key urban settlements and transport links in the East of England.

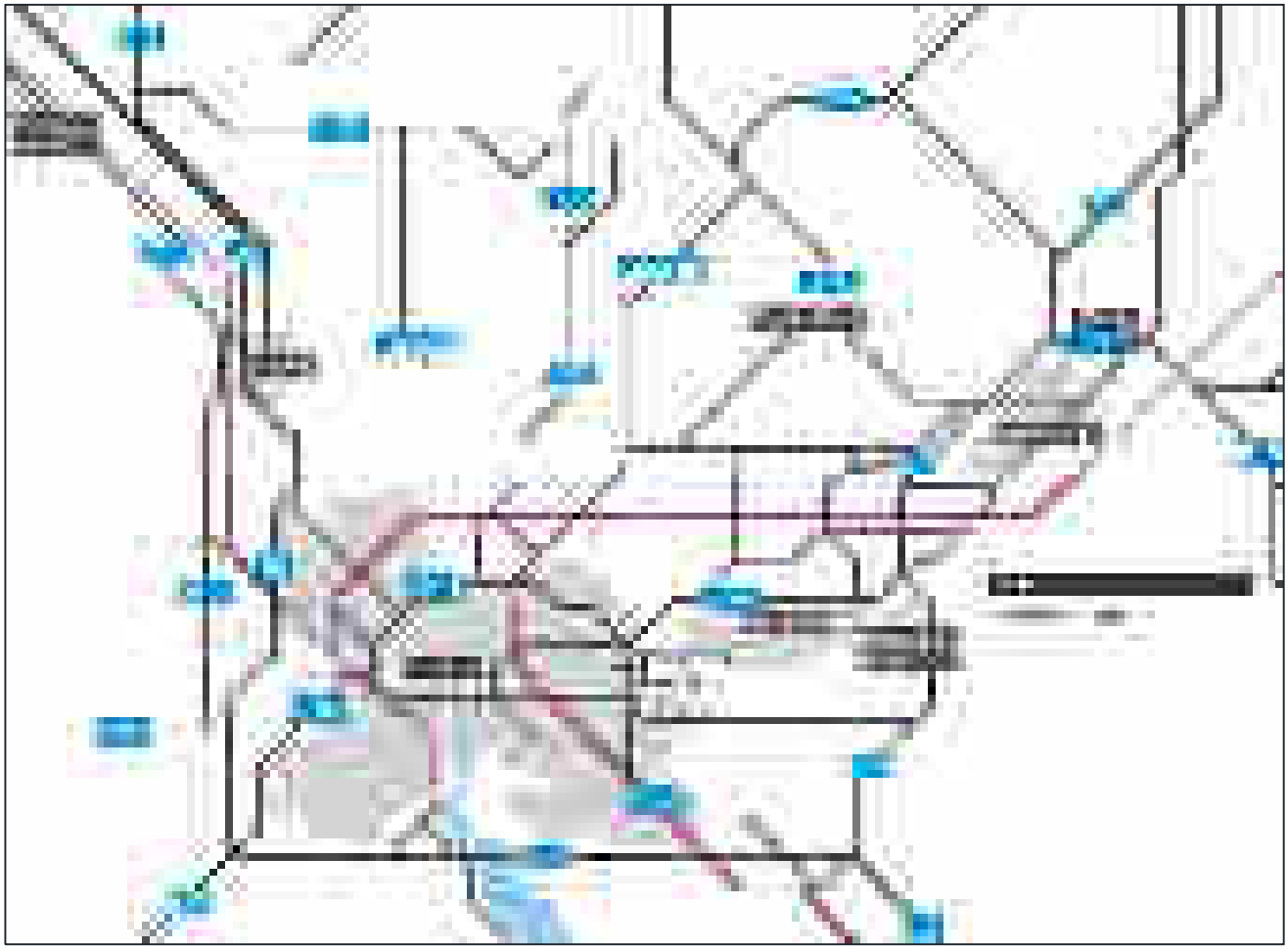
Figure 2 Ipswich Geographical Context

Ipswich performs a regional role in delivering growth and is a major employment, retail and service centre, with a focus for transportation. As an engine of growth for the East of England, Ipswich has a thriving commercial sector, high levels of entrepreneurship and a wide range of skills within the workforce. As a university, maritime, telecoms and financial industries centre, Ipswich is developing dynamically and prosperously. Finance, IT and business activities account for almost one-quarter of the workforce, with a similar proportion for distribution, hotels and restaurants; the latter demonstrating the role of Ipswich in sub-regional tourism and the strong leisure economy.

The scheme objectives (set out in **Table 1**) have been developed to address both stress points within the existing transport network and to improve capacity and performance in response to prospective growth within the region. As noted previously, these represent a much broader area than the objectives associated with previous studies; hence the study area for this OAR, that includes the previous study area to the north, has been extended to encompass more of the wider Ipswich area, including the Town Centre.

A schematic map showing the geographical area within which the long list of options was generated is shown in **Figure 3**.

Figure 3 Broad Geographic Study Area for Option Generation



2.3 REPORT STRUCTURE

The structure of this OAR is outlined in **Table 2**:

Table 2 Report Structure

Chapter	Content
Chapter 3	Policy Review
Chapter 4	Current & Forecasted Situation
Chapter 5	The Need for Intervention
Chapter 6	Environmental & Built Environment Constraints
Chapter 7	Generating Options
Chapter 8	Further Assessment of Potential Options
Chapter 9	Summary & Conclusion

3 POLICY REVIEW

This chapter sets out the current economic and transport policy base which is considered pertinent to the context of this INR study. This section identifies the national, regional and local transport infrastructure policies for improved transport infrastructure in the wider Ipswich area. The documents reviewed in this chapter are set out in **Table 3**.

Table 3 Policy Documents

Policy Type	Relevance	Documents Reviewed
National	Sets out the national case for infrastructure investments.	National Planning Policy Framework (2018)
		National Infrastructure Delivery Plan (2016-2021)
		Highways England: Strategic Business Plan (2015-2020)
		Highways England: Delivery Plan (2015-2020)
Regional	Sets out the regional priorities in transport infrastructure investment to support regional economic growth.	New Anglia Local Enterprise Partnership
		Suffolk Local Transport Plan (2011-2031)
		Suffolk Framework for Inclusive Growth
Local	Sets out the transport infrastructure priorities to support economic and housing growth.	Ipswich Borough Council Local Plan (2011-2031)
		Suffolk Coastal District Council Local Plan (2010-2027)
		Mid Suffolk District's Core Strategy Focused Review
		Greater Ipswich City Deal*

*This is not a policy document, but it supplements other strategic transport infrastructure schemes

3.1 NATIONAL POLICY

This section focusses on national policy set out by central government or government-owned bodies. The broad principles of transport infrastructure delivery in England are set out, which will steer the development of intervention options.

3.1.1 NATIONAL PLANNING POLICY FRAMEWORK (2018)

The *National Planning Policy Framework* (NPPF) states that the purpose of the planning system is to help achieve sustainable development and recognises that there are three separate but inter-linked dimensions: economic, social and environmental. The NPPF recognises the role of planning in contributing to building a strong, responsive and competitive economy and by identifying and coordinating development requirements – including the provision of infrastructure.

The policies within the NPPF seek to improve health, social and cultural wellbeing for all, deliver sufficient community and cultural facilities and services to meet local needs, and secure a good standard of amenity for all existing and future occupants of land and buildings. Development is expected to contribute to the conservation and enhancement of the natural and historic environments and prevent development from contributing to unacceptable levels of pollution.

The NPPF places emphasis on good design which is a key aspect of sustainable development and should contribute positively to making places better for people and should avoid significant adverse impacts which can affect health and quality of life.

3.1.2 NATIONAL INFRASTRUCTURE DELIVERY PLAN (2016-2021)

The *National Infrastructure Delivery Plan (2016-2021)* confirms that the Government is investing £15 billion to support Highways England (HE) and the SRN (Strategic Road Network - motorways and A-Roads) with over 100 major schemes completed or in-construction by the end of 2020-21. This includes the A14, A1, A303 and rolling out further Smart Motorways.

The document confirms that the SRN is vital to businesses and the successful functioning of the economy. The SRN is the country's main freight arteries and helps people to reach a wide range of jobs.

A reliable and high-performing SRN ensures high productivity, however, over time the quality of the network has declined with increased congested areas, noise and air pollution. The Government confirms that it is committed to tackling these challenges by building a better network with smarter roads and by using modern road building techniques to *"ensure the country has a road network that drives, instead of constrains, growth".*

In the East of England, the *National Infrastructure Delivery Plan (2016-2021)* confirmed that the Government has now committed to invest in a new river crossing at Lowestoft.

3.1.3 HIGHWAYS ENGLAND: STRATEGIC BUSINESS PLAN (2015-2020)

The *Highways England: Strategic Business Plan (2015-2020)* recognises that the roads which make up the SRN are a key enabler of economic growth and prosperity and are essential to quality of life across the nation. It states that 98% of UK manufacturers consider the condition of roads on the network to be critical to the potential success of a business and that 60% of congestion is caused by a general lack of available capacity.

HE considers that in order to improve the capacity and performance of the network, it will be required to modernise, maintain and operate the network.

The *Highways England: Strategic Business Plan (2015-2020)* recognises the importance of the SRN in enabling and supporting economic growth and productivity. Investment in the SRN within the study area will support the plan by improving network capacity and resilience and thus support economic growth and productivity.

3.1.4 HIGHWAYS ENGLAND: DELIVERY PLAN (2015-2020)

The *Highways England: Delivery Plan (2015-2020)* builds upon the *Highways England: Strategic Business Plan (2015-2020)* and provides detail on how HE intends to deliver strategic outcomes, measure success, identify goals and plan for the future. The focus will be on:

- Supporting economic growth
- A safe and serviceable network
- A more free-flowing network
- Improved environment
- An accessible and integrated network

The *Highways England: Delivery Plan (2015-2020)* recognises the importance of supporting economic growth through the creation of a more free-flowing, integrated and accessible network. Investment in improved east-west transport infrastructure within the study area would help deliver HE's strategic outcomes.

3.2 REGIONAL POLICY

This section summarises the relevant regional policy to the East of England, and sub-regional policies relevant to East Anglia and Suffolk.

3.2.1 NEW ANGLIA LOCAL ENTERPRISE PARTNERSHIP

The *New Anglia Local Enterprise Partnership* (LEP) Economic Strategy sets out an ambitious plan that seeks to promote economic growth within the region over and above existing forecasts, and has identified five key sectors for rapid growth:

- Advanced manufacturing and engineering
- Agri-tech
- Energy
- ICT and digital creative
- Life sciences

Ipswich was identified as one of the fastest growing towns in the Country, benefiting from a high employment rate. The wider Ipswich area has strong growth prospects, including the Adastral Park, the Innovation Martlesham initiative, and locations within the northern Ipswich area that have been targeted as the largest urban expansion areas. Ipswich is also a growing centre for education, including the central campus for the University of Suffolk (UoS).

The document recognises that connectivity is vital to the wider Ipswich area and outlying settlements along the A12 and A14 corridors. Congestion within Ipswich is expected to increase by 15% to 20% by 2032, and this growth forecast has led to the development of a number of strategic congestion alleviation projects, including improvements at three major trunk road intersections: A14 / A12 Copdock Roundabout – Junction 55, A14 Junction 57 and A14 / A12 Sevens Hills Roundabout – Junction 58.

3.2.2 SUFFOLK LOCAL TRANSPORT PLAN (2011-2031)

Suffolk's third *Local Transport Plan* (LTP) sets out the County's transport policy, strategy and delivery plan for the period 2011 to 2031. This LTP demonstrates how transport will support sustainable economic growth. SCC aims to achieve this is by:

- maintaining (and in the future improving) the transport networks
- tackling congestion
- improving access to jobs and markets
- encouraging a shift to more sustainable travel patterns

The LTP has identified challenges that will need to be overcome in the future, such as significant developments in the northern fringe and Town Centre, which will add transport pressure on local, so called 'radial' routes and the SRN.

Key transport issues for Ipswich are summarised in the LTP as:

- road maintenance
- urban realm improvement
- tackling congestion
- modernisation of the bus station
- reducing separation between the town centre and waterfront
- better facilities for walking and cycling
- stronger neighbourhoods
- crossing for improved access to wet dock island site
- town centre masterplan for regeneration
- A14 improvements and A14 Orwell Bridge and Seven Hills Interchange congestion

The LTP also focuses on the need to help people to travel more sustainably into and around the town.

3.2.3 SUFFOLK FRAMEWORK FOR INCLUSIVE GROWTH

Suffolk Framework for Inclusive Growth has been prepared to drive forward economic growth (jobs), infrastructure investment (transport, communication, utilities, education and health facilities) and residential growth (homes). It aims to enable Suffolk to have a prospering economy, of national and international significance, that also unlocks wider benefits, so that local people and places can thrive.

So far, the framework has:

- Reviewed and considered the growth and investment plans put forward by neighbouring authorities and recognises the competitive environment in which it operates
- Reviewed the locations where growth could be focused and identified the investment needed to make sure these locations can be developed in an inclusive and sustainable way

Going forward, the strategy aims to:

- Prioritise investment in transport infrastructure to deliver growth in and around the Ipswich area and along Suffolk's strategic routes (A14, rail corridors, A12, A11)
- Recognise the demographic challenges faced by Suffolk and the impact these changes have on the need to build more new homes
- Strengthen the role of Suffolk's ports (Felixstowe, Ipswich and Lowestoft) as vital gateways for UK trade
- Allow further economic benefits to be realised for Suffolk Energy Coast
- Expand the opportunities offered by post-16 education and training providers, to raise aspirations and deliver the skilled employees needed for the future
- Plan and secure investment in infrastructure, to connect places that can sustain the jobs and homes Suffolk needs
- Encourage greater joint planning across district and borough boundaries and approach in partnership with the Government

3.3 LOCAL POLICY

This section summarises the relevant policies set out within the Local Plans of each district encompassed within the broad study area. It is noted that the local plans are currently being reviewed across the area to plan for growth to cover the period to 2036.

3.3.1 IPSWICH BOROUGH COUNCIL LOCAL PLAN (2011-2031)

The current *Ipswich Borough Council Local Plan (2011-2031)* was adopted on 22 February 2017 and includes the strategic vision and objectives to guide future development of the town. The document promotes the spatial strategy and sets out the policy against which development within the Borough will be assessed. The key relevant aspects of the Local Plan are summarised in the following sections.

Vision

- Improve quality of life by supporting growth and ensuring development can happen in a sustainable manner in conjunction with delivery of adequate transport infrastructure
- For Ipswich to be a more vibrant, active and attractive modern county town
- To be a place where people can aspire to live, work, learn, visit and invest and have a reduced carbon footprint

Objectives

- Development focussed within the central Ipswich area, Ipswich Garden Suburb (*Policy CS10)* and adjacent to district centres
- Improve accessibility to and convenience of all forms of transport, and achieve significant modal shift from the car to more sustainable modes
- Improve air quality and create a safer, greener and more cohesive town

Policy

CS5: Improving Accessibility

- Development should be located and designed to minimise the need to travel and to enable access safely and conveniently on foot, by bicycle and by public transport
- Support the implementation of the Travel Ipswich scheme; this will provide improvements to bus facilities and interchanges, coordinated signals, real time passenger information and walking and cycling provision

CS6: The Ipswich Policy Area

- Work with neighbouring authorities to explore the preparation of joint or aligned planning documents

CS7: The Amount of Housing Required

- Interim target for housing delivery is at least 9,777 dwellings for the period 2011-2031, equivalent to an annual target of at least 489 dwellings
- Acknowledged that there is little scope for the delivery of greater than this target within the Borough in the period to 2031
- Recognises that urgent work is required with neighbouring authorities to deliver the forecasted household requirement

Since the start of the *Ipswich Borough Council Local Plan (2011-2031)* period in 2011, 3,433 dwellings were completed, under construction, or had planning permission by February 2017. Allocation of land for at least 5,344 net additional dwellings will be made by the Council. The estimated housing delivery is summarised in **Table 4**.

Table 4 Estimated Housing Delivery and Previously Developed Land Trajectory*

Time Period	2001-2011	2011-2015	2015-2031
Housing Delivery	6,903	1,081	6,896
Previously Developed Land %	94.5%	81.9%	52.2%

*Including sites with planning permission and under construction

- Ipswich Garden Suburb (*Policy CS10)*, to be located at the northern fringe of Ipswich, will deliver a significant proportion required housing on previously undeveloped land

CS10: Ipswich Garden Suburb

- Land at the northern fringe of Ipswich, which will significantly contribute to the supply of housing land during the Local Plan period
- Development area of 195 hectares on the northern fringe of Ipswich, comprising approximately 3,500 dwellings, a local centre and four schools

CS13: Planning for Jobs Growth

- Delivery of 12,500 jobs in the Borough between 2011 and 2031
- At least 35 hectares of land will be allocated for employment uses

CS20: Key Transport Proposals

- Aiming to reduce dependency on the private car by 15% within the lifetime of the Local Plan
- Supports the provision of significant alternative east-west transport capacity; a case for a package of measures including a Wet Dock Crossing and traffic management schemes will be made
- Alternative east-west capacity could be provided via a northern bypass or link road to the north of Ipswich, the provision of which will be encouraged to neighbouring authorities within which it would be built

The *Ipswich Borough Council Local Plan (2011-2031)* presents a strong vision for Ipswich, backed up by objectives and policies to be enforced during its lifetime. There is emphasis on the delivery of housing and jobs to meet demand, which in turn requires the provision of an effective transport network.

Additional east-west capacity within the Town Centre, particularly during peak periods and when the Orwell Bridge is closed, is required to support the level of future growth. It recognises that a Wet Dock Crossing is an important prospect for enabling regeneration within the town centre; however, its acceptability may be subject to the provision of additional capacity elsewhere. This could be in the form of a bypass route or link route north of Ipswich.

The *Ipswich Borough Council Local Plan (2011-2031)* also emphasises promoting sustainable travel and reducing dependence on the private car. This can be encouraged by improving existing infrastructure and facilities and delivering future development with good provision for non-car modes.

3.3.2 SUFFOLK COASTAL DISTRICT COUNCIL LOCAL PLAN (2010-2027)

The existing *Suffolk Coastal District Council Local Plan (2010-2027)* was adopted in July 2013 and includes the strategic vision and objectives to guide future development of the district. The document promotes the spatial strategy and sets out the policy against which development within the district will be assessed. The Local Plan is currently being reviewed and adoption is planned for November / December 2019. The key relevant aspects of the current 2010-2027 Local Plan are summarised in the following sections.

On 01 April 2019, East Suffolk Council was created, covering the former districts of Suffolk Coastal District Council (SCDC) and Waveney District Council (WDC).

Vision

- Suffolk Coastal will be a district where people can and want to live and invest, as well as to care for others and the environment

Objectives & Policy

SP2: Housing Numbers and Distribution

- Make provision for at least 7,900 new homes in the period 2010 to 2027, equivalent to 465 additional dwellings annually
- Additional unidentified housing supply of approximately 50 dwellings per year is likely to also come forward through by means of windfall provision

SP5: Employment Land

- Make allocations for at least 8.5 hectares of new employment land, creating approximately 30,000 new jobs within the plan Local Plan period to 2027
- Support the retention, expansion and consolidation of Felixstowe Port, Martlesham Heath Business Campus and Ransomes Europark

SP6: Regeneration

- Economic regeneration is considered a priority in the resort of Felixstowe, rural areas, and the towns of Leiston and Saxmundham

SP10: A14 & A12

- Recognises that there are issues with capacity on the A14 around Ipswich, particularly between Seven Hills and Copdock Roundabouts
- Commits to working with neighbouring authorities to consider options for increased capacity, initially focussed on management of local traffic, but also on the possibility of new routes in the longer term
- Supports the provision of improvements to the A12 north of Woodbridge, particularly a bypass of the villages between Glemham to Stratford St Andrew
- Recognises that improvements are required to the A12 south of its junction with the A1214 to the Seven Hills interchange

SP11: Accessibility

- Commits to working with neighbouring authorities, the highway authority, public transport providers, developers and others to maximise mode shift away from the private car

The *Suffolk Coastal District Council Local Plan (2010-2027)* has particular emphasis on allowing economic regeneration and improving its connectivity with neighbouring districts. There is also a focus on the issue of congestion on the A14, particularly in the area around the Orwell Bridge crossing.

The document identifies key employment areas where expansion is encouraged. These are likely to deliver a significant proportion of the 30,000 additional forecasted jobs, and includes Martlesham Heath Business Campus on the eastern fringe of Ipswich. It is noted that these developments would apply additional pressure to the A14 and A12, which are already congested; therefore, SCDC has committed to exploring options for capacity improvements, including the provision of new routes in the longer term.

The *Suffolk Coastal District Council Local Plan (2010-2027)* also recognises the importance of Sizewell C which would bring jobs opportunities for approximately 5,000 to 6,000 staff during the construction phases and between 700 to 1,000 staff for the operation phase.

3.3.3 MID SUFFOLK DISTRICT'S CORE STRATEGY FOCUSED REVIEW

Mid Suffolk District's Core Strategy Focused Review, adopted in December 2012, is supplementary to the *Core Strategy* adopted in 2008, and defines the spatial vision for the district to 2025. A joint Babergh & Mid Suffolk Local Plan document has been prepared that went to consultation in late 2017. The key relevant aspects of the current 2008-2025 *Core Strategy*, taking account of the supplementary review and emerging *Joint Local Plan*, are summarised in the following sections.

Vision

- By 2025 the Mid Suffolk district will become a more prosperous, healthy, safer, attractive and greener place to live with fewer inequalities, improved access to and provision of housing, employment and services for all

Objectives & Policy

FC2: Provision and Distribution of Housing

- Allocation for at least 2,625 homes and associated infrastructure for the period between April 2012 and 2025, equivalent to the provision of 202 new dwellings per year
- The emerging *Joint Local Plan* indicates that provision for 9,951 new dwellings are necessary between 2014 and 2036 in Mid Suffolk

FC3: Supply of Employment Land

- Allocation for development that delivers at least 8,000 additional jobs in the district by 2026 will be made, and an indicative 11,100 jobs by 2031

CS12: Retail Provision

- Aiming to deliver 6,100m^2 of additional retail floorspace in Stowmarket, and maintain or increase retail floorspace in other district centres

The *Core Strategy (2008-2025)* recognises that Mid Suffolk has a higher than average number of cars per household. The district aims to promote alternatives to car and freight transportation and increase more sustainable methods of travel.

The emerging *Joint Local Plan* makes reference to an INR, and encourages development in the future to be planned, such that the provision of key infrastructure, including an INR can be delivered.

The *Core Strategy (2008-2025)* takes account of the Regional Transport Strategy objectives and will contribute to Suffolk's LTP to maintain viable communities in towns and villages.

3.3.4 GREATER IPSWICH CITY DEAL

The *Greater Ipswich City Deal* is very much focused on jobs, especially youth employment, and seeks to grow the local economy in potential areas of employment, with sites identified for this growth as follows:

- 6,500 research and innovation jobs at the Adastral Park and Innovation Martlesham
- 15,000 advanced manufacturing jobs in Suffolk
- Biotechnology jobs at UoS
- Financial Services
- 600 jobs in low carbon industry manufacturing
- Jobs in the agri-science and agri-tech research bases

4 CURRENT & FORECASTED SITUATION

This chapter aims to describe the existing demographic, socioeconomic and transport conditions within the wider Ipswich area, identifying past trends and future projections from a variety of sources. The data presented in this chapter will illustrate the baseline scenario and help to establish the need for intervention.

4.1 DEMOGRAPHIC PROFILE

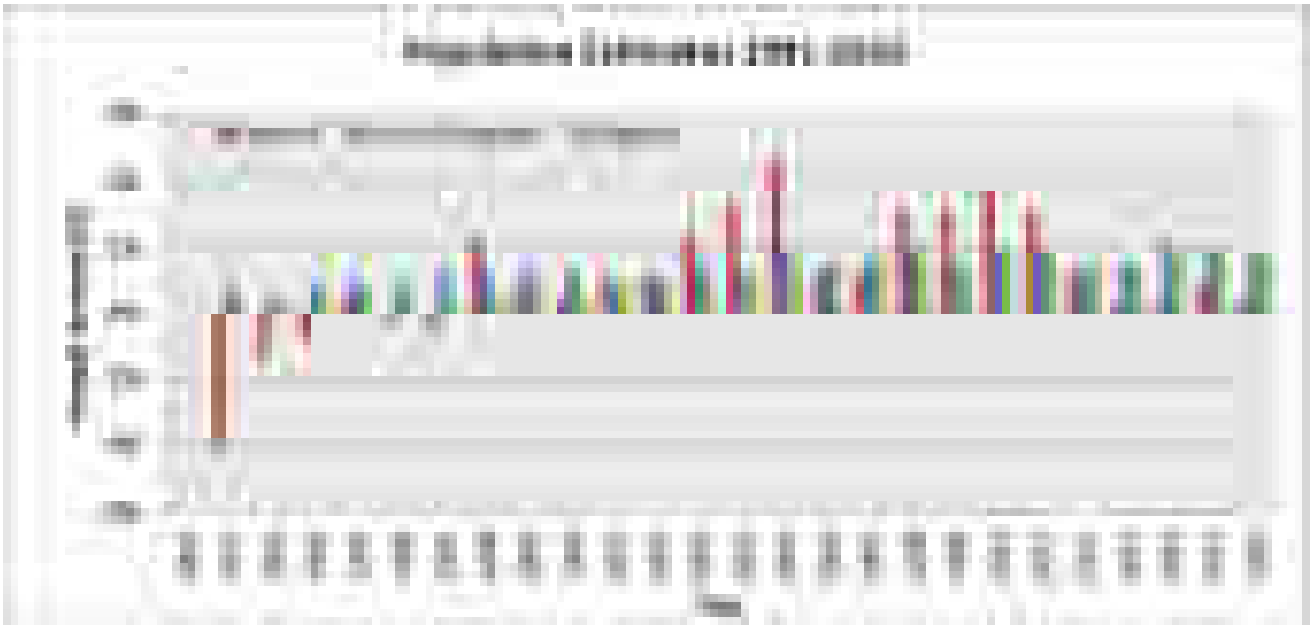
This section aims to set out the population and age structure of Ipswich, relative to past and future regional and national trends.

4.1.1 Resident Population

Historic

The resident population change over time provides a good baseline statistic for the level of growth in all sectors within an area, in addition to its level of attractiveness. Annual population estimates 1991-2016 have been obtained for the Ipswich district. The percentage annual increase is compared with the East of England and England in **Figure 4**.

Figure 4 Population Estimates 1991-2016



Source: Office for National Statistics

Figure 4 shows that throughout the early and mid-1990s, Ipswich's population generally decreased each year, compared with the East of England region and England as a whole, which experienced steady population growth.

The population of Ipswich, the East of England and England have increased in every year since 1998 at varying rates; the estimated population of Ipswich in 2016 was 135,908. The East of England has consistently outgrown the country as a whole in terms of population, while Ipswich has fluctuated above and below the national population growth rate. The periods 2003-2005 and 2008-2011 demonstrated particularly high levels of population growth in comparison with the national and regional rates.

To further explore this period of growth, 2001 and 2011 Census data has been obtained. Total population and working age (16-64) population statistics for all districts in Suffolk, the East of England region and England as a whole have been compared in **Table 5**. For geographical context, **Figure 5** shows the 2011 Census Local Authority district boundaries within Suffolk.

Figure 5 Local Authority Districts within Suffolk

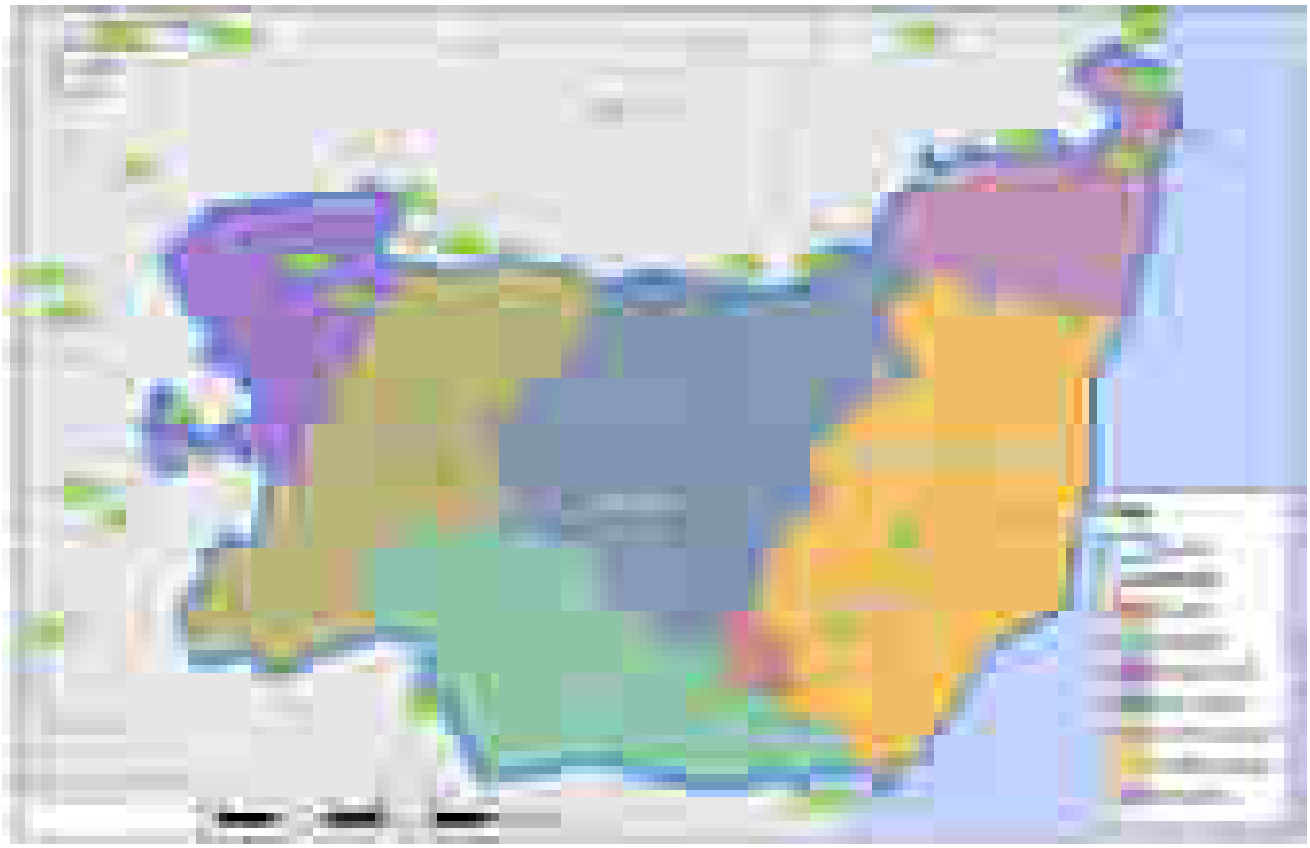


Table 5 Total Population and Working Age (16-64) Population: 2001 & 2011 Census

Area	Total Population			Working Age (16-64) Population		
	2001	2011	% Increase	2001	2011	% Increase
Ipswich	117,069	133,384	14%	72,846	87,566	20%
Babergh	83,461	87,740	5%	51,873	53,065	2%
Forest Heath	55,510	59,748	8%	35,716	38,990	9%
Mid Suffolk	86,837	96,731	11%	54,437	59,436	9%
St Edmundsbury	98,193	111,008	13%	63,269	69,693	10%
Suffolk Coastal	115,141	124,298	8%	68,875	73,596	7%
Waveney	112,342	115,254	3%	66,328	67,876	2%
Suffolk	**668,553**	**728,163**	**9%**	**413,344**	**450,222**	**9%**
East of England	**5,388,140**	**5,846,965**	**9%**	**3,418,763**	**3,714,151**	**9%**
England	**49,138,831**	**53,012,456**	**8%**	**31,429,250**	**34,329,091**	**9%**

Source: Office for National Statistics

Table 5 demonstrates the relatively high level of total population growth in Ipswich between 2001 and 2011 (14% increase). Other districts in Suffolk which also expanded in terms of total population greater than the national level were St Edmundsbury (13%) and Mid Suffolk (11%). Suffolk and the East of England both experienced population growth of 9% between the two Census periods, greater than the national growth of 8%.

The pattern is largely reflected within the working age population, with several districts of Suffolk at or above the national working age population growth rate of 9%. Ipswich itself was significantly higher, with 20% more people at working age in 2011 than 2001. This demand for jobs is both an engine for job creation within the local area and an indicator of the attractiveness of Ipswich as a residence for workers in its vicinity. Suffolk and the East of England were in line with the national working population growth rate of 9%.

As population increases, the population density also tends to increase. This is evidenced within the Census statistics, as population density in Ipswich in 2001 was 29.7 people per hectare, growing to 33.8 people per hectare in 2011. This statistic indicates the urbanisation of previously undeveloped areas or the redevelopment of areas at a higher density, applying pressure to the existing networks and infrastructure.

It should be noted that **Figure 4** reveals a reduction in the level of population growth experienced between 2001 and 2011. While the population is not decreasing, it does fall short of the national and regional rates of population growth, indicating some pressure on the area to meet demand for housing or employment growth.

Future

If past trends are to continue, the study area will continue to grow in terms of population. It is the ambition of Ipswich Borough Council (IBC) to cater for this growth sustainably and adequately, for which some forecasts of probable future population are required. Planning data loaded into the Trip End Model Presentation Program (TEMPro v7.2) software has been used to project the future population trends in Ipswich, the East of England and England. **Figure 6** illustrates the projected population of Ipswich up to 2036 and the percentage growth from 2016.

Figure 6 TEMPro v7.2 Forecasted Population Growth 2016-2036

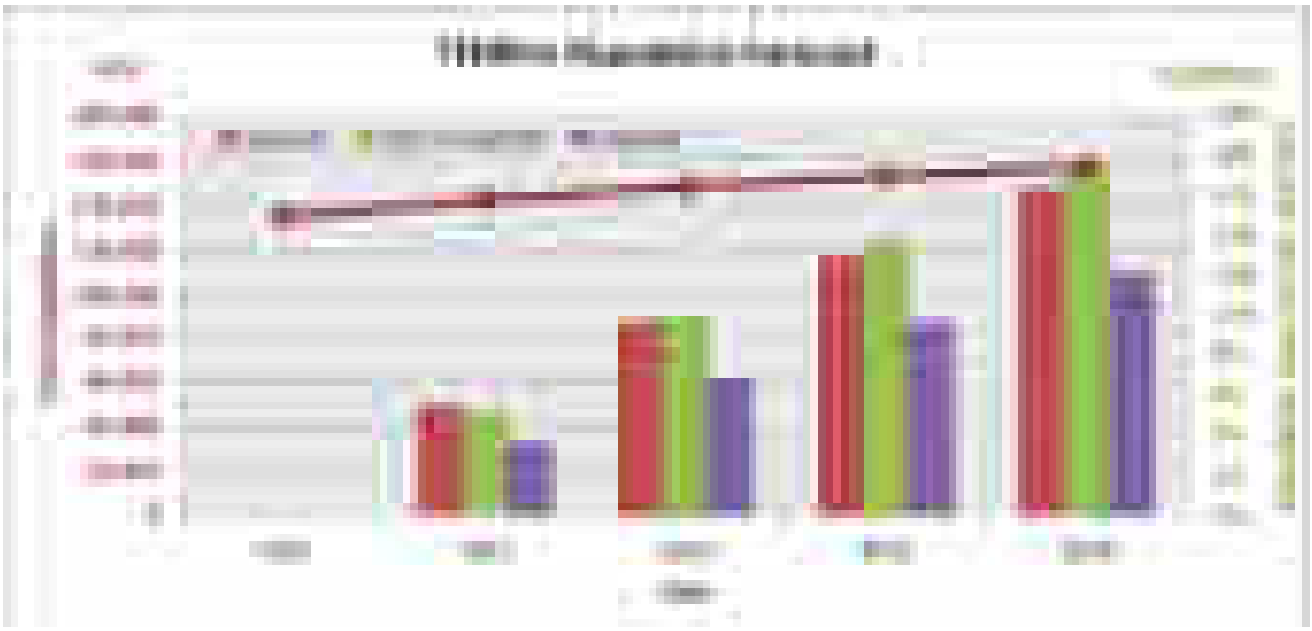


Figure 6 shows that the population of Ipswich in the short term is likely to exceed the level of growth in the East of England and be almost double the rate of England. This would see Ipswich's total population exceed 140,000. Although it is expected to continue to grow in the longer term, it falls behind the East of England by 2026. There are ambitious short to medium term growth targets in the East of England in areas such as Cambridgeshire and Bedfordshire, reflected in the population growth targets. By 2036, the population in Ipswich is expected to have grown by approximately 16% from 2016, compared with 17% and 12% in the East of England and England respectively.

Such growth relies on the appropriate infrastructure being implemented in a timely fashion to facilitate residential, commercial and economic growth.

4.2 SOCIOECONOMIC PROFILE

This section aims to set out the social and economic context of Ipswich and the wider region, and how this compares with historical and forecasted national trends.

4.2.1 HOUSING

Historic

2001 and 2011 Census statistics have been obtained to interrogate housing growth between the two Census periods. The total number of households for all districts in Suffolk, the East of England region and England as a whole has been compared in **Table 6**.

Table 6 Number of Households: 2001 & 2011 Census

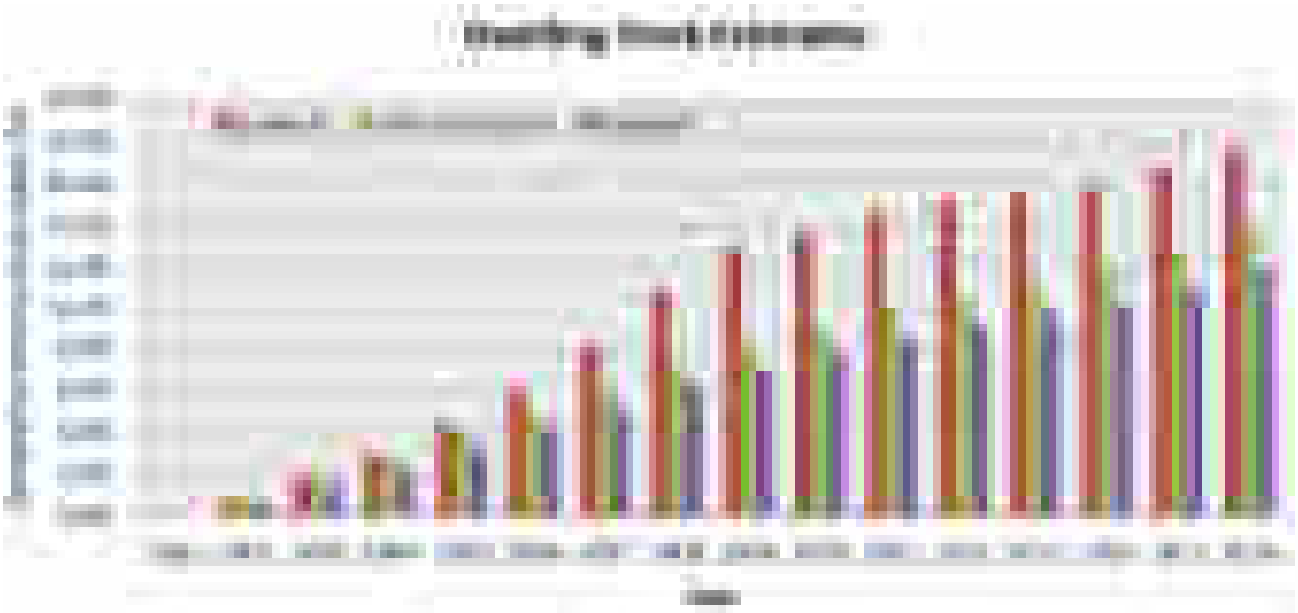
Locations	2001 Households	2011 Households	% Increase
Ipswich	49,869	57,298	15%
Babergh	34,865	37,522	8%
Forest Heath	23,018	25,376	10%
Mid Suffolk	35,396	40,306	14%
St Edmundsbury	40,560	45,802	13%
Suffolk Coastal	49,025	53,558	9%
Waveney	48,424	50,883	5%
Suffolk	**281,155**	**310,745**	**11%**
East of England	**2,231,974**	**2,423,035**	**9%**
England	**20,451,427**	**22,063,368**	**8%**

Source: Office for National Statistics

Table 6 demonstrates the relatively high level of household growth in Ipswich between 2001 and 2011 (15% increase). Other districts in Suffolk which expanded in terms of households at a faster rate than the national level were Mid Suffolk (14%), St Edmundsbury (13%), Forest Heath (10%) and Suffolk Coastal (9%). In keeping with the majority of the districts within it, Suffolk exceeded the national housing growth rate of 8%, and the regional increase of 9%, with 11% more households in 2011 than in 2001.

Dwellings are defined in the 2011 Census as a single self-contained household space (an unshared dwelling) or two or more household spaces at the same address that are not self-contained, but combine to form a shared dwelling that is self-contained. Dwelling stock estimates are available annually up to 2016, at Local Authority level and above. This data has been obtained for Ipswich, East of England and England to analyse the growth in dwellings over time. The cumulative percentage increase in dwelling stock since 2001 is presented in **Figure 7**.

Figure 7 Cumulative Percentage Dwelling Stock Increase from 2001-2016



Source: Ministry of Housing, Communities & Local Government

Figure 7 illustrates that Ipswich has experienced a much greater cumulative growth in dwelling numbers since 2001 than the East of England, and to a greater extent, England as a whole. By 2016, Ipswich had almost 18% more dwellings than in 2001, whereas the East of England had nearly 14% and England as a whole had 12%.

The year-on-year percentage increases have been plotted in **Figure 8** to analyse how consistent the dwelling growth has been and identify any periods of particularly high or low growth.

Figure 8 Year-on-Year Percentage Dwelling Stock Increase

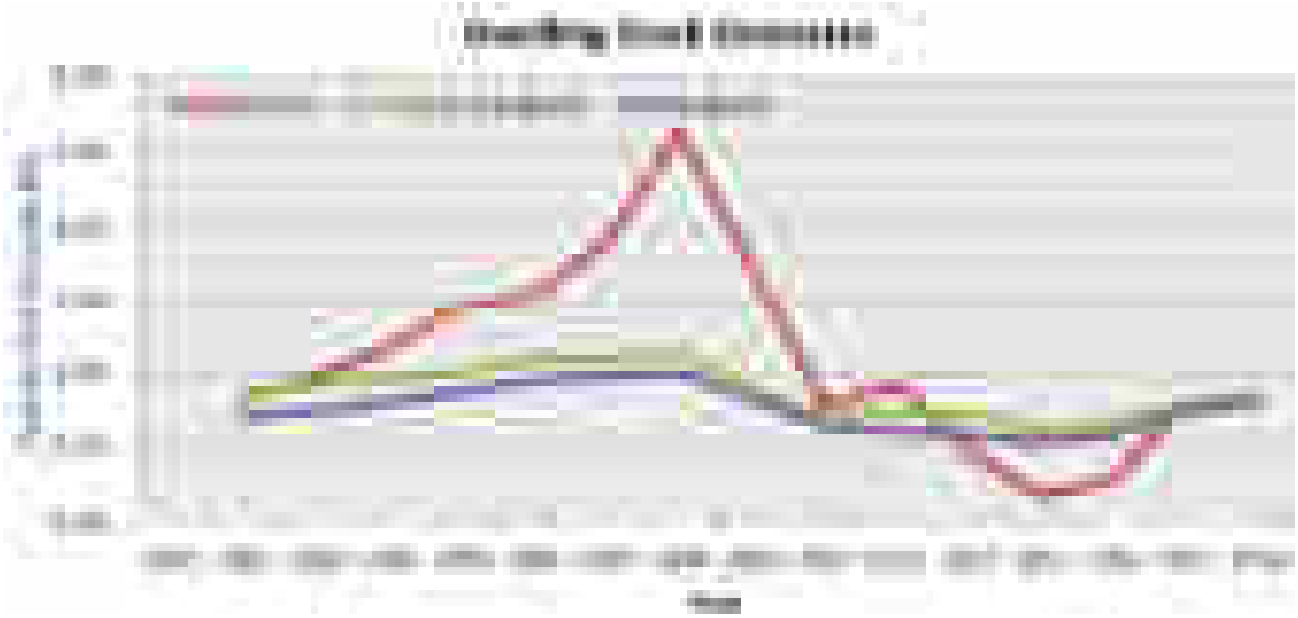


Figure 8 clearly demonstrates that the rate of growth in Ipswich was greater than the regional and national rates every year between 2003 and 2011. In particular, the growth from 2007 to 2008 (2.6%) was significantly greater than the regional (1.1%) and national (1.0%) rates.

However, in more recent years the level of growth in Ipswich has fallen behind the East of England and England; significantly so between 2012 and 2014. In combination with the slowing population growth presented in **Section 4.1**, this trend serves as an indicator of constraints on growth in the area.

Future

To support the level of population increase demonstrated in **Section 4.1**, there needs to be adequate house building within the study area. Local planning policies aim to allocate sufficient land to support growth in a sustainable manner. The planning policy driven forecasts from TEMPro v7.2 have been obtained for Ipswich, the East of England and England. The cumulative increase from 2016 and total households in Ipswich are presented in **Figure 9**.

Figure 9 TEMPro v7.2 Forecasted Housing Growth 2016-2036

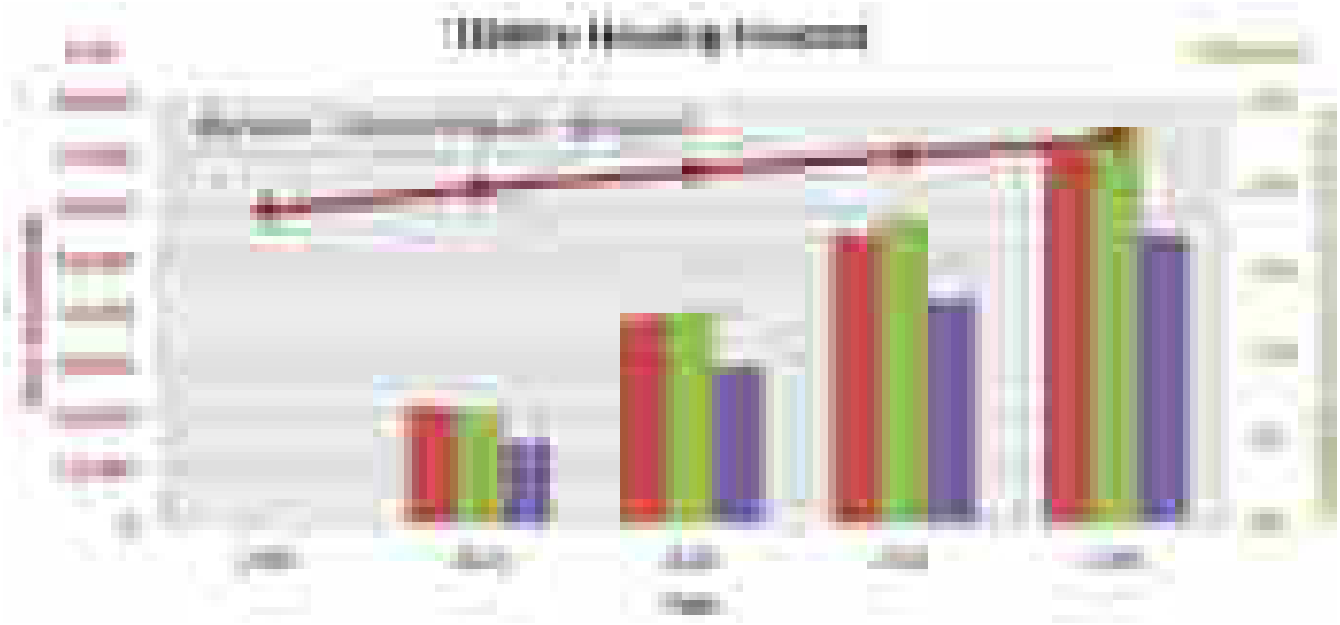


Figure 9 largely reflects the trends demonstrated in the population forecasts. It shows that housing in Ipswich in the short term is likely to exceed the level of growth in the East of England, both of which are above the national forecast. Although the number of households in Ipswich is expected to continue to grow in the longer term, it falls behind the East of England by 2026. By 2036, the population in Ipswich is expected to have grown by approximately 22% from 2016, compared with 23% and 17% in the East of England and England respectively.

The rate of housing growth forecasted is even greater than population growth forecasts, hence it is essential that appropriate infrastructure is being implemented in a timely fashion to facilitate residential, commercial and economic growth.

IBC's document *Topic Paper: Reviewing the Ipswich Housing Figures* provides an evidence base on Ipswich's expected growth, with particular focus on housing demand and delivery.

The document confirmed that the Core Strategy and Policy CS7 have highlighted a housing requirement of 13,550 dwellings between 2011 and 2031 (approximately 678 dwellings per year).

IBC has identified that land to the north of Ipswich could accommodate approximately 3,500 dwellings, in addition to 1,394 allocated within their Development Plan Document. The remainder of the requirements will look to be delivered through the granting of planning permission for schemes either within the Borough area, or working with neighbouring authorities, in addition to those already completed since April 2011.

4.2.2 EMPLOYMENT

Historic

The 2001 and 2011 Census provides information about the Workplace Population (WP) of an area. The WP is defined as all usual residents aged 16 to 74 whose usual place of work is in the area. These statistics have been obtained for all districts in Suffolk, the region of East of England and England as a whole, as they provide a good estimate of the number of jobs in an area. The percentage increase from 2001 to 2011 is summarised in **Table 7**.

Table 7 Workplace Population: 2001 & 2011 Census

Locations	2001 Working Population	2011 Working Population	% Increase
Ipswich	65,888	71,601	9%
Babergh	32,220	35,722	11%
Forest Heath	32,159	32,904	2%
Mid Suffolk	34,643	41,665	20%
St Edmundsbury	50,311	58,400	16%
Suffolk Coastal	47,996	54,351	13%
Waveney	42,465	44,953	6%
Suffolk	**305,703**	**339,596**	**11%**
East of England	**2,383,212**	**2,650,835**	**11%**
England	**22,376,119**	**25,087,843**	**12%**

Source: Office for National Statistics

Table 7 shows that the number of jobs in Ipswich increased by 9% from 2001 to 2011, below the rate of increase in the East of England and England as a whole. However, elsewhere in Suffolk, the percentage increase in jobs was 20% in Mid Suffolk, 16% in St Edmundsbury and 13% in Suffolk Coastal; all greater than the national average of 12%.

Compared with the rate of growth in the working age population in Ipswich (20%), set out in **Section 4.1**, the rate of job increase is much lower. This disparity is made clearer when studying the absolute changes: the working age population increased by 14,720, whereas the workplace population (jobs) increased by 5,713. In total the working age population was 15,965 more than the number of jobs in Ipswich in 2011. This illustrates the attractiveness of Ipswich as a place to live for the economically active but indicates that there is significant outward commuting to reach their workplaces.

While demonstrating an increase in jobs, Ipswich falls behind other districts in Suffolk, the East of England and the national average growth. The disparity between population and jobs, both in terms of absolute numbers and historical growth, indicate the need to invest in the provision of adequate employment opportunities for future sustainable growth. This in turn relies upon an adequate, high quality transport network, capable of connecting residents with their jobs and essential facilities and services.

Future

To support the level of population and housing increases, there needs to be adequate investment in the creation of jobs within the Ipswich Borough and surrounding area. Local planning policies aim to allocate sufficient land to support growth in a sustainable manner. The planning policy driven forecasts from TEMPro v7.2 have been obtained for Ipswich, East of England and England. The cumulative increase from 2016 and forecasted job numbers in Ipswich are presented in **Figure 10**.

Figure 10 TEMPro v7.2 Forecasted Jobs Growth 2016-2036

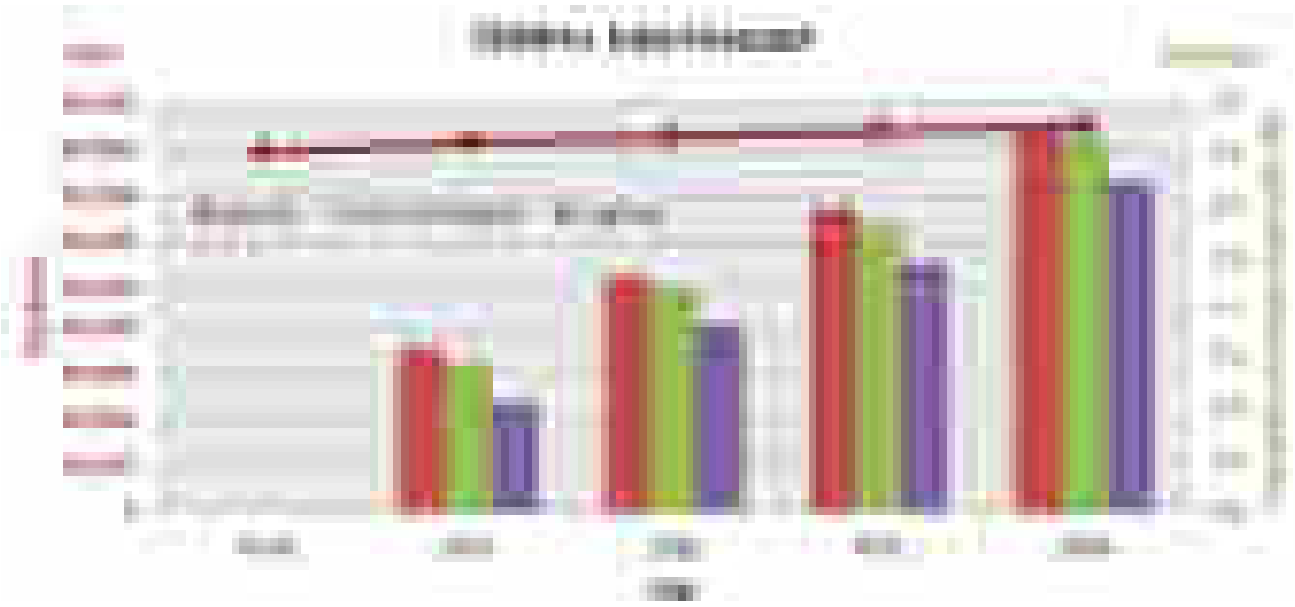
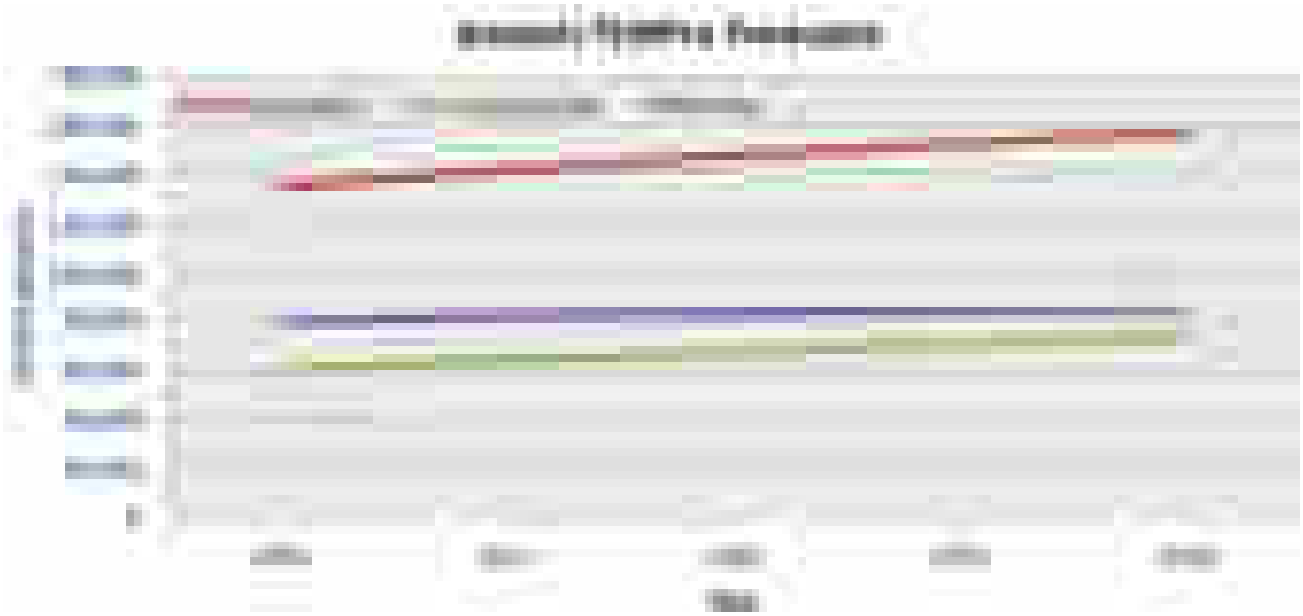


Figure 10 illustrates that Ipswich is forecasted to have a faster rate of job growth than the rest of the East of England region and England as a whole. The cumulative growth from 2016 maintains this pattern throughout the forecast through to 2036, by which time the number of jobs is forecasted to be approximately 7.6% more than 2016 (or approximately 6,000). The surrounding districts were also analysed for forecasted jobs growth and Suffolk Coastal is seen to have a higher cumulative increase in jobs than Ipswich by 2036, with an 8.0% increase from 2016 to 2036. However, Ipswich will continue to have the greatest number of jobs within Suffolk, forecasted to be 85,279 in 2036, compared to that of Suffolk Coastal – 70,745 jobs by 2036. All the districts and boroughs in Suffolk will see jobs growth higher than that of England, which shows that Suffolk will be a key employment area continuing into the future. **Figure 11** shows the TEMPro forecasted change in population, households and jobs in Ipswich up to 2036.

The forecasted job growth is contradictory to historical patterns, predicting an upward trend in job growth from what has historically been the case. This further reinforces the need to invest in the provision of adequate employment opportunities for future sustainable growth; and subsequently the provision of a high-quality transport network capable of connecting residents with their jobs and other services is essential.

Figure 11 TEMPro Forecast



4.3 TRANSPORT CONDITIONS

This section aims to provide background information on the existing transport conditions in the wider Ipswich area, focussing on all modes of travel, their current level of operation and safety, and their forecasted future growth.

4.3.1 HIGHWAY CONTEXT

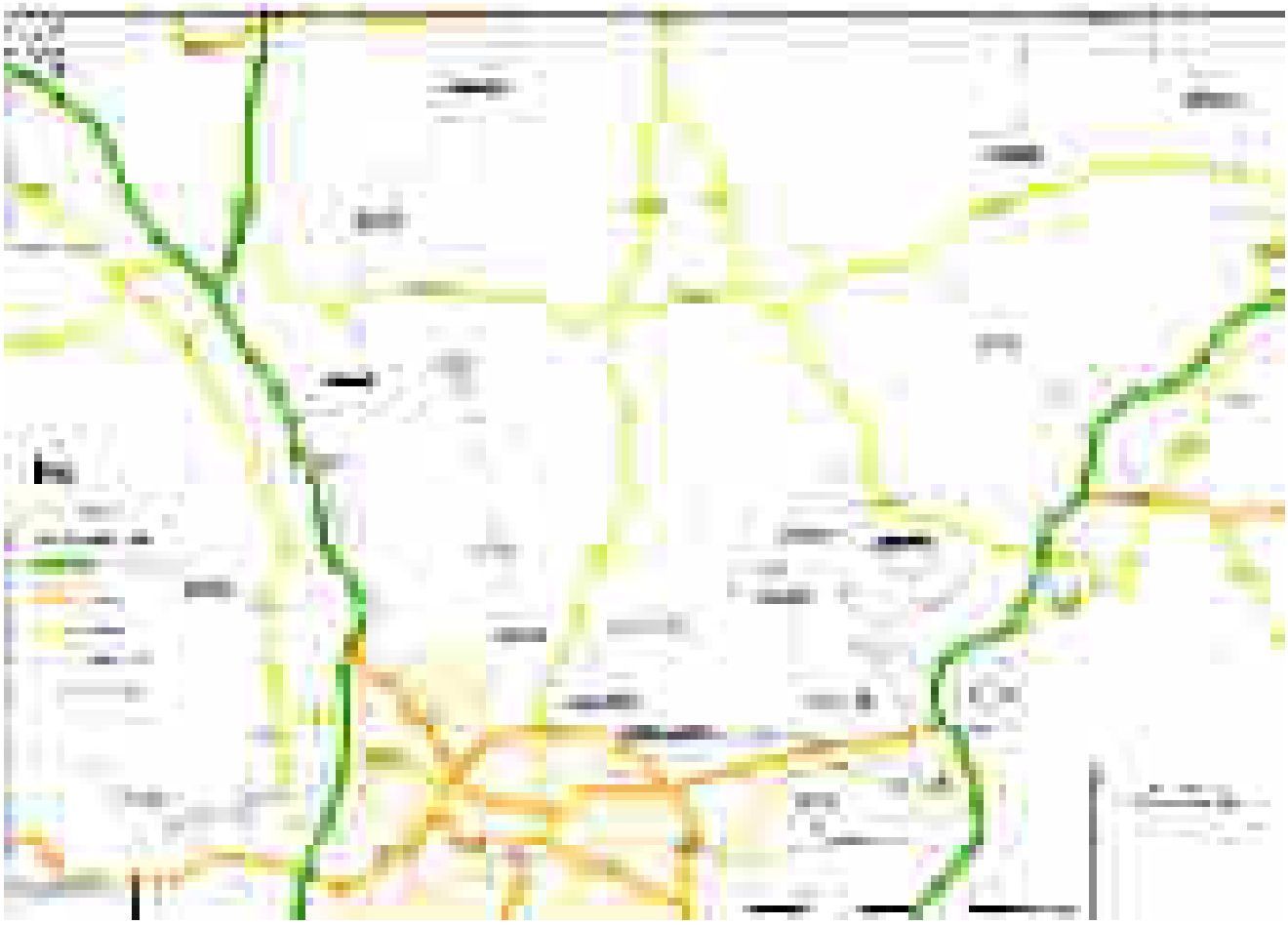
This section specifically focusses on key roads located within the study area. For context, public highways in Suffolk are assigned distinct designations to identify the strategic hierarchy of the road, defining its character and likely capacity. The hierarchy is set out in **Table 8**. This information is based on the guidance document *Well Maintained Highways Code of Conduct* 2005 edition (with updates from 2013), published by the Road Liaison Group.

Table 8 Suffolk Highway Hierarchy

Category	Hierarchy	Type of Road General Description	Description
1	Motorway	Limited access motorway regulations apply	Routes for fast moving long distance traffic. Fully grade separated and restrictions on use.
2	Strategic Route	Trunk and some Principal 'A' roads between Primary Destinations	Routes for fast moving long distance traffic with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.
3a	Main Distributor	Major Urban Network and Inter-Primary Links. Short-medium distance traffic	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.
3b	Secondary Distributor	Classified Road (B and C class) and unclassified urban bus routes carrying local traffic with frontage access and frequent junctions	In rural areas these roads link the larger villages and HGV generators to the Strategic and Main Distributor Network. In built up areas these roads have 30mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons.
4a	Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions	In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two way traffic. In urban areas they are residential or industrial interconnecting roads with 30mph speed limits random pedestrian movements and uncontrolled parking.
4b	Local Access Road	Roads serving limited numbers of properties carrying only access traffic	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads of cul-de-sacs.

Ipswich and the surrounding area contain a large variety of road types, as demonstrated in **Figure 12**. Ipswich itself is bordered by two primary routes of strategic importance (the A14 and A12) and a number of secondary rural roads that support trips both locally and more strategically (B1078, B1079 and B1077). In addition to these roads, there are a number of A-roads that act as radial routes into Ipswich Town Centre and a network of minor roads that connect residential settlements with the town itself and with the strategic routes.

Figure 12 Local and Strategic Road Network



A14

The A14 falls into Suffolk Highway Hierarchy category 2. The road is a dual carriageway with grade separated junctions.

The A14 is a major strategic route in East Anglia which serves both longer distance strategic trips in addition to local trips between various settlements in Suffolk. The A14 spans approximately 200km from the port of Felixstowe in Suffolk, through Cambridgeshire and Northamptonshire to the Catthorpe Interchange where the A14 meets the M1 and M6 motorways. The A14 forms part of Euroroutes E24 and E30, indicating that it is a designated part of the international road network.

As a result of connecting the Port of Felixstowe and a number of strategically significant routes, the A14 carries a significant proportion of Heavy Goods Vehicles (HGVs). HE's Web-based Traffic Information System (WebTRIS) data indicates that heavy vehicles make up approximately 15% of Annual Average Daily Flow (AADF) on the A14 to the south of Ipswich and around 16% to the west of Ipswich, which is significant given that the average proportion of heavy vehicles on trunk roads in the East of England is 11% (DfT AADF, 2016).

Locally, the A14 acts as an Ipswich southern and western bypass and provides a strategic crossing of the River Orwell between Junctions 56 and 57. The alignment of the A14 allows trips across Ipswich to be made without the need to travel through the Town Centre.

The main A14 interchanges within the study area from west to east are:

- Junction 51 (Needham Market) – A140
- Junction 52 (Claydon) – B1113
- Junction 53 (White House) – A1156
- Junction 54 (Sproughton) – Sproughton Road / Lower Road
- Junction 55 (Copdock) – A12 / A1214
- Junction 56 (Wherstead) – A137
- Junction 57 (Ravenswood) – A1189 / Nacton Road
- Junction 58 (Seven Hills) – A12 / A1156

A12

The A12 is another major strategic road that passes through Suffolk, linking London to Lowestoft. The section between London and the A14 (Copdock Roundabout) is managed by HE as part of their SRN. The A12 is intersected by the A14 between Junctions 55 and 58. The A12, between Ipswich and just north of Woodbridge, is a dual carriageway and the junctions are all at-grade roundabouts with some minor routes using at-grade left turn only 'T' junctions.

The A12 provides a strategic north-south route to the east of Ipswich which acts as an eastern bypass, preventing trips from needing to travel through Ipswich Town Centre. The A12 serves a number of key employments sites including Adastral Park and Martlesham Business Park.

Radial Routes

Ipswich has approximately 16 radial routes connecting the settlements outside of the town in nearly all directions. The roads are mostly single carriageway with two lanes of traffic allowing movements in both directions.

To the north of Ipswich, within the study area, the following radial roads are present (from west to east), as indicated in **Figure 13**:

- A1156 (Norwich Road)
- Henley Road
- B1077 (Westerfield Road)
- Tuddenham Road
- Playford Road
- A1214

Figure 13 Northern Radial Routes and SRN

The A1156 (Norwich Road) is a 30mph single carriageway route that connects the A14 (Junction 53) and the Anglia Retail Park to Ipswich Town Centre. The road includes a southbound bus and cycle lane (and bus gates at signalised junctions). The road is approximately 4.4km in length from the A14 to Ipswich Town Centre.

Henley Road is a 30mph single carriageway route until the outskirts of Ipswich at which point it becomes a national speed limit rural route. It runs parallel to the A14 western bypass and is classified as a secondary distributor road. It includes a short section of southbound on-road cycle lane as it meets the outer ring road. The road connects to Henley and Hemingstone to the north of Ipswich and it eventually terminates at a junction with the B1078. Henley Road is also accessible from the village of Claydon and A14 Junction 52 which means it offers a potential alternative to Norwich Road when travelling from the north.

The B1077 (Westerfield Road) is a 30mph single carriageway route at its southern extent, where it meets the Ipswich Outer Ring Road. The speed limit increases to 40mph at the outskirts of Ipswich, occasionally dropping to 30mph as it passes through Westerfield. It eventually becomes a 60mph rural road north of Westerfield. It connects to Witnesham and Ashbocking to the north of Ipswich and also to the B1078 and the A1120. Ultimately the B1077 connects Ipswich to Eye and Diss at the Norfolk border. The road can be classified as a secondary distributor road.

Tuddenham Road is a 30mph single carriageway route at its southern extent which becomes a rural national speed limit route north of Humber Doucy Lane. It is a secondary distributor road on the Suffolk hierarchy, which connects Grundisburgh to Ipswich via Tuddenham and Culpho. Tuddenham Road connects to the B1079 at Grundisburgh which allows access to the A12 at Woodbridge.

Playford Road is another 30mph single carriageway route at its southern extent which becomes a national speed limit rural route north of Rushmere. It follows a similar corridor to the A1214, but offers a narrower, more rural alternative. Playford Road does not have a connection with the A12, but it does link Martlesham to Ipswich Town Centre. This road is also considered to be a secondary distributor road.

The A1214 is the most western major radial route within the study area, linking the A12 and Martlesham to Ipswich Town Centre. The A1214 is a 30mph single carriageway route with footpaths along the majority of its length and a short section of off-road cycle lane outside Kesgrave High School. It has a short section of westbound bus lane on approach to Ropes Drive (east) and a short section of westbound bus lane where the A1214 meets the A1189 (Heath Road). The A1214 has a number of signalised junctions and roundabouts, where key access points from residential areas to the south connect to it. It is the key route that serves Ipswich Hospital and it becomes Colchester Road / Valley Road / Yarmouth Road as it passes the Town Centre, acting as an Ipswich northern outer ring road. The route also continues to head west and connects to the A14 / A12 Copdock Interchange to the south-west of the town.

Currently, there is not a direct route to travel from east to west (or vice versa) immediately to the north of Ipswich. This journey can be made using the B1078 which is located approximately 8km north of Ipswich, or by using the A14 / A12 to travel round Ipswich to the south. Alternatively, a series of rural roads between Claydon and Woodbridge can be used. This route is formed by Church Lane, Henley Road, Lower Road, Main Road, Hall Farm Road and Grundisburgh Road before using the B1079 to access the A12.

Measured as the crow flies, the A14 and A12 are approximately 13km apart. The three east-west routes currently available are 21km (B1078), 31km (A14 / A12) and 19km (rural route) in length from Claydon to Woodbridge and they all take approximately 25-minutes. Taking 25-minutes to travel a distance of 13km (as the crow flies) equates to an average speed of 19mph, so the current east-west options are not considered to be efficient. A more direct route could significantly reduce travel times and improve access to the northern Ipswich radial routes.

4.3.2 NATIONAL RAIL NETWORK

The suitability of the existing rail network to provide a valid alternative to road-based trips, within the study area, has been assessed by analysing the existing routes, stations and services. The main local rail routes are all connected to Ipswich Railway Station which holds a central position on the network. Ipswich Railway Station is currently managed by Abellio Greater Anglia. Ipswich station is served by the following key routes shown in **Table 9**. A plan showing the national rail network within the study area is provided in **Figure 14**.

Table 9 Existing Rail Network

Service	Calling Points
London Liverpool Street to Norwich	Stratford, Shenfield, Chelmsford, Witham, Marks Tey, Colchester, Manningtree, Ipswich, Stowmarket and Diss
London Liverpool Street to Ipswich	Shenfield, Chelmsford, Witham, Colchester and Manningtree
Peterborough to Ipswich	Whittlesea, March, Manea, Ely, Bury St Edmunds and Stowmarket
Cambridge to Ipswich	Dullingham, Newmarket, Kennett, Bury St Edmunds, Thurston, Elmswell, Stowmarket and Needham Market
Felixstowe to Ipswich	Trimley, Derby Road and Westerfield
Lowestoft to Ipswich	Oulton Broad South, Beccles, Brampton, Halesworth, Darsham, Saxmundham, Wickham Market, Melton and Woodbridge

Figure 14 National Rail Network

In addition to Ipswich Railway Station, Derby Road Railway Station (east Ipswich) and Westerfield Railway Station (north Ipswich) are also available for travel; they are currently managed by the same rail operator.

Table 10 shows the expected growth in number of passengers at each of the local railway stations in or close to the study area. Base data is taken from the Office of Rail and Road (ORR) 2015 annual patronage figures and growth figures are taken from the Anglia Route Study (ARS), March 2016.

Table 10 Table of Expected Passenger Station Utilisation Growth

Station Name	Passengers per Annum	Growth 2011-2023 (ARS)	Growth 2013-2043 (ARS)
Derby Road	46,336	61,164	81,088
Ipswich	3,312,564	4,372,584	5,796,987
Melton	68,516	90,441	119,903
Westerfield	9,864	13,020	17,262
Woodbridge	202,444	267,226	354,277
Stowmarket	944,466	1,246,695	1,652,816
Needham Market	91,358	120,593	159,877

The data shows that Ipswich Railway Station is by far the most popular station within the study area, followed by Woodbridge. Stowmarket is also well used but is outside of the study area. Ipswich Station has also been analysed for rail improvements as part of the Suffolk Rail Prospectus. The document highlights the need to reduce journey times from Ipswich to areas like Cambridge; a study commissioned by Suffolk County Council found that a half-hourly service to Cambridge would generate £35m in economic and associated benefits. Improvements are also highlighted in Ipswich to upgrade the platform capacity and the station forecourt.

The ARS forecasts predict that there will be a 32% increase in local passenger demand for rail services to 2023 and 75% to 2043 from local services into London via the Great Eastern Norwich and outer suburban services.

The Westerfield Railway Station is not heavily used at present. The Ipswich Garden Suburb development will provide approximately 3,500 homes and associated ancillary land uses adjacent to the station. There is therefore additional scope for passenger growth if Westerfield station becomes fully integrated into the Masterplan.

A new railway station could be provided between Ipswich and Needham Market as part of developments at Great Blakenham. Such a scheme could increase accessibility by rail to the north-west of Ipswich, if it is taken forward.

Other than Ipswich Town Centre, key local employment sites are currently not well connected to the rail network making it less possible for future increased demand to travel to work by rail in the wider Ipswich area.

4.3.3 BUS AND COACH NETWORK

Several local bus services operate in the study area. The existing bus network has been assessed to understand the current availability and level of service in the study area. Ipswich Buses operate services from Tower Ramparts Bus Station on Crown Street, whilst all other bus services stop at the Old Cattle Market on Turret Lane. It is also noted that the Park & Ride services do not run on Sundays.

Ipswich Buses

The bus operator Ipswich Buses is owned directly by IBC and is the main operator in the town. **Figure 15** shows the current network operated by the company within Ipswich.

Figure 15 Ipswich Buses Network

Source: Ipswich Buses website

Bus services operating in the northern part of Ipswich include;

- No.8: Westbourne and Whitehouse (north-west) to the Town Centre
- No.9/10: Town Centre to the Castle Hill and Whitton area, also to the north-west of Ipswich
- No.19: Circular service linking Dale Hall, Valley Road and south of the Westerfield railway line
- No.6/6A: Circular service covering the area to the east of the Town Centre, routing between Rushmere / Northgate in the north-east, the hospital, Priory Heath, and Town Centre
- No.800: Park & Ride service that runs along the A1214 from Martlesham Park & Ride (east), travelling through Ipswich Town Centre and on to London Road Park & Ride (south-west)

Table 11 provides an indication of the frequency of each of the Ipswich Buses routes, many of which operate regularly with a 20-minute frequency or better (Monday-Saturday). The only exception to this is service No.19 which has a 30-minute frequency and no service on Sundays.

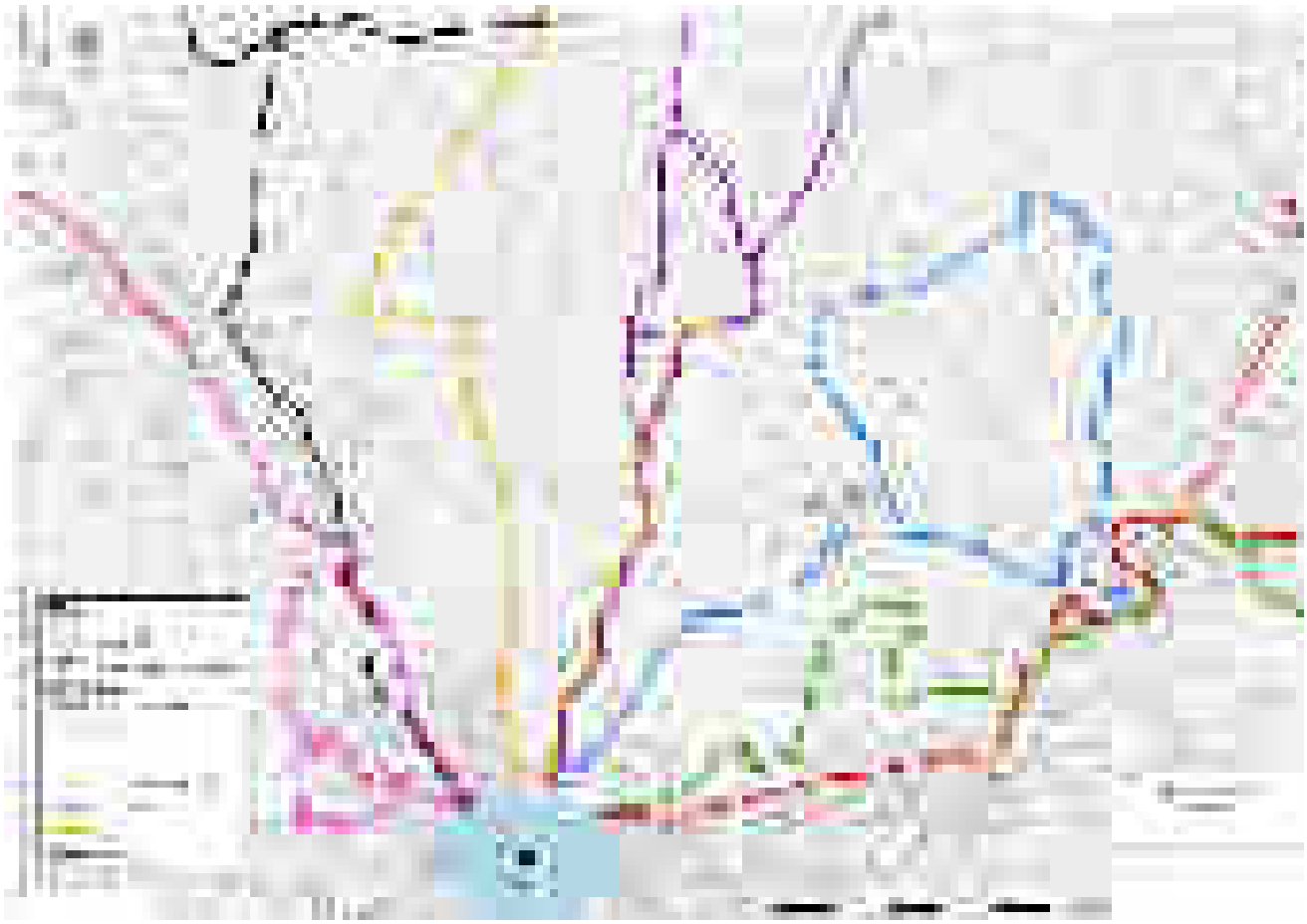
Table 11 Existing Ipswich Buses Services in the North of Ipswich

Service No	Bus Route	Frequency	
		Monday-Saturday	Sunday
5E (Evenings Only)	Ipswich Central – Foxhall Road – Ipswich Hospital, Garret Anderson Centre – Woodbridge	30 mins	Hourly
6	Ipswich Central – Northgate – Rushmere – Ipswich Hospital	20-30 mins	Hourly
7	Ipswich Central – Dale Hall – Henley Road – Stratford Court – Asda & Anglia Retail Park	Hourly	N/A
8	Ipswich Central – Bramford Road – Whitehouse – Asda & Anglia Retail Park	10-15 mins	20-30 mins
9/10	Ipswich Central – Norwich Road – Whitton – Castle Hill – Norwich Road – Ipswich Central	10 mins	20 mins
111	Ipswich – Somersham – Bildeston - Hitcham	2-3 Hours	N/A

Other Local Bus Services

Several bus services, with different bus operators such as Galloway European and First in Norfolk & Suffolk, also serve the north of Ipswich. **Figure 16** shows the existing network to the north of Ipswich for these operators.

Figure 16 Ipswich North Bus Network



As shown in **Figure 16**, a number of longer distance bus services operate within the study area. From west to east, these services are as follows:

- Services 87, 88 and 89 travel along Old Ipswich Road (following the A14 north corridor), connecting Stowmarket and Needham Market to Ipswich
- Service 113 / 114 from Diss follows the A140 / A14 corridor via Debenham and Claydon, using Junction 52 of the A14 to access Ipswich;
- Service 116 runs via Debenham and Henley, passing through Coddenham and entering Ipswich via Henley Road
- Service 118 / 119 travels directly north of Ipswich along Westerfield Road, calling at Witnesham and Otley before terminating at Framlingham
- Service 70 / 70A travels north-west towards Tuddenham and Grundisburgh before looping back to Ipswich town centre
- Service 71 runs along Rushmere Road and calls via Rushmere, Playford, the Bealings and on to Martlesham and Woodbridge before terminating at Subourne near the east coast
- Services 63, 64 and 65 operate along the A1214 from the Aldeburgh and Woodbridge.

Figure 12 provides an indication of the frequency of each of the local services. These services are generally less frequent than the Ipswich Town Centre services listed in **Table 11** due to the more rural, longer distance nature of the routes.

Table 12 Local Bus Services by other Bus Operator

Service No	Bus Route	Frequency	
		Mon-Sat	Sun
63 / 64 / 65 / 65B	Aldeburgh - Woodbridge - Ipswich	30 mins	75 mins
70 / 70A	Woodbridge - Grundisburgh - Ipswich	6 per day	-
71	Ipswich - Bealings - Woodbridge - Orford - Sudbourne	5 per day	3 per day
87 / 88 / 88A / 89 / 89A	Stowmarket - Needham Market - Claydon - Bramford - Ipswich	30 mins	5 per day
113 / 114	Diss - Eye - Mendlesham/Debenham - Claydon - Ipswich	60 mins	-
116	Ipswich - Henley - Debenham (- Mendlesham)	6 per day	-
118 / 119	Ipswich - Witnesham - Otley - Earl Soham - Framlingham	30 mins	-

Coaches

For those travelling to Ipswich by coach there are two stops in Ipswich, one at the Railway Station and one located on Quadling Street (just north of the river). National Express operates Coach No. 481 which routes between Ipswich, Colchester and London; whilst Coach No. 250 routes between Ipswich, Stansted and Heathrow airports.

Service 481 provides four services a day from Ipswich, stopping at Clacton-on-Sea, Colchester, Chelmsford and London among other destinations. Service 250 provides 11 daily services and stops at Colchester, Mark Teys, Braintree, Stansted Airport and Heathrow Airport.

4.3.4 PUBLIC RIGHTS OF WAY

Several public footpaths, byways and bridleways are located within the study area. Any infrastructure proposed should look to protect, maintain and where possible enhance the existing Public Rights of Way (PRoW) network to maintain current connectivity to the north of Ipswich and in the rural areas for walking and cycling.

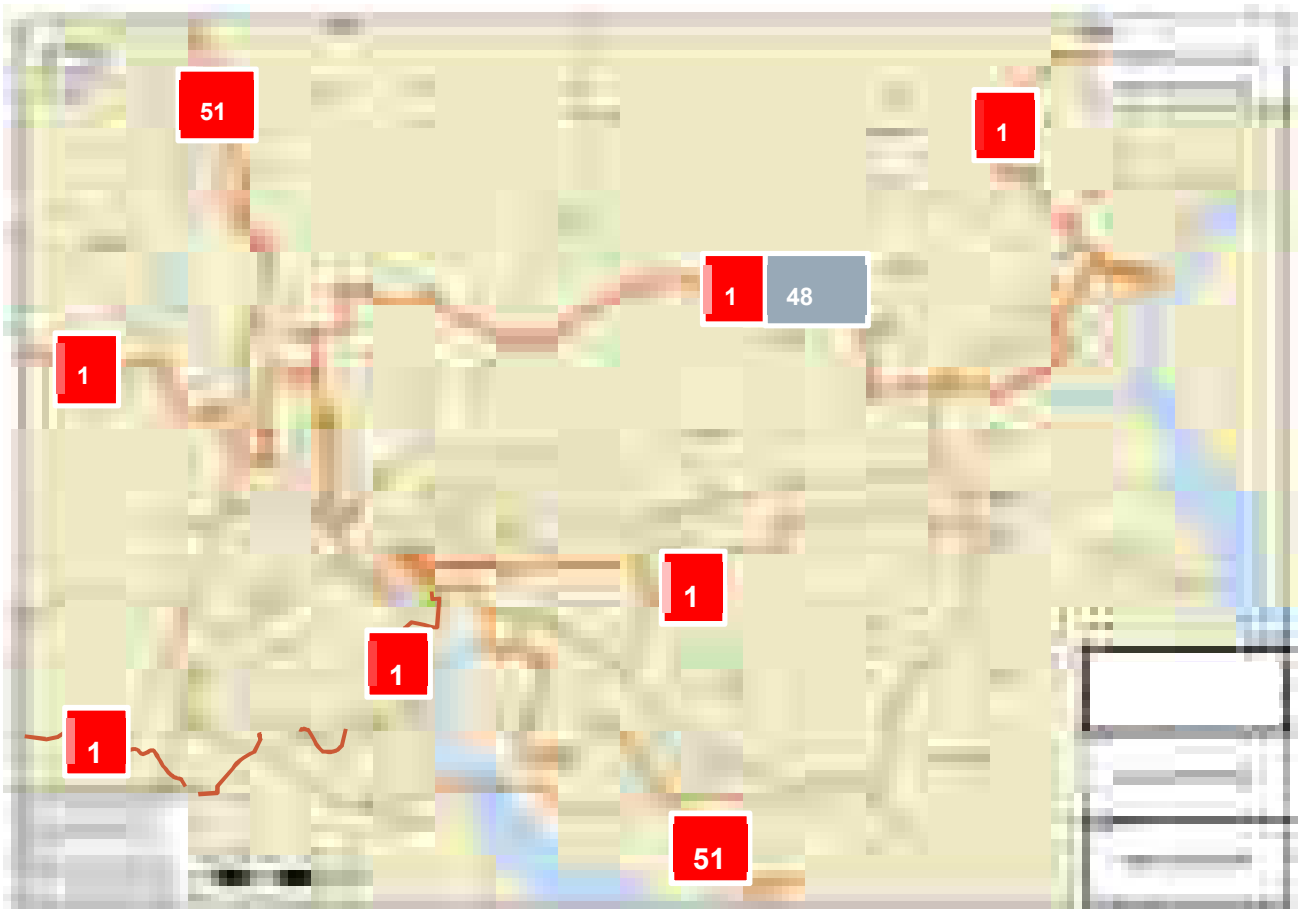
4.3.5 CYCLE NETWORK

A high-level review of the existing cycle network within the study area has been undertaken. The review confirms that the National Cycle Network (NCN), and in particular Route 1, runs east to west in the north of Ipswich, connecting with the local cycle network along its route.

National Cycle Network

NCN Routes 1 and 51 run through Ipswich, in part on-road and in part off-road. Route 48 traverses the north of Ipswich using local roads. During a site visit on 07 September 2017, the available on-road NCN routes in the north of Ipswich were observed to be generally well used by cyclists during off-peak periods. In addition, there are several regional and local routes also identified on the Sustrans network (**Figure 17**).

Figure 17 NCN within Ipswich



As noted the primary long distance NCN routes located within or near the study area are:

National Cycle Network Route 1

NCN Route 1 is a long-distance cycle route connecting Dover and the Shetland Islands – via the east coast of England and Scotland. Locally, the route runs south-west to north-east from Colchester, Stratford St Mary, Hadleigh, Ipswich via Bourne Park, Ipswich Hospital, Martlesham and through Woodbridge heading northbound towards Norwich. A branch of the NCN Route 1 appears to follow the Regional Route 48 to the north of Ipswich.

Alongside the study area, NCN Route1 / Regional Route 48 is on-road and it runs along Martlesham Road, west of Woodbridge, Holly Lane near Little Bealings village, Grundisburgh Road near Tuddenham St Martin, Church Lane and Lower Road at Westerfield Village, Thurleston Lane north of Castle Hill and the Old Ipswich Road towards Claydon, where it meets the NCN Route 51.

Looking at the route in detail, the on-road route starts at the Main Road / Bealings Road with a simple priority-controlled junction, just south of Woodbridge. Bealings Road can be considered as a rural route which crosses the A14 as an over bridge. The route then heads north towards the Little Bealings at The Street / Martlesham Road priority-controlled crossroad junction. It crosses the Woodbridge to Ipswich Railway Line at a level crossing. The route follows mostly quiet rural lanes and roads.

The two simple priority-controlled junctions of Lower Road / Henley Road and Henley Road / Thurleston Lane can be considered difficult and areas where cyclists are required to take great care. The route then enters the Whitton area and connects back to the NCN at the Whitton Church Lane / Old Norwich Road priority-controlled junction.

National Cycle Network Route 51

NCN Route 51 is a long-distance route which connects Milton Keynes, Bedford, Bury St Edmunds and Ipswich. The route also continues towards Felixstowe, Harwich and then Colchester. Locally, the NCN Route 51 runs on a north-west south-east direction through Ipswich from Claydon via the Old Ipswich Road, Shakespeare Road, along the River Gipping, Neptune Quay, Greenwich neighbourhood, Nacton Road towards Felixstowe.

Local Cycle Network

The local Ipswich cycle map confirms the location of the existing NCN. In addition, many roads are marked as advisory cycle routes, some of which are located to the north of Ipswich. Key cycle routes in Ipswich are:

- Tuddenham Road
- Westerfield Road
- Dale Hall Lane (Local Cycle Route 12)
- Butts Road
- Playford Road

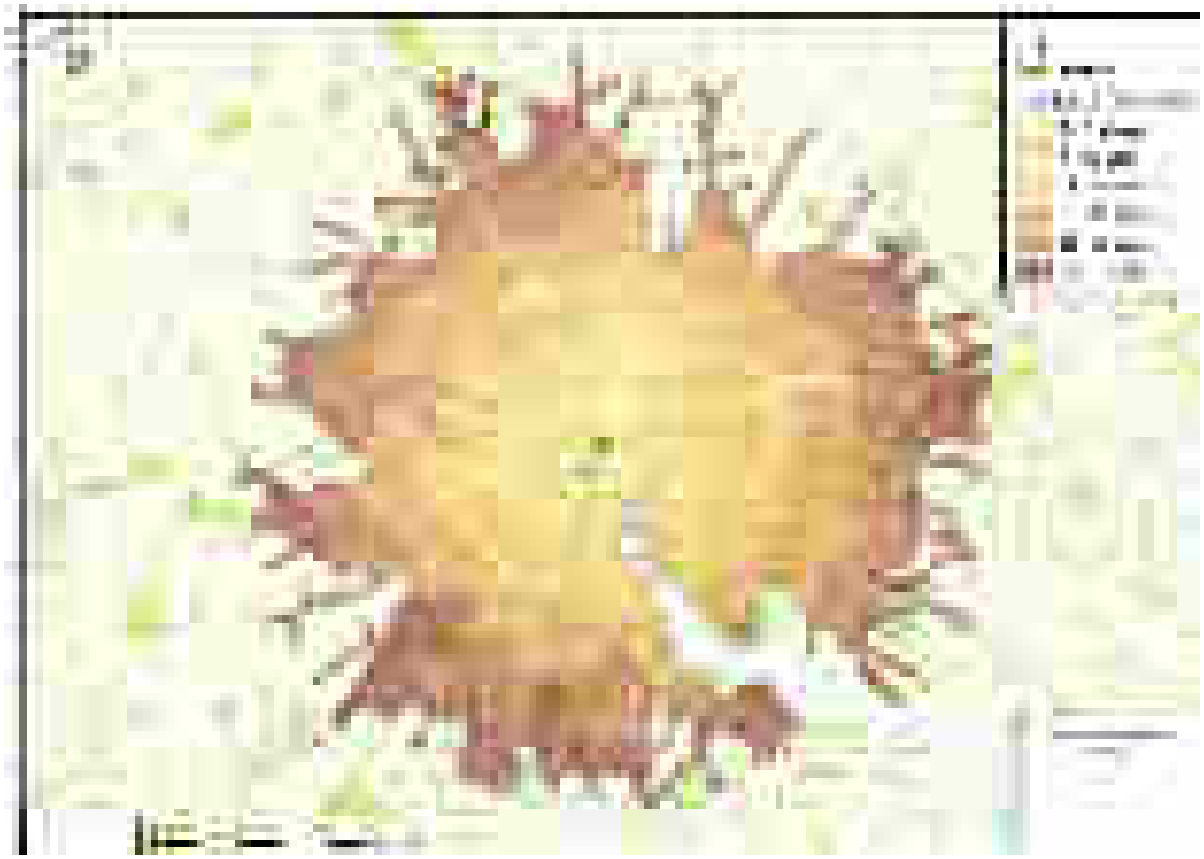
Figure 18 shows the current Ipswich cycle map. Cycling catchment analysis, centred around Ipswich Town Centre is shown in **Figure 19**. The isochrones demonstrate that there are potential cycle commuters located within the study area and hence need to be considered within any options that come forward. This is based on the DfT's *Local Transport Note 2/08 Cycle Infrastructure Design* which advises that, for commuter journeys, cycling distances up to 8km (5 miles) are not uncommon, which at an average cycling speed of 19.3kph (12mph) is equivalent to a 25-minute cycling journey time.

Providing new east-west transport infrastructure to the north of Ipswich would potentially improve the existing NCN routes and improve connectivity in the study area. In addition, the infrastructure could enhance the connectivity to existing cycle routes leading to Ipswich.

The proposed infrastructure will need to assess the interaction with the existing cycle facilities. Care within the design should be taken to ensure that the proposed facilities do not create a barrier to non-motorised user movements.

Figure 18 Ipswich Cycle Map

Figure 19 Ipswich Cycling Isochrones



4.3.6 TRAVEL PATTERNS

This section provides a strategic overview of existing travel demands and patterns within Ipswich and the study area. The analysis is primarily based on 2011 Census data and focuses on the main urban areas primarily contained within the study area, including; Ipswich, Woodbridge, Claydon and Needham Market.

Unsurprisingly, Ipswich is the main commuter draw in the local area and has the largest labour market in the County. According to the 2011 Census data, Ipswich is inhabited by 117,069 people who live within 49,869 households. The Census further confirms that out of the 82,787 people aged between 16 to 74 years old, 57,212 were economically active while 2,893 people declared themselves as unemployed.

Method of Travel to Work

Table 13 below presents the method of travel to Work by local residents, within the Borough of Ipswich, providing a comparison of 2001 and 2011 census data.

Table 13 Method of Travel to Work – Ipswich Borough: 2001 & 2011 Census Data

Method of Travel to Work (QS701EW)	Ipswich Borough			
	2001		2011	
	Trips	Percentage	Trips	Percentage
Underground, Metro, Light Rail, Tram	34	0%	59	0%
Train	981	2%	1,622	3%
Bus, Minibus or Coach	5,623	11%	5,067	8%
Taxi	143	0%	237	0%
Motorcycle, Scooter or Moped	821	2%	724	1%
Driving a Car or Van	28,140	56%	36,712	58%
Passenger in a Car or Van	3,940	8%	4,529	7%
Bicycle	3,092	6%	3,069	5%
On Foot	7,490	15%	10,929	17%
Other Method of Travel to Work	211	0%	315	0%
Total	**50,475**	**100%**	**63,263**	**100%**

Source: Office for National Statistics

In terms of travel to work in Ipswich, **Table 13** demonstrates that 5,067 (8%) commuters travel to work by bus. This is 10% lower than in 2001 where 5,623 (11%) commuters were recorded as travelling to work by bus. The data also demonstrates the reverse pattern for commuter journeys being made by train with 981 train commuters (2%) recorded in 2001 and 1,622 (3%) in 2011, an increase of 65% over 10 years.

The number of commuters walking to work has also increased from 7,490 (15%) in 2001 to 10,929 (17%) in 2011. The number of cyclists, however, has remained relatively consistent between 2001 and 2011 with just over 3,000 cycle commuters per day.

Finally, the predominant mode of travel to work within the Borough of Ipswich remains via car, with 36,712 journeys (58%) using this mode in 2011, an increase of 30% from the 28,140 car driver trips (56%) recorded in 2001.

A number of key parishes outside of Ipswich have also been analysed in terms of method of travel to work in 2011. The parishes have been selected as they represent a cross section of areas surrounding Ipswich, as some have train stations, some are on main trunk routes, and some would be expected to have higher modal shares in car or van driver and sustainable modes. The locations of these parishes are show in **Figure 20** and the resulting data is presented in **Table 14**.

Figure 20 Key local parishes outside of Ipswich

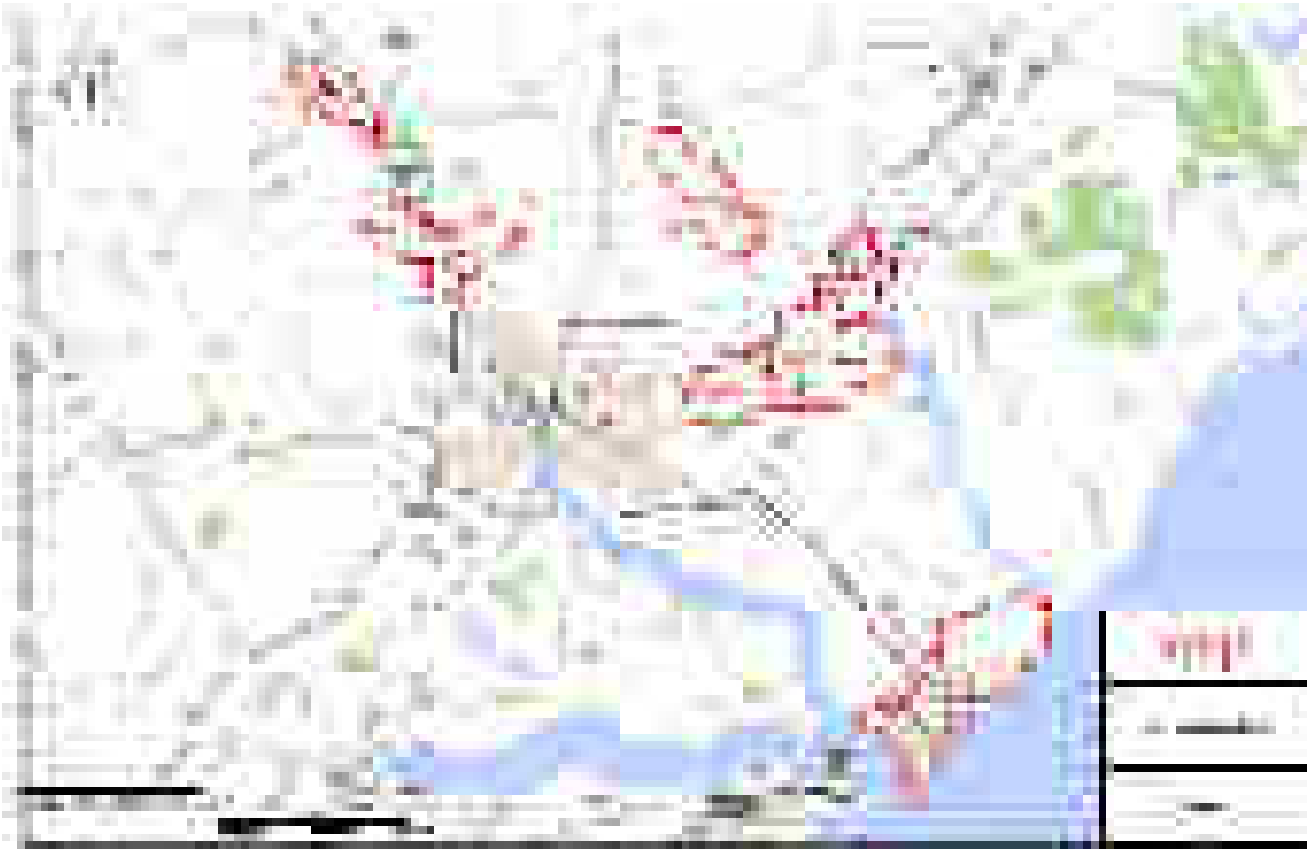


Table 14 Method of Travel to Work – Local Parishes: 2011 Census Data

Method of Travel to Work (QS701EW)	Car / Taxi	Train	Bus	Active Modes
Woodbridge	71%	3%	3%	22%
Martlesham	76%	2%	5%	16%
Felixstowe	74%	1%	2%	23%
Claydon	83%	2%	4%	10%
Needham Market	80%	3%	2%	15%
Kesgrave	81%	3%	5%	11%
Grundisburgh	85%	3%	2%	9%
Great Blakenham	88%	2%	4%	6%

Source: Office for National Statistics

Table 14 demonstrates that the main mode of commuter transport from local parishes around Ipswich is dominated by use of cars. Parishes served by bus priority measures and railway stations do generally have a slightly higher uptake of public transport and those closer to Ipswich or with a greater level of jobs internally, see increased levels of active mode use. Regardless of these factors, the predominant mode of travel to work remains to be by car. This is likely to be attributable to the rural nature of the settlements around Ipswich, which are widely spread across the study area. Therefore, the catchment area for public transport services is reasonable but the catchment population is small.

Looking at the local parish Census data in more detail, it can be seen that:

- Fewer pedestrian trips are made within the Martlesham Parish than in any of the other parishes; however, bus usage is higher with approximately 5% of the commuter mode share, which is likely due to association with the Park & Ride
- Public transport usage is relatively low in Felixstowe, however trips made on foot or by bicycle represent the highest proportion of the seven parishes being considered. This is likely to relate to the fact Felixstowe has a large amount of employment, so residents are able to live near to places of work making walking and cycling more feasible
- Woodbridge has a large proportion of active mode trips which, again is likely to relate to the fact that jobs at Martlesham are close by. It is also served by NCN Route 1
- Great Blakenham has the lowest proportion of walking and cycling and the highest proportion of car driver trips which is likely attributable to the proximity and connection to the A14. It does however contain a major employment area to the south of the village, but this employment area has 80% car mode share so incentives to walk and cycle must be low.

Origins & Destinations

A series of thematic maps have been produced to assess existing origin and destination of work trips. These maps have been analysed to look at different modes of transport (cycle, bus, train, and car) for jobs in Ipswich. A summary of this analysis is provided in the following paragraphs.

Cycle commuting does currently occur from outside the Borough on an east-west corridor, from places such as Woodbridge, Kesgrave and Martlesham. This demonstrates there is a demand for cycle commuting from the wider Ipswich area and therefore a potential to further increase cycle commuting to and from Ipswich in combination with potentially providing improved cycle facilities and infrastructure to the north of the town, and on the east-west corridor.

For bus travel, the east to west corridor is also marked with residents of Kesgrave or Martlesham traveling by public transport to the town and Borough area. Presumably the 800 Park & Ride service, in addition to local bus services, assists in delivering bus patronage in these areas external to the Borough boundary.

The existing services serving the north of Ipswich, and located within the study area, deliver some bus patronage. It is expected that a better integrated bus network could deliver further public transport usage to the north of the town.

In terms of rail, a large proportion of commuters traveling to the town come from smaller market towns such as Stowmarket and Needham Market to the north-west or from the south such as Colchester, Manningtree, Mistley or Wrabness. Less commuting train journeys are made from the south-east (Felixstowe) or north-east (Woodbridge, Melton or Wickham Market).

In terms of car commuter journeys to and from Ipswich, the external origin and destinations appear well distributed across the region, but with proportionally higher demand along an east to west corridor. **Figure 21** and **Figure 22** illustrate the origins and destinations of journey to work trips by car taken from Census data. A detailed assessment of trip routes will require a comprehensive Automatic Number Plate Recognition (ANPR) survey to be undertaken during the subsequent stages of this project.

Figure 21 Origin of Journey to Work Trips to Ipswich

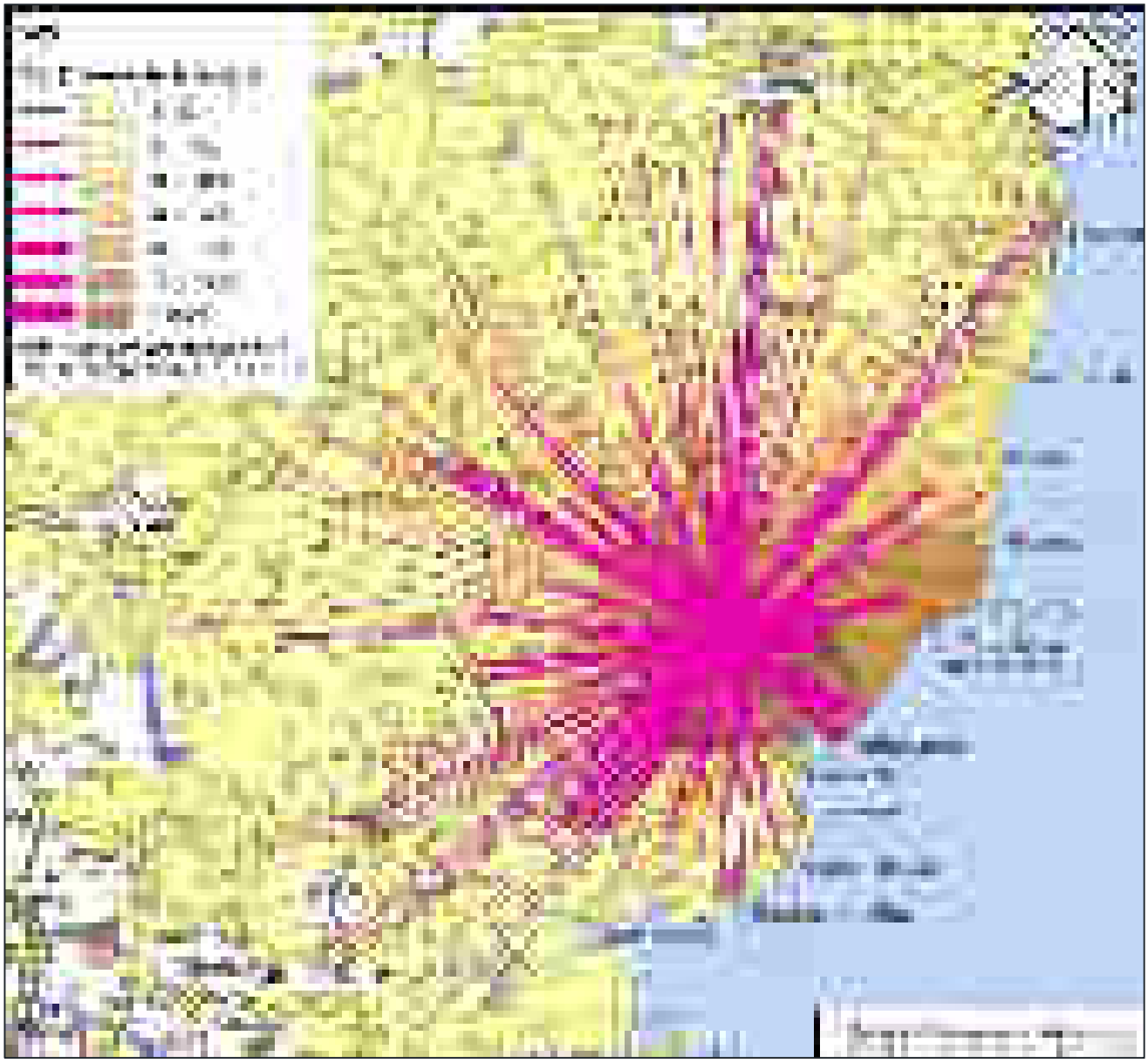
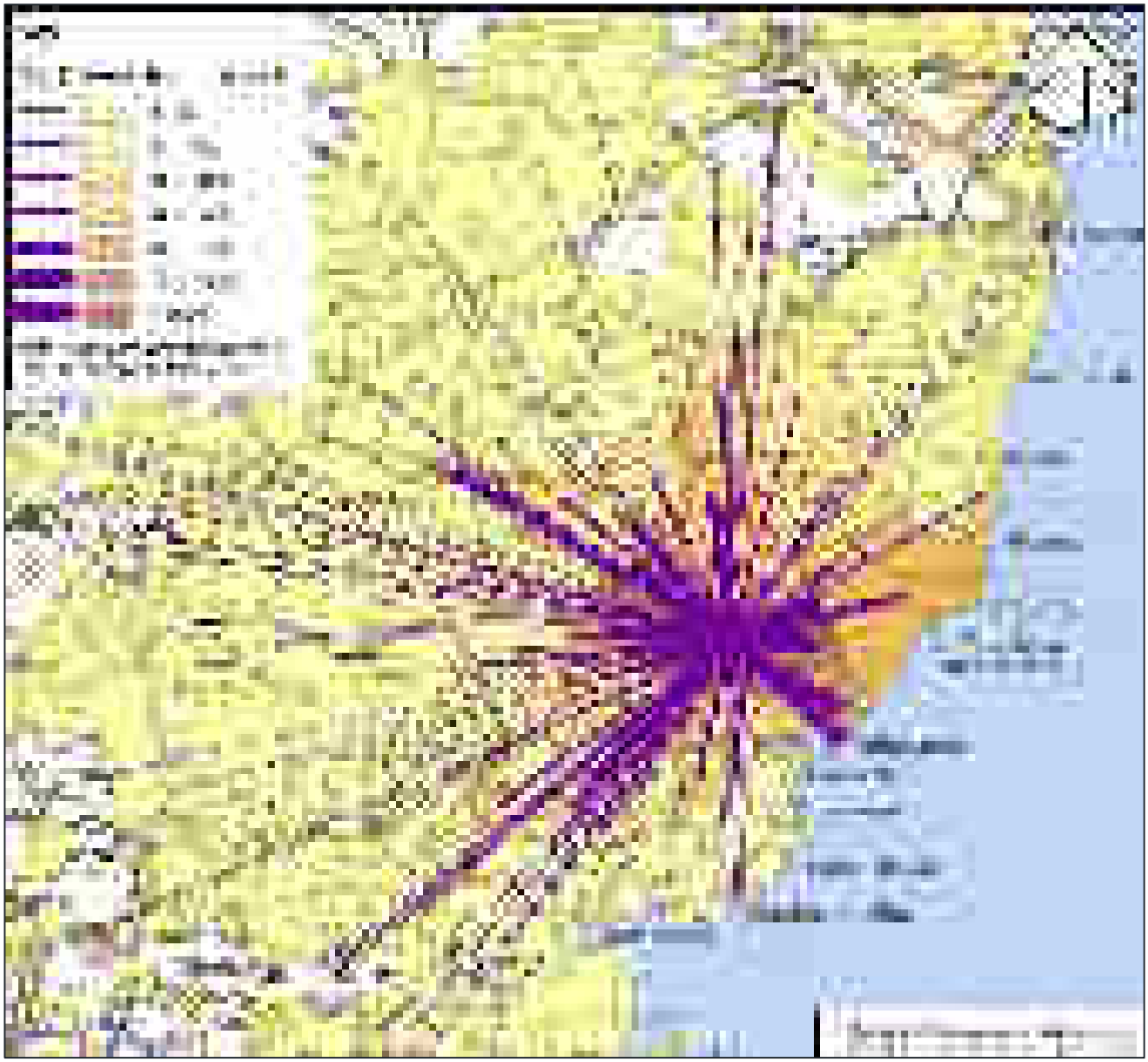


Figure 22 Destination of Journey to Work trips from Ipswich



4.3.7 TRANSPORT NETWORK OPERATION

Existing Traffic Flows

This section of the report provides an overview of the traffic conditions on the existing road network within the highway study area, on which any highway infrastructure options delivered in the study area could impact upon.

A number of count points have been obtained from the DfT database within the study area over the last five years. The AADF at these points are summarised in **Table 15**, showing current levels and how these have changed over the last five years (from 2010 to 2015). Please note these counts are indicative and should not be taken as absolutes but can be used to identify general trends.

Table 15 DfT AADF Traffic Flows Summary

Location	All Vehicles			HGVs		
	2015 AADT	5-Year Change (AADT)	5-Year Change (%)	2015 AADT	5-Year Change (AADT)	5-Year Change (%)
A14 (north of A1156)	56,965	-1,698	-2.9%	8,237	+274	+3.4%
A14 (north of A12)	54,600	+9,240	+20.4%	7,214	+765	+11.9%
A14 (between A137 and A1189)	61,105	+5,275	+9.4%	8,350	+691	+9.0%
A14 (southeast of A12)	29,995	+2,965	+11.0%	5,632	+1,020	+22.1%
A12 (south of A14)	45,623	+4,066	+9.8%	5,341	+392	+7.9%
A12 (south of A1214)	41,224	+8,287	+25.2%	1,727	-211	-10.9%
A12 (north of A1214)	35,024	+1,439	+4.3%	1,370	-101	-6.9%
A12 (south of B1078)	18,668	+3,005	+19.2%	844	+5	+0.6%
A1156 Norwich Road	18,951	-740	-3.8%	386	-118	-23.4%
A1156 Crown Street	16,829	+748	+4.7%	299	-7	-2.3%
A1214 Valley Road	19,658	+902	+4.8%	498	0	0.0%
A1214 Woodbridge Road	33,136	-3,914	-10.6%	385	-403	-51.1%
A1214 Main Road	18,209	+758	+4.3%	309	+4	+1.3%

It is of no surprise that the A14 carries most of the traffic in the study area, with the particular section between Junction 56 and Junction 57 carrying, on average, 61,405 vehicles a day. It is also worth noting that on the Orwell Bridge the five-day average flow is much higher than this average at around 66,000-68,000 and can reach as much as 70,000 on a weekday.

In the five-year period from 2010 to 2015, traffic levels on the A14 grew by 20% on the section to the west of Ipswich, by 9% on the southern section (Orwell Bridge) and by 11% on the section towards Felixstowe. However, traffic decreased by 3% on the section to the west of Ipswich to the north of the A1156 (Bury Road). The level of HGVs has increased significantly on every section of the A14 around Ipswich, and in particular, along the section to Felixstowe where HGVs traffic grew by approximately 22%.

During the same time period, traffic on the A12 grew by 10% with 8% additional HGV movements. In addition, the A12 east of Ipswich has also observed some significant growth such as the section near Martlesham between the A14 and the A1214 junction. At this location the volume of HGVs has decreased by 11%.

Within the Ipswich urban area, the traffic has grown on the A1214 (Valley Road) to the north of the Town Centre, on the A1214 Main Road at Kesgrave and on the A1156 Crown Street. The traffic levels have, however, decreased on Norwich Road and at the A1214 gyratory junction (Woodbridge Road). The level of HGV vehicles have also significantly reduced at the same junctions and on Norwich Road.

Existing Network Performance

In order to establish the current levels of network delay, Annual Average Traffic Speeds (AATS) and Annual Average Journey Times (AAJT) Trafficmaster data has been analysed for the study area. The data being analysed has focused on east to west travel on the highway network around Ipswich. The data used was recorded by Trafficmaster between September 2014 and August 2015 and has been analysed for the following periods:

- AM Peak Hour – 0800-0900 hours
- PM Peak Hour – 1700-1800 hours
- Average Daily Period (24 hours)
- Overnight – 0000-0500 hours

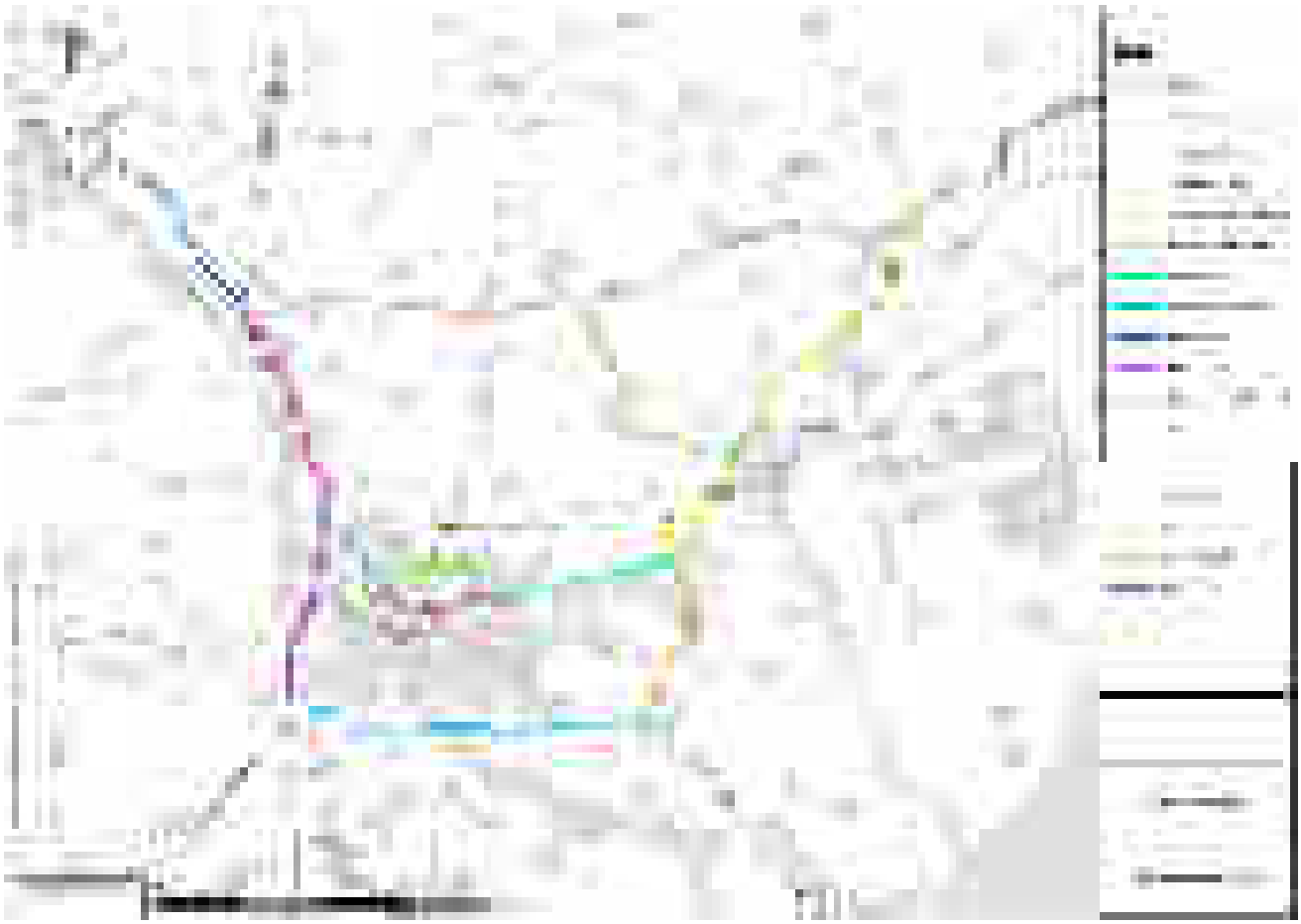
For the purposes of this assessment, the peak hours have been used to identify the average journey speeds and journey times during the peak travel periods. These time periods are considered to cover the peak commuter periods into the main conurbations within the study area.

The annual average overnight speed and journey time data have been used as an indicator of the average route speeds and travel times under free flow traffic conditions. The annual average vehicle speeds and journey times in the peak hours has then been compared against the overnight average speeds and journey times respectively, to highlight the locations where peak period congestion occurs.

This assessment provides a comparison of Class 1 vehicles (cars) between the AM and PM peak periods and overnight; as there is a significantly higher proportion of HGVs during the peak periods compared to overnight. By selecting Class 1 vehicles the assessment avoided an unfair comparison of the time periods.

Figure 23 shows how the road network has been represented and divided into sections. The routes all start and end at the same point from just north of Wickham Market (to the east) and terminate south of Needham Market to the west of the study area.

Figure 23 Journey Time Links



The routes studied within this report in terms of network performance are:

1. Strategic and Major Road Network (MRN): along the A14 and A12
2. Urban Network: along parts of the A14 and A12, the A1214 through Kesgrave, Norwich Road and via:
   a. A1214 Valley Road
   b. A1156 Crown Street

Rural Network: along the B1078 and small sections of the A14 and A12. In addition, the B1079 link between the junction with the B1078 and the A12 near Woodbridge has also been studied.

1. Strategic and Major Road Network – A14 / A12

Analysis of the Trafficmaster data has been carried out in order to understand the existing journey time and average speed along the primary SRN and MRN between the A12 (SRN) and A14 (MRN) around Ipswich, from Wickham Market to Needham Market to the west.

The length of road along this route is approximately 47km. The route has been subdivided in seven sections and the AAJT for these sections for Class 1 Vehicles – Cars, in both directions, is summarised in **Table 16**, whilst **Table 17** provides the average journey time and speed over the whole travelling length.

Table 16 Strategic Network (A14 / A12): Link AAJT

Direction	Link	Link Name	Link Length (km)	AM Peak	PM Peak	Overnight	All Day
East to West	1	A12 N of Lower Hacheston	1.4	00:01:01	00:00:59	00:00:53	00:01:03
	2	A12 S of Lower Hacheston	10.0	00:07:05	00:06:34	00:06:02	00:07:03
	3	A12 S of B1079	4.0	00:03:19	00:03:18	00:02:40	00:03:23
	4	A12 S of A1214	5.8	00:05:18	00:04:52	00:04:40	00:05:08
	5	A14 E of River Orwell	11.4	00:06:56	00:08:01	00:06:27	00:06:59
	6	A14 N of A12	6.4	00:03:36	00:03:31	00:03:19	00:03:36
	7	A14 between J52 and J53	7.7	00:04:18	00:04:17	00:04:00	00:04:19
West to East	7	A14 between J52 and J53	7.2	00:04:13	00:03:57	00:03:44	00:04:06
	6	A14 N of A12	6.3	00:03:42	00:03:38	00:03:17	00:03:39
	5	A14 E of River Orwell	11.4	00:07:18	00:06:56	00:06:21	00:07:00
	4	A12 S of A1214	5.6	00:04:37	00:05:25	00:04:13	00:05:00
	3	A12 S of B1079	4.0	00:03:01	00:03:06	00:02:43	00:03:07
	2	A12 S of Lower Hacheston	10.3	00:06:44	00:06:31	00:05:58	00:06:43
	1	A12 N of Lower Hacheston	1.1	00:00:54	00:00:49	00:00:42	00:00:50

Table 17 Strategic Network (A14 / A12): Route AAJT & AAJS

Direction	Metric	AM Peak	PM Peak	Overnight	All Day
East to West	Time	00:31:34	00:31:31	00:28:01	00:31:30
	Speed (mph)	55.2	55.3	62.2	55.4
West to East	Time	00:30:29	00:30:23	00:26:56	00:30:25
	Speed (mph)	57.19	57.38	64.72	57.32

Analysis of the data shows that there is, on average, a difference in travel time along the length of the route between the peak periods and overnight. Journeys during peak periods take 30-31 minutes in both directions, with an average speed of 55-57mph. In comparison, overnight the same journey would take 27-28 minutes with average speeds of 62-65mph.

In order to understand the relative increases in section and end-to-end route reduction in speeds during the peak travel periods, the AM and PM peak hour data has been compared to the overnight period (0000-0500 hours) data. The difference between AM and PM peak hour journey speeds and the overnight journey speeds are summarised in **Table 18**.

Table 18 Strategic Network (A14 / A12): Delay, Peak hour vs Overnight Period

Direction	Link	Link Name	Link Length (km)	AM Peak		PM Peak	
				Speed Change (mph)	% Change	Speed Change (mph)	% Change
East to West	1	A12 N of Lower Hacheston	1.4	-8.13	-13.7%	-6.03	-10.2%
	2	A12 S of Lower Hacheston	10.0	-9.29	-15.0%	-5.01	-8.1%
	3	A12 S of B1079	4.0	-10.98	-19.6%	-10.67	-19.0%
	4	A12 S of A1214	5.8	-5.52	-11.8%	-1.89	-4.1%
	5	A14 E of River Orwell	11.4	-4.62	-7.0%	-12.90	-19.6%
	6	A14 N of A12	6.4	-5.57	-7.8%	-4.01	-5.6%
	7	A14 between J52 and J53	7.7	-4.95	-6.9%	-4.63	-6.5%
West to East	7	A14 between J52 and J53	7.2	-8.32	-11.5%	-4.06	-5.6%
	6	A14 N of A12	6.3	-8.08	-11.2%	-6.71	-9.3%
	5	A14 E of River Orwell	11.4	-8.81	-13.1%	-5.70	-8.5%
	4	A12 S of A1214	5.6	-4.30	-8.8%	-10.99	-22.4%
	3	A12 S of B1079	4.0	-5.61	-10.2%	-7.02	-12.7%
	2	A12 S of Lower Hacheston	10.3	-7.36	-11.4%	-5.55	-8.6%
	1	A12 N of Lower Hacheston	1.1	-14.03	-23.1%	-9.27	-15.3%

Table 18 shows that there is a significant reduction in journey speeds in the peak hours on several sections of the strategic network compared to the overnight period. In other words, delays are present during the peak periods which are not present overnight.

One section which observes a reduction in vehicle speeds is the A14 south of Ipswich, with a notable speed reduction of around -20% in the PM peak in the east to west direction and an -8.5% reduction in the reverse direction.

2. Urban Network

A1214 Valley Road

To assess the performance of the urban road network, Trafficmaster data has again been analysed to understand the existing journey time and average speed between Wickham Market and Needham Market. However, this routing follows parts of the A14, up to Junction 53, and A12, at the roundabout junction with the A1214, and routes through Ipswich.

The length of this route, between Needham Market (west) and Wickham Market (east) is shorter at approximately 37km, however it passes through the Ipswich Urban Network (IUN) using the A1214 (Valley Road) to pass through the Town Centre.

Table 19 shows the journey time along this route, which has been subdivided into sections to give a more detailed analysis. **Table 20** then compares journey time and speeds along the whole route.

Table 19 Urban Network (A1214 Valley Road): Link AAJT

Direction	Link	Link Name	Link Length (km)	AM Peak Time	PM Peak Time	Overnight Time	All Day Time
A1156 and A1214 East to West	1	A12 N of Lower Hacheston	1.4	00:01:01	00:00:59	00:00:53	00:01:03
	2	A12 S of Lower Hacheston	10.0	00:07:05	00:06:34	00:06:02	00:07:03
	3	A12 S of B1079	4.0	00:03:19	00:03:18	00:02:40	00:03:23
	4	A12 S of A1214	0.1	00:00:18	00:00:20	00:00:24	00:00:19
	5	A1214 W of A12	5.5	00:09:14	00:08:53	00:05:53	00:08:51
	6	A1214 N of City Centre	4.6	00:08:58	00:07:57	00:04:34	00:08:09
	7	Norwich Road	4.0	00:06:30	00:06:49	00:04:21	00:06:41
	8	A14 between J52 and J53	7.7	00:04:18	00:04:17	00:04:00	00:04:19
A1156 and A1214 West to East	8	A14 between J52 and J53	7.2	00:04:13	00:03:57	00:03:44	00:04:06
	7	Norwich Road	3.7	00:08:55	00:08:15	00:05:15	00:08:04
	6	A1214 N of City Centre	4.7	00:08:19	00:08:47	00:05:04	00:08:10
	5	A1214 W of A12	5.1	00:08:08	00:08:10	00:05:30	00:07:59
	3	A12 S of B1079	4.0	00:03:01	00:03:06	00:02:43	00:03:07
	2	A12 S of Lower Hacheston	10.3	00:06:43	00:06:31	00:05:57	00:06:43
	1	A12 N of Lower Hacheston	1.1	00:00:54	00:00:49	00:00:42	00:00:50

Table 20 Urban Network (A1214 Valley Road): Route AAJT & AAJS

Direction	Metric	AM Peak	PM Peak	Overnight	All Day
East to West	Time	00:40:44	00:39:07	00:28:46	00:39:48
	Speed (mph)	34.1	35.5	48.3	34.9
West to East	Time	00:40:14	00:39:35	00:28:55	00:39:00
	Speed (mph)	34.55	35.11	48.07	35.63

The AAJT across the route shows a significant difference between the peak periods and overnight. A journey between Needham Market and Wickham Market through the IUA would take approximately 13-minutes longer during the AM or PM peak periods, compared to the overnight period. On average, vehicles travel 10mph faster during the overnight period compared to the peak hours.

Table 21 provides a comparison of vehicle speeds along the route, for each section, between the peak periods and the overnight period to allow a more detailed analysis to be undertaken.

Table 21 Urban Network (A1214 Valley Road): Delay, Peak hour vs Overnight Period

Direction	Link	Link Name	Link Length (km)	AM Peak		PM Peak	
				Speed Change (mph)	% Change	Speed Change (mph)	% Change
B1067 and A1214 East to West	1	A12 N of Lower Hacheston	1.4	-8.13	-13.7%	-6.03	-10.2%
	2	A12 S of Lower Hacheston	10.0	-9.29	-15.0%	-5.01	-8.1%
	3	A12 S of B1079	4.0	-10.98	-19.6%	-10.67	-19.0%
	4	A12 S of A1214	0.1	2.67	33.3%	1.49	18.6%
	5	A1214 W of A12	5.5	-12.68	-36.4%	-11.78	-33.8%
	6	A1214 N of City Centre	4.6	-18.50	-49.1%	-16.08	-42.7%
	7	Norwich Road	4.0	-11.29	-33.2%	-12.37	-36.3%
	8	A14 between J52 and J53	7.7	-4.95	-6.9%	-4.63	-6.5%
B1067 and A1214 West to East	8	A14 between J52 and J53	7.2	-8.32	-11.5%	-4.06	-5.6%
	7	Norwich Road	3.7	-10.60	-41.0%	-9.38	-36.3%
	6	A1214 N of City Centre	4.7	-13.68	-39.1%	-14.80	-42.3%
	5	A1214 W of A12	5.1	-11.28	-32.4%	-11.35	-32.6%
	3	A12 S of B1079	4.0	-5.61	-10.2%	-7.02	-12.7%
	2	A12 S of Lower Hacheston	10.3	-7.35	-11.4%	-5.54	-8.6%
	1	A12 N of Lower Hacheston	1.1	-14.03	-23.1%	-9.27	-15.3%

The data in **Table 21** demonstrates significant speed reduction across the local highway network, within the IUN. Significantly, the A1214 (Valley Road) observes average speed reductions of up to 18.5mph. Norwich Road and the A1214 through Kesgrave also sees a significant reduction in vehicle speeds during the AM and PM peak periods.

A1156 Crown Street

The Trafficmaster data has been further analysed on the route through the Town Centre via the Ipswich Inner Ring Road (the A1156 Crown Street). This repeats the assessment of the route between Wickham Market and Needham Market, using parts of the A12 and A14, the A1214 in Kesgrave, Norwich Road but now via the A1156 Crown Street.

The length of this route is also approximately 37km and it passes through the IUA, near to the Town Centre. **Table 22** shows journey times across the route, which has been subdivided into sections for the purpose of this assessment. **Table 23** compares journey times and speeds along the whole route through the Ipswich urban area via the A1214 and A1156.

Table 22 Urban Network (A1156 Crown Street): Link AAJT

Direction	Link	Link Name	Link Length (km)	AM Peak	PM Peak	Overnight	All Day
A1156 East to West	1	A12 N of Lower Hacheston	1.4	00:01:01	00:00:59	00:00:53	00:01:03
	2	A12 S of Lower Hacheston	10.0	00:07:05	00:06:34	00:06:02	00:07:03
	3	A12 S of B1079	4.0	00:03:19	00:03:18	00:02:40	00:03:23
	4	A12 S of A1214	0.1	00:00:18	00:00:20	00:00:24	00:00:19
	5	A1214 W of A12	5.4	00:09:09	00:08:48	00:05:49	00:08:46
	6	A1156	4.7	00:15:10	00:12:29	00:06:29	00:13:08
	7	Norwich Road	4.0	00:06:30	00:06:49	00:04:21	00:06:41
	8	A14 between J52 and J53	7.7	00:04:18	00:04:17	00:04:00	00:04:19
A1156 West to East	8	A14 between J52 and J53	7.2	00:04:13	00:03:57	00:03:44	00:04:06
	7	Norwich Road	3.7	00:08:58	00:08:18	00:05:17	00:08:07
	6	A1156	4.4	00:10:55	00:13:18	00:06:04	00:11:39
	5	A1214 W of A12	5.2	00:08:13	00:08:15	00:05:33	00:08:04
	3	A12 S of B1079	4.0	00:03:01	00:03:06	00:02:43	00:03:07
	2	A12 S of Lower Hacheston	10.3	00:06:43	00:06:31	00:05:57	00:06:43
	1	A12 N of Lower Hacheston	1.1	00:00:54	00:00:49	00:00:42	00:00:50

Table 23 Urban Network (A1156 Crown Street): Route AAJT & AAJS

Direction	Metric	AM Peak	PM Peak	Overnight	All Day
A1156 East to West	Time	00:46:52	00:43:34	00:30:38	00:44:43
	Speed (mph)	29.7	31.9	45.4	31.1
A1156 West to East	Time	00:42:57	00:44:14	00:30:00	00:42:37
	Speed (mph)	32.37	31.43	46.35	32.62

The data in **Table 23** demonstrates that this route suffers from greater traffic delays than the A1214 Valley Road route. The average speed along this 37km route reduces to between 30-32mph during the peak periods. This is a 15-16mph reduction on overnight speeds. The time to travel the A1214 Valley Road on average was between 8-9 minutes during the peak periods, whilst along the A1156 the travel time would be between 11-15 minutes.

Table 24 focuses on the comparison of vehicle speeds along the A1156 section only (Link 6) and provides a comparison of the peak periods and the overnight period.

Table 24 Urban Network (A1156 Crown Street): Delay, Peak hour vs Overnight Period

Direction	Link	Link Name	Link Length (km)	AM Peak		PM Peak	
				Speed Change (mph)	% Change	Speed Change (mph)	% Change
A1156 East to West	6	A1156	4.7	-15.36	-57.3%	-12.90	-48.1%
A1156 West to East	6	A1156	4.4	-12.15	-44.5%	-14.88	-54.4%

The data in **Table 24** demonstrates significant speed reductions along the A1156 during the peak periods compared to the overnight traffic. The average speed along the link is approximately halved due to delays on this route.

3. Rural Network – B1078

Another possible route between Needham Market and Wickham Market is to bypass Ipswich to the north using the B1078 rural road. The route starts near Wickham Market to the east and goes through several settlements such as Coddenham, finishing near Needham Market, resulting in a journey length of approximately 25km.

Table 25 provides an overview of vehicle speeds along the B1078 at peak periods and overnight. The route has been split into five sections. Due to a lack of observations on the B1078, all vehicle classes have been selected to compare journey times and speeds for the B1078 link. **Table 26** confirms the AAJT and AAJS along the whole length of the rural route between Needham Market and Wickham Market.

Table 25 Rural Network (B1078): Link AAJT

Direction	Link	Link Name	Link Length (km)	AM Peak	PM Peak	Overnight	All Day
B1078 East to West	1	A12 N of Lower Hacheston	1.4	00:01:03	00:01:01	00:00:55	00:01:05
	2	B1078 East	11.4	00:12:02	00:11:38	00:09:49	00:11:53
	3	B1079	1.1	00:01:12	00:01:11	00:01:08	00:01:14
	4	B1078 West	10.6	00:11:12	00:10:55	00:09:42	00:11:14
	5	A140	0.6	00:02:01	00:02:00	00:01:45	00:02:05
B1078 West to East	5	A140	0.7	00:01:16	00:01:14	00:01:00	00:01:20
	4	B1078 West	10.6	00:11:02	00:10:56	00:10:18	00:11:11
	3	B1079	1.1	00:01:14	00:01:13	00:01:16	00:01:17
	2	B1078 East	11.4	00:12:12	00:10:59	00:10:00	00:11:32
	1	A12 N of Lower Hacheston	1.1	00:00:53	00:00:50	00:00:45	00:00:53

Table 26 Rural Network (B1078): Route AAJT & AAJS

Direction	Metric	AM Peak	PM Peak	Overnight	All Day
B1078 East to West	Time	00:27:30	00:26:45	00:23:19	00:27:31
	Speed (mph)	34.1	35.1	40.3	34.1
B1078 West to East	Time	00:26:37	00:25:12	00:23:19	00:26:13
	Speed (mph)	35.28	37.27	40.29	35.83

The data demonstrates that vehicles travel along the B1078 at relatively lower average speeds, despite the majority of the route having a 60mph speed limit. This is due to the layout of the road, with reduced visibilities, tighter bends, narrow sections and travel through rural villages. The data confirmed that during peak periods vehicles travel between 34-37 mph along the route which can be compared to faster speeds of approximately 40mph overnight. **Table 27** provides a comparison of vehicle speeds between the AM and PM peak periods and the overnight period along the section of the B1078 rural route.

Table 27 Rural Network (B1078): Delay Peak hour vs Overnight Period

Direction	Link	Link Name	Link Length (km)	AM Peak		PM Peak	
				Speed Change (mph)	% Change	Speed Change (mph)	% Change
B1078 East to West	1	A12 N of Lower Hacheston	1.4	-7.09	-12.5%	-4.91	-8.7%
	2	B1078 East	11.4	-7.97	-18.4%	-6.78	-15.6%
	3	B1079	1.1	-2.15	-5.8%	-1.75	-4.7%
	4	B1078 West	10.6	-5.44	-13.3%	-4.51	-11.1%
	5	A140	0.6	-5.28	-13.9%	-4.82	-12.7%
B1078 West to East	5	A140	0.7	-8.13	-20.9%	-7.12	-18.3%
	4	B1078 West	10.6	-2.56	-6.6%	-2.25	-5.8%
	3	B1079	1.1	0.62	1.9%	1.14	3.5%
	2	B1078 East	11.4	-7.70	-18.1%	-3.83	-9.0%
	1	A12 N of Lower Hacheston	1.1	-8.56	-15.1%	-5.66	-10.0%

The data demonstrates that some particular sections of the route suffer from reduced vehicle speeds on the network, due to a higher volume of vehicles. This is particularly the case for the westbound direction in the AM peak between Needham Market and the B1079 junction and on the B1078 east of the B1079 in the eastbound direction.

In addition, the traffic along the B1079 road route between the B1078 junction and the A12 roundabout junction near Woodbridge has also been assessed to understand potential existing traffic delay. **Table 28** provides information on journey times along the B1079 between the A12 near Woodbridge and the B1078 to the west. Due to a lack of observed data, all vehicle classes have been selected for this particular route.

Table 28 Rural Network (B1078): B1079 Link AAJT & AAJS

Direction	Metric	AM Peak	PM Peak	Overnight	All Day
East to West	Time	00:08:22	00:08:00	00:07:39	00:08:41
	Speed (mph)	34.1	35.1	40.3	34.1
West to East	Time	00:08:34	00:08:18	00:08:55	00:08:44
	Speed (mph)	32.2	33.2	30.9	31.6

Vehicle speeds along B1079 from the A12 near Woodbridge to B1078 junction are heavily influenced by the road geometry, with several bends, reduced visibilities and sections passing through rural villages, that help to limit vehicle speeds. **Table 29** provides a comparison of vehicle speeds between the AM and PM peak periods and the overnight period along the B1079.

Table 29 Rural Network (B1078): B1079 Delay, Peak hour vs Overnight Period

Direction	Link	Link Name	Link Length (Km)	AM Peak		PM Peak	
				Speed Change (mph)	% Change	Speed Change (mph)	% Change
B1079 East to West	3	B1079	7.6	1.56	4.8%	2.13	6.6%
B1079 West to East	3	B1079	7.4	0.97	3.1%	3.38	10.9%

The above data shows a reduction in travel speeds in the overnight period compared to the peak periods. This is likely due to the lack of speed records on this particular link. It is also expected that the particular layout of the road also makes drivers slow down during night-time periods when visibility is reduced. In addition, the data shows all vehicle classes, and the proportion of HGVs in the evening may be higher than during the peak.

It can be considered that the effect of peak traffic on that particular link is negligible and thus does not suffer from particularly severe delays in peak periods, compared to free flow conditions overnight.

Network Performance

The change in peak hour average vehicle speeds compared to the overnight period has been plotted graphically (**Figure 24** and **Figure 25**) for the key routes described in the previous sections. A colour scale has been applied based on the percentage change in speeds between the overnight and peak period. A red band represents a location where average peak speeds are lower than the overnight speed, therefore delay is present, whilst a blue band represents locations where the overnight speed is lower than the peak speed. It should be noted that links falling into the latter category are generally those that are more rural and have smaller sample sizes meaning their average speeds are not necessarily representative. The nature of a rural road may also have an impact on overnight speeds due to blind bends and poor visibilities. It is generally expected that peak speeds are lower than overnight speeds, which can be clearly seen in the more heavily trafficked areas.

Figure 24 and **Figure 25** clearly demonstrate that some areas of the network are already operating at or above capacity, and that there are a number of sections which suffer from severe delays.

Clearly the A1214 and A1156, within the urban area, experience significant reduced speeds in the peak periods. In addition, the A12 experiences delays near Woodbridge, Martlesham and on the approach to Junction 58 of the A14. The A14 experiences a significant change in traffic speeds between Junctions 56 and 57 (at the Orwell Bridge) and on the approach to Junction 53 to the north west of Ipswich.

Figure 24 AM Peak vs Overnight Trafficmaster Speeds

Figure 25 PM Peak vs Overnight Trafficmaster Speeds

Route Capacity Assessment

In order to understand route capacity, the Congestion Reference Flow (CRF) has been calculated for roads within the study area. The CRF is an estimate of the AADF, at which the hourly traffic demand is likely to exceed the maximum sustainable hourly throughput of the link, i.e. the point at which congestion might be expected to begin. The CRF has been calculated using the Design Manual for Roads and Bridges (DMRB) 46/97 *Traffic Flow Ranges for Use in the Assessment of New Rural Roads*.

Several routes assessed within this study are located within an urban environment, such as the A1214 or A1156. Regardless of this, a CRF assessment still provides a good overview of how the demand relates to the available capacity on key links within the study area. The CRF assessment should be treated as a high-level appraisal of congestion, as the capacity in the network is a product of both link and junction capacity and the CRF only takes into account the former.

The CRF for each link has been calculated using the latest 12-hour traffic flows released by the DfT, and the 2015 AADT as a percentage of the calculated CRF is illustrated in **Figure 26**. Links that are likely to be operating at their maximum sustainable hourly throughput are identified in orange and red shades and flows that are significantly higher than the maximum sustainable hourly throughput of the link are shown in dark red.

Figure 26 2015 AADT as a Percentage of CRF

Figure 26 provides a high-level estimate of the level of flow to capacity of the key links situated within the study area. This analysis demonstrates that the A14 is at, or near, capacity on the link between Junctions 56 and 57. The section of the A14 between Junction 52 and 53 is also approaching capacity.

This assessment is based on the DMRB guidance for New Rural Roads and therefore has limits to the accuracy of its use on links within urban areas which are more susceptible to junction capacity constraints. In urban areas where there is a series of successive controlled junctions, such as roundabouts or signalised junctions, there is likely to be a lower capacity than that assumed in this part of the analysis. Nevertheless, the study does show that the A1214 section north of Ipswich Town Centre currently operates near capacity.

Future

Forecast growth was derived from an uncertainty log approach in collaboration with the local authorities within Suffolk. Developments considered to be “more than likely” or “near certain” are included in the forecast year models, as per WebTAG guidance. A full dependent development test looking at the impact of additional development that could be unlocked as a result of the scheme has not been conducted at this stage. This was considered to be an appropriate proportionate approach given the early stage of scheme development. Observed Traffic Master data demonstrates that parts of the road network already experience congestion issues and the forecast year modelling suggests that this problem is likely to worsen over time on a number of the existing east to west routes. The Stage 1 report provides a more detailed summary of the predicted future situation on the highway network.

4.3.8 NETWORK SAFETY

This section provides a summary of the current level of network safety within the strategic study area to the north of Ipswich.

Personal Injury Accidents

Personal Injury Accident (PIA) records along the primary network on the east to west corridors have been reviewed for the five-year period between January 2011 and December 2015. This is the most recent period for which ‘STATS 19’ PIA data has been released by the DfT.

The location, number and severity of PIAs along the primary east-west route area (A12 to A14) are illustrated in **Figure 27** and **Figure 28**.

Figure 27 2011-2015 PIAs: North Ipswich

Figure 28 2011-2015 PIAs: Ipswich

Analysis of PIAs that have occurred on the A14 are summarised in **Table 30**.

Table 30 PIA Summary: A14

Year	A14 West of Ipswich				A14 South of Ipswich			
	Fatal	Serious	Slight	All	Fatal	Serious	Slight	All
2011	1	4	63	68	0	8	75	83
2012	1	6	54	61	2	0	72	74
2013	1	4	60	65	0	0	66	66
2014	0	0	57	57	0	4	84	88
2015	1	0	33	34	0	2	78	80
All	**4**	**14**	**267**	**285**	**2**	**14**	**375**	**391**
Annual Average	**0.8**	**2.8**	**53.4**	**57.0**	**0.4**	**2.8**	**75.0**	**78.2**

As summarised in **Table 30**, the total number of accidents on the A14 to the west of Ipswich has been fairly consistent over the five-year period, with around 60 PIAs, including roughly one fatality per year. In 2015, the total number of accidents reduced significantly to 34, although it is not clear whether this is a longer-term trend or just fluctuation within the data.

On the A14 south of Ipswich, the number of accidents has also remained fairly consistent over the five-year period with a peak of 88 accidents in 2014 and a low of 66 accidents in 2013. Two fatal severity accidents occurred in 2012 either side of Junction 57, but otherwise no fatal accidents were recorded in this location which suggests this is not a trend.

Analysis of accidents has also been carried out on the A12 east of Ipswich between the A14 and Woodbridge north. A summary of the data is provided in **Table 31**.

Table 31 PIA Summary: A12 East of Ipswich

Year	Fatal	Serious	Slight	All
2011	0	6	69	75
2012	1	6	42	49
2013	0	10	81	91
2014	0	0	72	72
2015	0	8	60	68
All	**1**	**30**	**324**	**355**
Annual Average	**0.2**	**6.0**	**64.8**	**71.0**

As shown in **Table 31**, one fatal severity accident was recorded on the A12 over the five-year period indicating that there is not a strong trend of fatalities. The highest number of total accidents recorded over 12-months was 91 in 2013 with the lowest number, 49, occurring in 2012 which demonstrates some fluctuation in annual totals around an average of approximately 70 accidents per year.

Analysis of PIAs has also been carried out on Norwich Road, one of the main radial routes entering Ipswich from the A14 Junction 53, to the north-east of the Town Centre. A summary of the data for Norwich Road can be seen in **Table 32**.

Table 32 PIA Summary: Norwich Road

Year	Fatal	Serious	Slight	All
2011	0	10	42	52
2012	0	6	51	57
2013	0	6	36	42
2014	0	6	66	72
2015	0	2	42	44
All	**0**	**30**	**237**	**267**
Annual Average	**0.0**	**6.0**	**47.4**	**53.4**

Table 32 shows that on average 53 PIAs are recorded annually on this stretch of single carriageway urban road. As expected due to the low speed of the road, many of these accidents are of slight severity, however, there are on average six serious severity accidents per year. There were no fatal severity accidents recorded during the five-year period.

Analysis of PIAs has also been carried out on the A1214 in two locations. The first location is a section of the outer ring road (Valley Road), one of the main radial routes entering Ipswich from the A14 Junction 53, to the north-east of the Town Centre. The second location is on the A1214 to the east of the Town Centre near Kesgrave. A summary of the data for the A1214 can be seen in **Table 33**.

Table 33 PIA Summary: A1214

Year	A1214 Valley Road (North of Ipswich)				A1214 Main Road (Kesgrave - East of Ipswich)			
	Fatal	Serious	Slight	All	Fatal	Serious	Slight	All
2011	0	2	48	50	0	0	21	21
2012	0	6	21	27	0	2	12	14
2013	0	6	39	45	0	0	21	21
2014	0	2	42	44	0	4	24	28
2015	0	0	24	24	0	2	21	23
All	**0**	**16**	**174**	**190**	**0**	**8**	**99**	**107**
Annual Average	**0.0**	**3.2**	**34.8**	**38.0**	**0.0**	**1.6**	**19.8**	**21.4**

As demonstrated in **Table 33**, over the five-year period there were on average 38 PIAs annually on the A1214 to the north of Ipswich; in 2011 however 50 accidents occurred on this section. The data confirmed that there were no fatal accidents recorded.

Fewer accidents occurred on the A1214 section to the east of Ipswich with on average 21 PIAs annually. Only 14 accidents occurred on this stretch of the road in 2012, with two serious severity accidents observed. No fatalities were recorded on this section of the road.

Analysis of accidents has also been carried out on the A1156 (Crown Street) which forms the northern section of the Ipswich Inner Ring Round. A summary of the data for this location can be seen in **Table 34**.

Table 34 PIA Summary: A1156 Crown Street

Year	Fatal	Serious	Slight	All
2011	0	2	33	35
2012	0	8	60	68
2013	0	0	33	33
2014	0	8	36	44
2015	0	6	30	36
All	**0**	**24**	**192**	**216**
Annual Average	**0**	**4.8**	**38.4**	**43.2**

As shown in **Table 34**, no fatal severity accidents were recorded on the A1156 Crown Street. On average 43 PIAs were recorded annually during the five-year period.

Finally, analysis of PIAs has also been carried out on the B1078 which forms an east-west connection between the A14 and A12 to the north of Ipswich. A summary of the data for this location can be seen in **Table 35**.

Table 35 PIA Summary: B1078

Year	Fatal	Serious	Slight	All
2011	1	2	12	15
2012	1	2	27	30
2013	0	0	33	33
2014	1	4	27	32
2015	0	0	27	27
All	**3**	**8**	**126**	**137**
Annual Average	**0.6**	**1.6**	**25.2**	**27.4**

The B1078 forms a route to the north of Ipswich through open countryside. It is expected that the route carries fewer vehicle movements than the SRN and key roads within the urban area, resulting in lower accident risks as a result. There were, however, three fatal severity accidents recorded along the route. On average, 27 PIAs occur along the B1078 annually, however the DfT data does not include information on the contributory factors, therefore the main causes and reasons for these accidents cannot be identified from this data.

A variety of speed limits exist on the B1078, including some national speed limit sections and the route includes a number of sharp bends and narrow carriageways. This is potentially a causal factor to the high incidents of fatalities on the B1078.

5 THE NEED FOR INTERVENTION

This chapter builds upon the baseline and future scenario set out in **Chapter 4**, establishing why there is a need for intervention. This forms the evidence base for the option generation and analysis within the remainder of the report.

The early 2000's showed a rejuvenation of Ipswich, with growth in population, housing and jobs, following a decline throughout the 1990s. However, **Chapter 4** clearly identified a slowing in the rate of growth in Ipswich in recent years, falling below the national and regional averages.

The existing situation leaves Ipswich at a critical point at which a catalyst for enabling future growth and prosperity is required. Without such a catalyst, existing infrastructure and services are unlikely to support the growth aspirations of the town and wider region. The story of historical and future trends that build the case for intervention is demonstrated within this chapter.

5.1 SUMMARY OF EXISTING & FUTURE SITUATION

This section summarises the existing and forecasted future situation in terms of demographics, socioeconomics and transport.

5.1.1 DEMOGRAPHICS

The total resident population of Ipswich was estimated to be 135,908 in 2016, rising from 117,069 recorded in the 2001 Census. The densification of Ipswich during this period is demonstrated by a rise in population density from 29.7 to 34.5 people per hectare.

The level of population growth experienced between 2001 and 2011 has slowed in recent years, according to population estimates. The rate of growth falls below the regional and national annual averages, indicating some pressure on the area to meet demand for housing or employment growth or perhaps a reduction in attractiveness of the area.

The population of Ipswich in the short term is likely to exceed the level of growth in the East of England and be almost double the rate of England. This would see Ipswich's total population exceed 140,000. Although it is expected to continue to grow in the longer term, it falls behind the East of England by 2026. There are ambitious short to medium-term growth targets in the East of England in areas such as Cambridgeshire and Bedfordshire, reflected in the population growth targets. By 2036, the population in Ipswich is expected to have grown by approximately 16% from 2016, compared with 17% and 12% in the East of England and England respectively.

Such growth relies on the appropriate infrastructure being implemented in a timely fashion to facilitate residential, commercial and economic growth.

5.1.2 SOCIOECONOMICS

Dwelling stock estimates show that there were approximately 60,810 dwellings in the Ipswich district in 2016. This has risen from 51,680 in 2001, an 18% increase. The rate of growth in Ipswich was greater than the regional and national rates every year between 2003 and 2011. In particular, the growth from 2007 to 2008 (2.6%) was significantly greater than the regional (1.1%) and national (1.0%) annual growth rates.

However, in more recent years the level of growth has fallen behind the East of England and England, this trend serves as an indicator of constraints on growth in the area.

The forecasted trend of population increase is largely reflected in future housing forecasts. It shows that housing in Ipswich in the short-term is likely to exceed the level of growth in the East of England, both of which are above the national forecast. In the longer term, it becomes more comparable with the wider East of England region. By 2036, the population in Ipswich is expected to have grown by approximately 22% from 2016, compared with 23% and 17% in the East of England and England respectively.

The rate of housing growth forecasted is even greater than population growth forecasts, hence it is essential that appropriate infrastructure is implemented in a timely fashion to facilitate residential, commercial and economic growth.

The WP increased from 65,888 to 71,601 between 2001 and 2011. Compared with the rate of growth in working age population in Ipswich (20%), the rate of jobs increase is much lower. This disparity is made clearer when studying the absolute changes; the working age population increased by 14,720, whereas the WP increased by 5,713. In total the working age population was 15,965 more than the number of jobs in Ipswich in 2011. This illustrates the attractiveness of Ipswich as a place to live for the economically active but indicates that there is significant outward commuting to reach their workplaces.

While demonstrating an increase in jobs, Ipswich falls behind other districts in Suffolk, the East of England and the national average growth. The disparity between population and jobs, both in terms of absolute numbers and historical growth, indicates the need to invest in the provision of adequate employment opportunities for future sustainable growth.

Ipswich is forecast to have a faster rate of job growth than the rest of the East of England region and England as a whole. The cumulative growth from 2016 maintains this pattern throughout the forecast through to 2036, by which time the number of jobs is forecasted to be approximately 7.6% more than 2016 (or approximately 6,000).

The forecasted job growth is contradictory to historical patterns, predicting an upward trend in job growth from what has historically been the case. This further reinforces the need to invest in the provision of adequate employment opportunities for future sustainable growth; therefore, the provision of an adequate, high-quality transport network capable of connecting residents with their jobs and other services is essential.

5.1.3 TRANSPORT

Road Network

Ipswich is well served by a series of strategically important routes, the A12 to the south and east, and the A14 to the south and west. The A14 forms part of Euroroutes E24 and E30 and connects the Port of Felixstowe to the wider SRN, via the Orwell Bridge crossing situated immediately south of Ipswich. The A14 to the west of Ipswich connects to the A1, M1 and M6, helping to connect the port and the East of England to the Midlands and the North of England. Due to the large amount of port traffic, the A14 has a high proportion of HGVs and often experiences delays, arising from a range of causal events including poor weather such as high winds and fog resulting in the closure of the Orwell Bridge crossing.

In addition to the primary A-roads, the B1078 forms an east-west link to the north of Ipswich, allowing access between the A12 and A14 without having to use the Orwell Bridge crossing. The B1078 is rural in nature and comprises of sections of single carriageway national speed limit and sections of 30mph local roads as it passes through a number of settlements, including Coddenham, Clopton and Wickham Market. It is narrow in places and has a number of sharp bends and junctions with poor visibility, so is not suitable as a strategic route.

Trips wishing to enter / leave Ipswich Town Centre itself have a number of radial routes to choose from, including six that head north into the study area. Most of these radial routes are urban in nature and have 30mph speed limits at their southern extent. As they head north, they typically become single carriageway rural routes with speed limits fluctuating between the national speed limit and 30mph through any villages.

The A1214 (Kesgrave Road) and the A1156 (Norwich Road) both have a number of bus priority and cycle facilities, whilst the other radial routes typically do not.

Rail Network

Ipswich is located at the interchange of the Great Eastern Main Line (London Liverpool Street to Norwich), Ipswich to Felixstowe line, East Suffolk Line (Ipswich to Lowestoft), Cross Country corridor route (Felixstowe to Peterborough), and Ipswich to Cambridge line. Lines connect Ipswich to Norwich to the north, the Suffolk Coastal area to the east, Felixstowe to the south-east, London and Chelmsford to the south-west and Bury St Edmunds and Cambridge to the west. **Figure 29** demonstrates the rail network from Ipswich.

Figure 29 Local Rail Network

Source: Anglian Route Study (Network Rail, 2016)

Overall, the town provides good rail connectivity, but improvements are needed to address infrequent and indirect services. Also, the resilience of the lines needs to be addressed, as both signalling and track capacity on some routes cause cancellations and delays of passenger rail services.

In addition to the main central station, which receives 3.3 million passengers per annum (2017/18), Ipswich has two smaller railway stations. The nearest, Westerfield station, is on the northern outskirts of Ipswich, on the Suffolk Coastal line, and receives approximately 11,100 passengers per annum (2017/18). The third station, Derby Road to the south of Ipswich, is on the line to Felixstowe and receives approximately 48,310 passengers per annum (2017/18). Both Westerfield and Derby Road have infrequent stopping services (hourly in the peak periods) so are not heavily utilised.

Rail passenger numbers at all three stations are predicted to increase by 75% from 2013 to 2043. Furthermore, over the next 25 years, footfall at Ipswich Station is predicted to grow by 115,500 passengers per annum.

Bus Network

A number of bus services operate within the study area. Ipswich Buses (owned by IBC) operate services within the town which originate from Tower Ramparts Bus Station on Crown Street. In addition to the Ipswich services, a number of rural bus services operate from the Old Cattle Market on Turret Lane. These rural services form a series of longer distance radial bus routes serving the villages to the north of Ipswich.

Two Park & Ride sites are in operation in Ipswich; the London Road Park & Ride site situated to the south-west of Ipswich near the A14 Junction 55 (Copdock Interchange) and the Martlesham Park & Ride site situated east of Ipswich on the A12. Park & Ride services run frequently from Monday to Saturday but do not run on Sundays.

A number of scheduled coach services are also in operation from the study area which connect Ipswich with London, Stansted airport, Heathrow airport, Colchester, Chelmsford, Mark Teys, Clacton-on-Sea, Cambridge, Norwich and Braintree.

Cycle Network

Ipswich has a number of advisory and signed cycle corridors within the Town Centre including Tuddenham Road, Westerfield Road, Dale Hall Lane (Local Cycle Route 12), Butts Road and Playford Road.

More strategic cycle routes are also present due to the NCN running through the study area. NCN Route 51 is a long-distance cycle route connecting Colchester to Oxford. Locally it runs directly to the north of Ipswich from Claydon in the east towards Martlesham in the west and then on to Felixstowe. It routes via Lower Road, Grundisburgh Road and Martlesham Road.

NCN Route 1 is a long-distance cycle route connecting Dover and the Shetland Islands – via the east coast of England and Scotland. Locally, the route runs south-west to north-east from Colchester, Stratford St Mary, Hadleigh, Ipswich via Bourne Park, Ipswich Hospital, Martlesham and through Woodbridge heading northbound from that point towards Norwich.

Travel Patterns

The 2011 Census data demonstrates that commuter journeys to work from local parishes around Ipswich are heavily dominated by use of cars. Parishes served by bus priority measures and railway stations do generally have a slightly higher uptake of public transport and those closer to Ipswich, or locations with a greater level of jobs internally, see increased levels of active mode use due to shorter trip distances. Regardless of these factors, the predominant mode of travel to work is by car. This is also likely to relate to the rural nature of the settlements around Ipswich which are well spread across the study area and do have frequent bus services, so the catchment area is reasonable geographically, but the population is small and therefore uptake is limited.

As for Ipswich itself, the predominant mode of travel to work remains to be car within Ipswich Borough, with 36,712 journeys (58%) using this mode in 2011, an increase of 30% from the 28,140 car driver trips (56%) recorded in 2001. The next most popular method of travel to work in Ipswich is walking and cycling, up from 15% in 2001 to 17% in 2011. Public transport remains the lowest mode share with 8% of commuters using bus (down in percentage and absolute terms from 2001) and 3% using train.

Network Performance

Network performance of the four main routes between Needham Market and Wickham Market has been assessed using Trafficmaster travel time data. The four routes are:

1. Strategic Network: along the A14 and A12
2. Urban Network: along parts of the A14 and A12, the A1214 through Kesgrave, Norwich Road and via:
   a. A1214 Valley Road
   b. A1156 Crown Street
3. Rural Network: along the B1078 and small sections of the A14 and A12. In addition, the B1079 link between the junction with the B1078 and the A12 near Woodbridge

The Trafficmaster data was provided for the morning peak hour, evening peak hour and overnight periods. The peak hours and overnight periods have been compared to provide an indication of the level of delay present on each of the routes during the peak periods.

The route with the highest level of delay was the A1156 Crown Street route (which travels directly through Ipswich Town Centre), which exhibited 13-14 minutes of delay from west to east in both peak periods and from east to west in the PM peak. In the AM peak, the east to west route experiences 16-minutes of delay.

The A1214 Valley Road route, travelling immediately north of the Town Centre experiences 10-12 minutes of delay during the peak hours.

The Rural Network route, utilising the B1078 to the north of Ipswich, experiences 2-4 minutes of delay in the peak periods, with the east-to-west route in the AM peak demonstrating the most delay. The A12 / A14 route, bypassing Ipswich to the south experiences 3-4 minutes of delay in both peak periods.

In order to minimise delay and therefore reduce overall travel times, routes that do not travel via Ipswich are most efficient during the peak periods. Despite the fact that the A14 / A12 is significantly longer in terms of distance, it is 10-15 minutes quicker than the more direct route via Ipswich. The B1078 offers the quickest and most direct route from Needham Market to Wickham Market, despite its rural nature and less than ideal conditions as a strategic route (narrow, sharp bends, poor visibility).

Accidents

There are a small number of locations within the study area where a long-term trend of fatal accidents can be identified. These locations include the A14, west of Ipswich and the B1078 route to the north of Ipswich. The average number of fatalities in both of these locations is approximately one per year (0.8 annually on the A14 and 0.6 annually on the B1078).

The main locations that experience the most serious accidents appear to be those that are more urban in nature. The locations with the highest level of serious accidents are the A12 (six per year), Norwich Road (six per year) and Crown Street (five per year). The latter two are urban in nature and carry a high number of cars, buses, pedestrians and cyclists which are likely to come into conflict, particularly during peak times when stop-start traffic and conflicts with side roads are at their peak.

Slight accidents are the most common type of PIA recorded and are common at all of the locations that have been analysed. The locations with the highest number of slight accidents per year are the A14 both south and west of Ipswich (75 and 53 per year respectively) and the A12 east of Ipswich (65 per year), which is likely to relate to the large volume of flows present in these locations. The location with the least slight accidents (and least accidents overall) is the A1214 (Kesgrave Road). Despite being a key radial route into Ipswich from the east and carrying a high flow during peak times, the presence of bus lanes and segregated cycle paths in a number of locations, segregate pedestrians, cycles and buses from general traffic increasing safety and reducing potential conflicts.

Along the SRN more generally, PIAs tend to occur close to junctions where conflicts between vehicles are likely to arise. Noticeably, the A12 on the approach to the Copdock Roundabout has experienced a number of slight severity accidents which are thought to result from extended traffic delays on the network and stop-start traffic.

On the A14, to the south of Ipswich, several accidents have been recorded near the Orwell Bridge. Two fatal severity accidents have also been recorded either side of Junction 57 at Nacton.

5.2 FUTURE DEMAND

5.2.1 FUTURE LAND USES & POLICIES

The wider Ipswich area is facing enormous growth in housing and employment demand over the next 15-years. The East of England Plan has allocated around 20,000 new homes and a similar number of new jobs to the wider Ipswich area.

By 2031 it is estimated that the population of Suffolk County will increase by 27%, one of the fastest rates in the East of England. This indicates that there will be significant growth in the economy, with the prediction of an additional 15,000 dwellings in Ipswich, and 5,000 more in neighbouring districts around the edge of the town, which will result in significant transport impacts.

Key regional policies highlight the focus on wider Ipswich as a centre for growth. The New Anglia LEP Strategy and Suffolk Growth Strategy identify a focus on the growth of information communications, technology sector, and higher education, in addition to cultural and visitor attractions, and business support functions.

The New Anglia LEP Strategy, in particular, suggests that without improvements to transport infrastructure, the full development potential of these sites may not be realised.

5.2.2 FUTURE CHANGES TO THE TRANSPORT SYSTEM

Highway Network & Local Roads

A study for the East of England Development Agency in 2008 showed that by 2021 – if not tackled – congestion will cost the Ipswich economy approximately £17 million per year[1]. Consequences of congestion include loss of business and health issues associated with air and noise pollution.

To tackle safety issues on the Orwell Bridge, Highways England introduced new safety measures (including lower speed limits) in 2015 / 2016.

Public Transport: Rail & Bus

SCC, IBC and Abellio Greater Anglia are working together to implement a project that will redevelop Ipswich Station and its forecourt. The project will improve station waiting facilities, station toilets, and the ticketing foyer. Work on the forecourt will seek to improve safety, accessibility and the appearance of the space.

Non-Motorised Users: Cycling & Walking

Travel Ipswich is working on a scheme for general improvements of Majors Corner junction to improve its safety for Non-Motorised Users (NMUs). The scheme was originally meant to commence in 2013 but has been postponed. Once complete this measure will improve accessibility for pedestrians and cyclists.

[1] Suffolk Local Transport Plan (2011-2031)

5.2.3 FUTURE TRAVEL DEMANDS & LEVEL OF SERVICE

Congestion problems are largely related to peak hour travel, which is strongly influenced by journeys to work and school. Many of the journeys within the town, including relatively short trips, are made by car, which leads to congestion on roads in and around the Town Centre and on radial routes leading to it. There are already air quality problems which have resulted in the declaration of three Air Quality Management Areas (AQMA) around the central area of Ipswich, two covering the important routes around the town centre. In addition, further AQMAs are being investigated heading away from the centre, as congestion spreads further outwards.

Ipswich has seen a 25% growth in employee travel demand between 2001 & 2011, but also a significant increase in car travel and reduction in bus travel to work over the same period. This is likely due to the rural nature of the area, where outlying parishes have less mode choice for getting to work. **Figure 30** and **Table 36** demonstrate the travel to work mode share for the Ipswich borough.

Figure 30 Travel to Work Mode Share

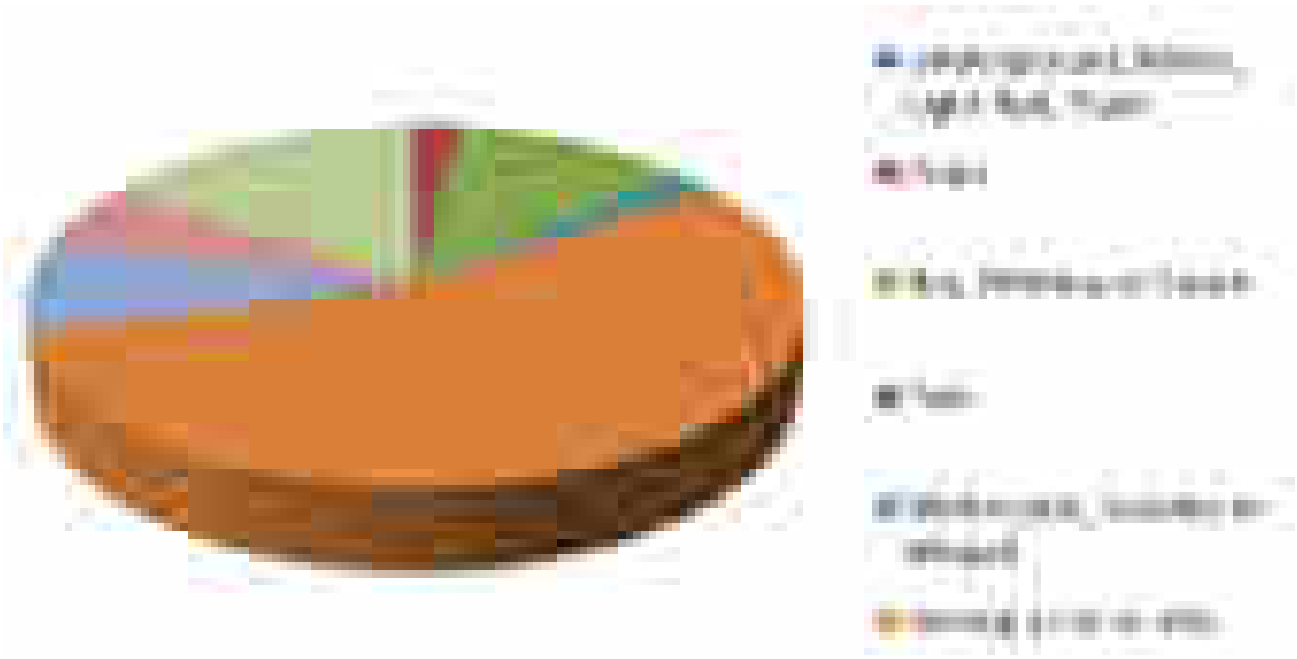


Table 36 Method of Travel to Work – Ipswich Borough: 2001 & 2011 Census Data

Method of Travel to Work (QS701EW)	Ipswich Borough			
	2001		2011	
	Trips	Percentage	Trips	Percentage
Underground, Metro, Light Rail, Tram	34	0%	59	0%
Train	981	2%	1,622	3%
Bus, Minibus or Coach	5,623	11%	5,067	8%
Taxi	143	0%	237	0%
Motorcycle, Scooter or Moped	821	2%	724	1%
Driving a Car or Van	28,140	56%	36,712	58%
Passenger in a Car or Van	3,940	8%	4,529	7%
Bicycle	3,092	6%	3,069	5%
On Foot	7,490	15%	10,929	17%
Other Method of Travel to Work	211	0%	315	0%
Total	**50,475**	**100%**	**63,263**	**100%**

Source: Office for National Statistics

The 2008 traffic modelling has also shown that, if the current patterns of travel are maintained into the future, the additional car trips brought about by background growth and new developments will lead to much greater congestion, which is also likely to spread beyond the morning and evening peak periods. The 2008 model forecasts a 17% increase in the number of peak hour trips into the central area between 2011 and 2021, and an increase of 22% of total trips within the central Ipswich area.

The forecast increase in congestion will cause increased delays on the transport networks and will have negative impacts on business, air quality, accessibility, bus punctuality and reliability.

5.3 CASE FOR INTERVENTION

Analysis of population and job forecasts indicate that the number of trips being made within the wider Ipswich area is likely to continue to grow, but at a rate significantly higher than that currently being experienced. Transport modelling has also indicated this trend and suggests that increased levels of delay will have a detrimental effect on business, air quality, accessibility, bus punctuality and reliability within the study area if appropriate interventions are not identified.

5.3.1 LOCAL OBJECTIVES

The Suffolk LTP, produced in 2011, aims to set out SCC's long-term transport strategy to 2031 with a view to:

"*maintain, and over time, improve Suffolk's transport networks, reduce congestion and improve access to jobs and markets.*"

The LTP identifies the key transport issues facing each district now, and in the future, if intervention is not undertaken. The key issues identified for Ipswich are listed in **Table 37**.

Table 37 Key Transport Issues for Ipswich

Key transport issues for Ipswich
Road condition
Urban realm improvements
Tackling congestion
Modernisation of bus stations
Reducing separation between town centre and waterfront
Better facilities for walking and cycling
Stronger neighbourhoods
Longer term – crossing for improved access to wet dock island site
Town centre masterplan
A14 improvements
Ipswich – Transport fit for the 21st century
Extensive Air Quality Management Areas
A14 Orwell Bridge and Seven Hills Interchange congestion

Source: Suffolk Local Transport Plan (2011-2031)

The majority of the issues identified in the LTP for Ipswich can be classified into four distinct categories;

- Congestion
- Accessibility and connectivity into, via and within the Town Centre
- Public realm
- Maintenance

The various interventions considered and assessed within this report are likely to be able to help address the first two categories in a variety of ways. Improvements to public realm and maintenance are not within the scope of the study objectives.

The key transport issues identified in the Suffolk LTP for the neighbouring districts to the north of Ipswich (Mid Suffolk and Suffolk Coastal) are listed in **Table 38** and **Table 39**.

Table 38 Key Transport Issues for Suffolk Coastal

Key transport issues for Suffolk Coastal
A12 Four Villages relief road
A12 reliability – flooding
Sea level change and coastal erosion
East Suffolk line improvements – Beccles Loop
Lorry parking
Operation Stack
Felixstowe – local bus services
Lorries and large buses on rural roads
Congestion on Ipswich eastern fringe including A12, A1214 and A14
Demand Responsive Transport (DRT) services in coastal area
Air Quality Management Areas in Woodbridge and Felixstowe

Source: Suffolk Local Transport Plan (2011-2031)

Table 39 Key Transport Issues for Mid Suffolk

Key transport issues for Mid Suffolk
Town based bus services in Stowmarket
Stowmarket transport interchange
Tackling congestion in Stowmarket
Cycle network
Rural bus provision
Rural footpaths
Local access to key services
Lorry management

Source: Suffolk Local Transport Plan (2011-2031)

Whilst some of the issues identified in **Table 38** and **Table 39** are not relevant to the scope of this study, a number do relate to issues that could be overcome by better connectivity and reduced congestion within the study area. These include;

Suffolk Coastal

- Relieving congestion on the A12, A14 and A1214
- Air Quality Management Areas in Woodbridge
- Lorries and large buses on rural roads

Mid Suffolk

- Rural bus provision
- Local access to key services
- Lorry management

The interventions being considered in this report are highly likely to reduce congestion on the A12, A14 and A1214, particularly if a highway option closer to Ipswich is selected. The same could also be said for air quality within Woodbridge, which is currently exacerbated by congestion on the A12 and could be improved by a number of the interventions considered in this report.

Issues relating to HGVs and public transport on rural roads are also likely to be alleviated should an alternative primary route be provided in place of routes such as the B1078. Such a route could also help with access to local services, such as Ipswich Hospital, which could be accessed more easily without the need to travel into the Town Centre.

Major distribution centres in Mid Suffolk (Coddenham) would also be better served by the transport network if a better east-west route were available, which would also help to reduce the number of HGVs on rural and local roads.

5.3.2 STRATEGIC OBJECTIVES

Regional Policy

Transport investment in a northern relief road, would support the New Anglia LEP Strategy, which targets growth in the northern Ipswich area, including higher education and employment, with estimates that the increase of the congestion on the roads could detriment expected employment growth.

Investment in a northern relief road would also complement the Suffolk LTP and contribute to the alleviation of congestion within the town, potentially enabling greater uptake of sustainable modes of transport in the urban area, if freed road capacity is then used to provide bus and cycle priority measures.

National Policy

Investment in an improved east-west transport infrastructure link, within the study area of the northern wider Ipswich area, would seek to meet the Government's *National Infrastructure Delivery Plan (2016-2021)* objectives to create a national road network that improves economic productivity, thus supporting jobs and growth across the country.

The *Highways England: Strategic Business Plan (2015-2020)* clearly identifies the strategic need to invest to modernise the transport network and is in line with the *Highway England: Delivery Plan (2015-2020)* to support local growth with a safer network.

5.3.3 STRATEGIC CASE

Local, regional and national policies all support the case for intervention within the study area. The selection of an appropriate intervention will not only support wellbeing and economic prosperity locally, it also has the potential to provide improvements on a regional and national scale, due to the strategic nature of the transport network within the study area.

6 ENVIRONMENTAL & BUILT ENVIRONMENT CONSTRAINTS

6.1 EVIDENCE BASE

The geographical study area includes a large number of listed buildings and scheduled monuments. However, the area does not include World Heritage sites, parks and notable gardens.

Several woodlands are also included within the study area; however, no nature reserves are present within the area.

The River Fynn, River Lark and the River Gipping form physical constraints that need to be considered within option development, as well as ecological and flooding impact. The terrain and these natural constraints will shape the layout and alignment of any proposed highway improvements along its routing. However, these features are not considered insurmountable to achieve an INR.

In particular, the area around the Rivers Fynn and Lark is protected and referenced in the SCDC Local Plan. Further investigation will be required to confirm whether any highway infrastructure could be constructed through the area, potentially using construction methods to integrate the route as best as possible within this protected environment.

Existing manmade infrastructure, such as an overhead high-power electrical cable, or underground apparatus, could also be a constraint on any routing, but these are more likely to impact the scheme in economic terms, particularly if any rerouting of services needs to occur to deliver an option.

The following sections provide an overview of the environmental and built environment constraints and opportunities within the INR study area.

The *Ipswich Relief Road – Environmental Constraints* report, published by WSP in December 2016, provides a fuller environmental context to the study area and can be found in **Appendix B**. Therefore, the following sections aim to provide a summary of the findings of the previous report.

6.2 ENVIRONMENTAL CONSTRAINTS

6.2.1 EDUCATIONAL LAND USE

Bealing Primary School, Grundisburgh Primary School, Claydon Primary School and Thomas Wolsey School (pupils with special care needs) are located within the study area. In addition, Kesgrave High School (secondary school) is located to the north of the A1214, Ormiston Endeavour Academy is located to the north of Castle Hill and Claydon High School is located to the south-east of Claydon.

6.2.2 CULTURAL HERITAGE

A large number of buildings which have been identified within the study area are listed. **Figure 31** illustrates the location of these buildings, that could potentially be affected by an INR.

No World Heritage Sites, public parks or gardens have been identified within the study area. However, there are parks 860m east, within Ipswich and 2km north of the study area. Bawdsey Beach Heritage Coast is situated 8km to the south-east of the study area but is not considered relevant at this stage. Key areas of cultural heritage with the study areas consist of:

- Mockbeggars Hall
- Akenham
- Close to the B1077/Witnesham Road and Westerfield

- Around Tuddenham St Martin
- Around Playford
- Little Bearings
- The White House, north of Kesgrave

Figure 31 **Local Cultural Heritage Constraints**

6.2.3 ECOLOGY

The *Ipswich Relief Road – Environmental Constraints* report (**Appendix B**) confirms that a number of protected habitats are present in the study area, especially in the western section around the A14 and in the eastern half of the study area.

- There are several areas of ancient woodland within the study area, one being located south of Playford (south of the railway line), just west of Woodbridge near the B1079 and a large section northwest of Culpho
- Bramford Meadows Local Nature Reserve is located to the west of the A14 and railway line but should not be affected by any scheme coming forward in the study area
- Sinks Valley Kesgrave Site of Special Scientific Interest (SSSI) is located in the south-east of the study area
- The local ecological protected areas in the wider region are outside of the study area
- No greenbelt, biosphere reserves, National Nature Reserves, or National Parks have been identified within the study area or within 10km of the study area

The document concludes that the least ecologically sensitive area, with just small localised areas of woodland, is to be found to the northern and western areas surrounding Ipswich. However, to the north-east of Ipswich, the area is ecologically denser with a variety of priority habitats, a parcel of ancient woodland and a SSSI in the south-east of the study area. All of these should be considered and ideally avoided in developing the preferred route corridor.

The map shown in **Figure 32** indicates that the area around the Rivers Fynn and Lark is identified as environmentally sensitive. This same area is included within the SCDC Local Plan as a Special Landscape Area and is protected under Policy AP13:

"Policy AP13 Special Landscape Areas

The valleys and tributaries of the Rivers Alde, Blyth, Deben, Fynn, Hundred, Mill, Minsmere, Ore and Yox, and the Parks and Gardens of Historic or Landscape Interest are designated as Special Landscape Areas and shown on the Proposals Map. The District Council will ensure that no development will take place which would be to the material detriment of, or materially detract from, the special landscape quality."

Figure 32 Environmentally Sensitive Areas

6.2.4 AIR QUALITY

There are no AQMAs located within the study area. There are five AQMAs located in the centre of Ipswich for Nitrogen Dioxide (NO_2 annual mean), south of the study area. The closest to the study area are Ipswich AQMAs No. 1 and No. 4 on Chevalier Street, which are located 1km south of the study area.

Ipswich AQMA No. 5 is located 1.25km south of the study area. Ipswich AQMA No. 2 is located 1.35km south of the study area. Ipswich AQMA No. 3 is located 2km south of the study area. The Woodbridge AQMA for Nitrogen Dioxide (NO_2 annual mean) is located approximately 1.5km east from the study area.

The *Ipswich Relief Road – Environmental Constraints* report (**Appendix B**) concludes that the highest background levels of Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) (2013) were found around the A14 but no area was identified as exceeding the UK Air Quality Strategy Objectives.

6.2.5 WATER

The *Ipswich Relief Road – Environmental Constraints* report (**Appendix B**) confirms that the study area is situated within a Nitrate Vulnerable Zone (NVZ) for groundwater and surface water.

Within the centre of the study area, rocks are located with essentially no groundwater. Most of the rest of the area is located within a low productivity aquifer, however the area west, near the A14 and Claydon, is situated within a highly productive aquifer.

There are several rivers and streams in the study area such as the River Fynn and River Lark to the east. In addition, the River Gipping is located to the west of the A14. The River Fynn runs through the centre of the study area towards the east, south of Playford and Woodbridge.

An area rated as Flood Zone 3 by the Environment Agency (EA) surrounds River Fynn in the east of the study area and has a high risk of flooding. A tributary of the River Gipping flows north of Westerfield and has some risk of flooding as rated by the EA. The River Gipping and its tributary from Westerfield are noted as having indicative funding for a flood risk management scheme in 2015 / 2016.

6.2.6 LANDSCAPE

The study area does not include any Areas of Outstanding Natural Beauty (AONB). However, there is the Suffolk Coast and Heaths AONB approximately 500m east of the study area.

Three landscape areas are present across the study area. The west is classed as South Suffolk and North Essex Clayland; the central section as South Norfolk and High Suffolk Claylands; and the eastern half of the study area is classed as Suffolk Coast and Heaths.

6.2.7 NOISE & VIBRATION

Existing noise sources include the A14 and A12, located at both extents of the study area. This is in addition to the railway line running from Woodbridge to Ipswich, which is also a source of noise.

Sensitive receptors such as those located in urban areas and villages including schools should be avoided. The change of noise level could potentially be important when considering impacts of introducing new road infrastructure to the study area.

6.2.8 CONTAMINATED LAND & GROUND CONDITIONS

Historic landfills are located within the area, around Akenham, close to Westerfield, to the north and east of Tuddenham St Martin, Sinks Pit Landfill between Kesgrave and Little Bealings and also west of the A14.

A number of industrial and waste operators are present, or have been present, which presents potential sources and areas of industrial pollution. They are concentrated in the west of the study area around Paper Mill Lane and next to the A14.

6.3 PHYSICAL CONSTRAINTS

6.3.1 TERRAIN & WATER

In terms of natural constraints these are typically mountains, steep valley escarpments, floodplains and rivers. Ipswich is located within an undulating terrain, ranging from sea level at the tidal River Orwell, to +53m Above Ordnance Datum (AOD) north of Westerfield.

The main river within the north Ipswich area is the River Fynn, which runs in the north to south direction in the centre of the study area and then eastbound through Playford and then south of Woodbridge. There is also a tributary of the River Lark located to the east of Grundisburgh, heading south through Great Bealings to converge with the River Fynn. There is also a tributary to the River Gipping, located to the west of the study area from Westerfield and Akenham settlements.

These options are located within a Drinking Water Protected Area (DrWPA) and a surface water and groundwater NVZ.

6.3.2 UNDERGROUND FEATURES

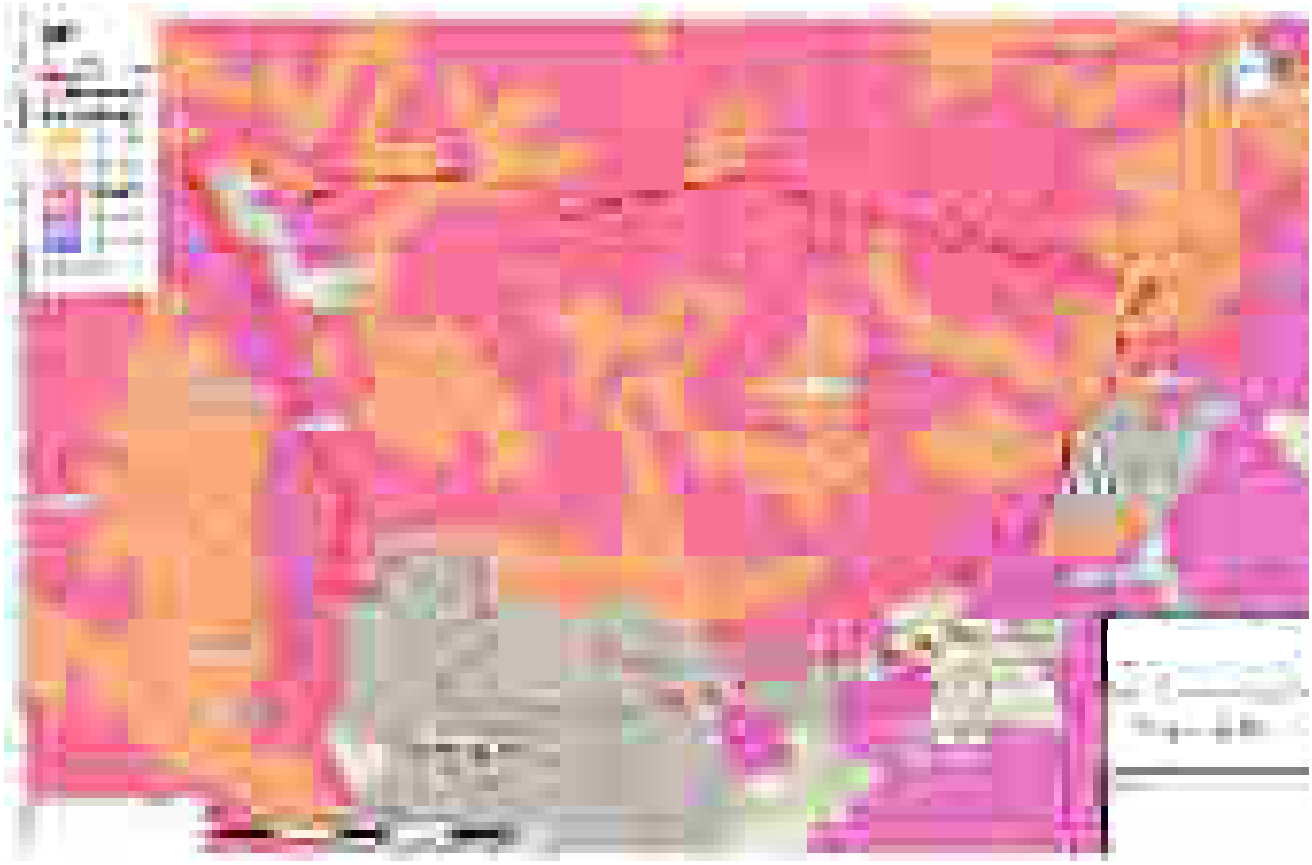
Underground natural features would include swallow holes and the like, associated with chalk and marl which underlays part of the study area. Appropriate geotechnical and geophysical investigations can identify their possible interface with route options in the future. Historical mining may also be present in isolated locations within the study area, and consultation with the Coal Board will identify such areas. Again, their presence, if found, can be counteracted through engineering solutions.

6.3.3 LAND USE

It is noted that the vast majority of the study area is given over to farming, with all types represented (including diary, beef, arable, forestry, etc.). Care will be taken to avoid the best classified land when the mapping of such assets is completed, and the route options are being assessed in general terms.

The Agriculture Land Class (ALC) for the study area is shown in **Figure 33**, which illustrates that much of the area is Grade 3 (good to moderate quality agricultural land) with small areas of Grade 4 (poor quality agricultural land) in the eastern and western ends of the area. Areas of Grade 2 (very good quality agriculture land) are present in the centre of the study area.

Figure 33 Agricultural Land Classification



6.3.4 MANMADE CONSTRAINTS

Above Ground Utilities

The most visually obvious utilities within the study area are the overhead high voltage power lines belonging to the National Grid and energy supply companies.

The National Grid has confirmed ownership of the overhead high voltage power lines located within the study area to the north of Ipswich. The power line runs in a southwest to northeast direction, crossing the A14 south of Claydon, passing through Akenham and then to the north of Tuddenham St Martin and Grundisburgh. The route of the overhead power lines taken from National Grid's asset records and visual observations is plotted on the combined Constraints Mapping attached to Appendix C.

Underground Utilities

A number of strategic buried utilities are present, carrying fuel, electricity, gas and water across the study area for both national and local services.

The National Grid asset records confirm the presence of two Local High Pressure (LHP) gas pipelines to the north of Ipswich. One runs east-west, from Junction 53 of the A14 to the west, running generally alongside the overhead power line, through the Fynn Valley Golf Club and south of Grundisburgh were it meets another high-pressure gas main which runs north-south at the National Grid Above Ground Installation (AGI) – reference: Great Bealings 55001. The second gas main runs in a northeast-southwest direction passing through Little Bealings, Playford, then on to Ipswich near Kesgrave High School.

Further investigation will be required to identify the exact location of the gas pipelines and associated wayleaves and easements; however, the apparatus should not create a significant constraint, other than costs linked to protection works, with the exception of any proposed works at the A14 / A1156 interchange (A14 Junction 53), which may require a diversion in the event that works are required to modify the junction.

A fuel pipeline network is present in the UK and it is possible that operational oil companies, such as CLH Pipeline Systems, have apparatus in the area. Further investigation will be required to examine the location of possible apparatus in the geographical study area.

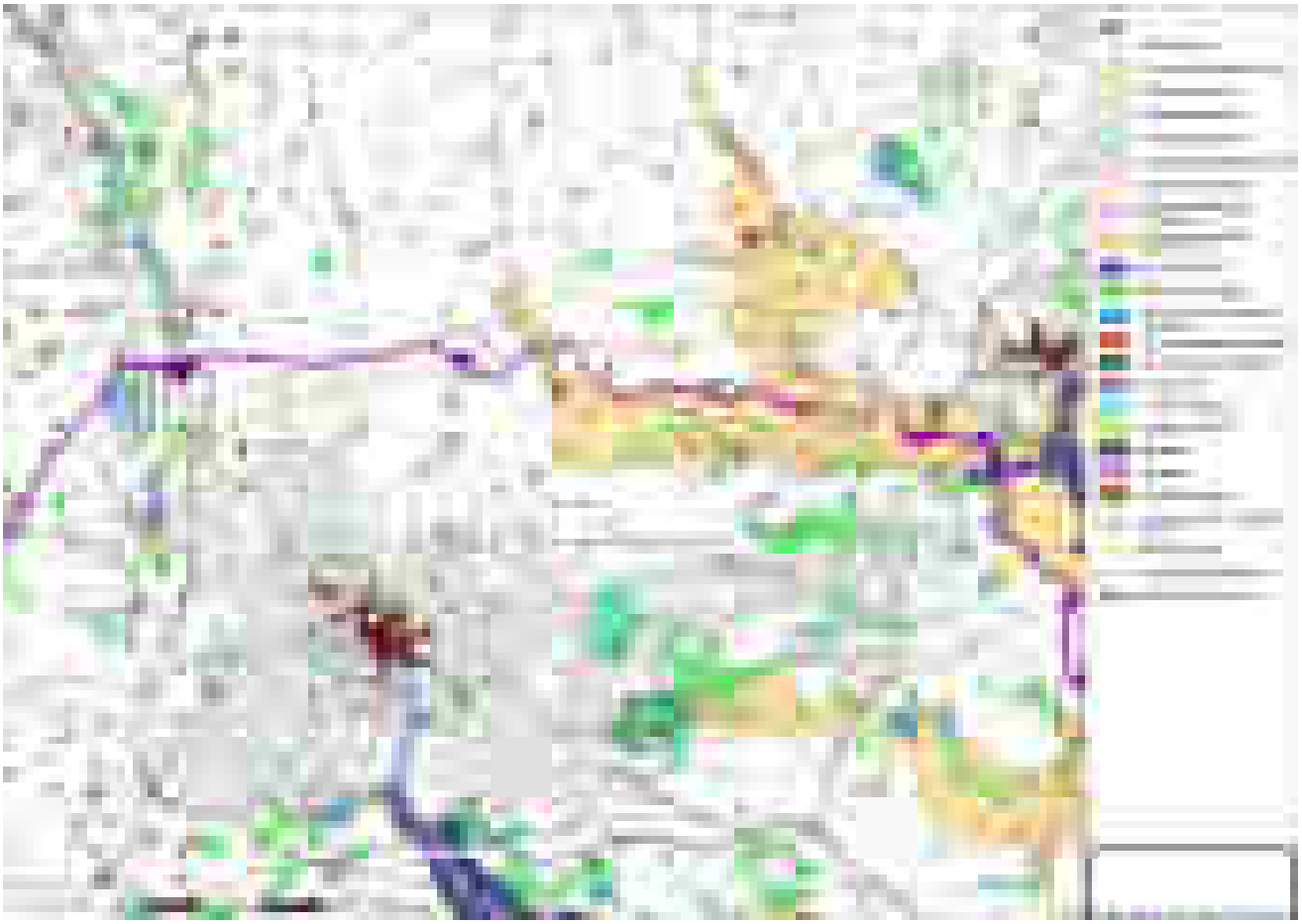
Anglia Water Services Ltd confirmed that some substantial growth is being planned in the study area; however, Anglia Water further confirmed that there is nothing currently in effect which would potentially be a constraint for a scheme. Any works and project which would trigger network improvements would be required to obtain planning approval by the relevant councils.

East Anglia Ones is an offshore wind farm project which will be located to the south-east of Ipswich. The 500-600MW offshore windfarm project, will be one of the world's largest. An underground high voltage cable is proposed to be laid down to the north of Ipswich, within the study area, to connect the coast near Bawdsey through Newbourne, across the railway line and A12 south of Woodbridge, north of Tuddenham, across the A14 between Junction 52 and Junction 53 connecting a large electrical substation west of Bramford.

Figure 34 shows the known significant constraints available on the iGIS database, including power overhead cables, high pressure gas main and the future high voltage underground line to Suffolk One offshore windfarm.

It should be noted that due to the reliance at this stage on utility asset record mapping to locate buried services, further investigation will be required during subsequent stages of this project to refine the route options order to coordinate potential works with existing strategic utilities infrastructure to fully understand the extent of mitigation and, where possible, avoid / minimise the extent of any diversionary and / or protection works.

Figure 34 Summary Constraints Plan



6.3.5 TRANSPORT INFRASTRUCTURE

Details of the railway network is covered in **Section 0**. Crossing under or over these corridors will need to be a consideration as the route options develop, but their presence is not regarded as a significant constraint.

Similarly, the road network in the study area (described in **Section 4.3.1**) is a consideration, but not a constraint. For convenience, and to minimise disruption to the travelling public, careful choice of road closure, bridge options and locations will be part of any later assessment.

6.3.6 COMMERCIAL & RESIDENTIAL PROPERTIES

Villages and local settlements form the commercial and residential properties which will need to be avoided as much as possible. These urban areas are concentrated within Ipswich but also within the numerous villages present within the study area.

In addition, isolated farms, dwellings and golf courses (such as the Fynn Valley Golf Club and Seckford Golf Centre) are also present within the study area.

7 GENERATING OPTIONS

This chapter builds upon the evidence base and the need for intervention presented in the previous chapters. It aims to take into account the issues faced by the existing transport network, and future demand levels, to generate a long list of intervention options across a range of transport modes. An initial appraisal and sifting process is undertaken to establish potential options that should be taken forward for further assessment of their viability.

7.1 HISTORICAL OPTIONS

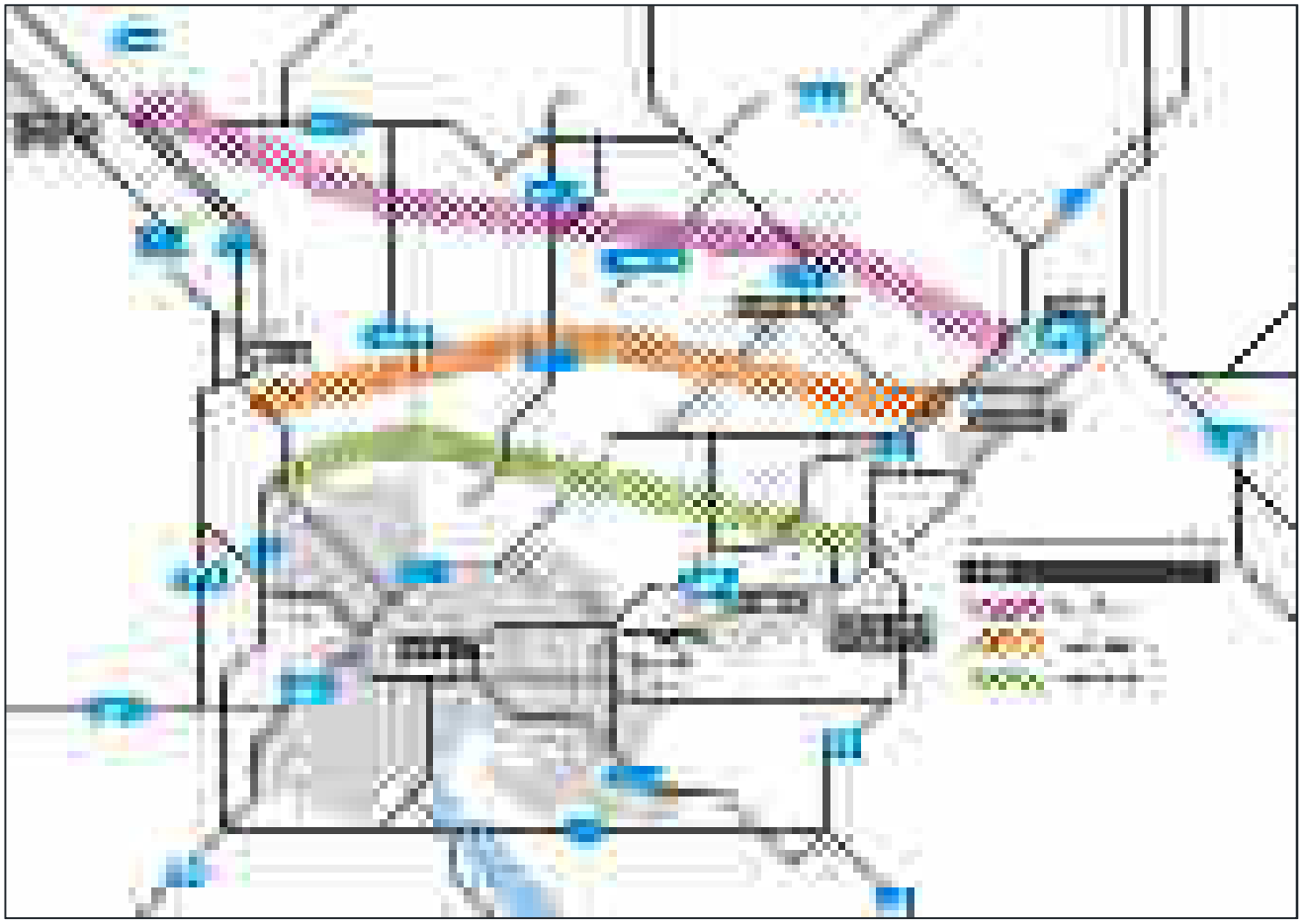
Historically, a number of studies have taken place assessing the merits of providing a strategic highway-based transport solution to improve traffic flow in and around Ipswich. These studies focused on the creation of an east-west road linking the A14 and A12 to the north of Ipswich.

7.1.1 IPSWICH NORTHERN ROUTES STUDY, 2017

As part of the early development of this study, and following on from earlier studies, three emerging highway routes were identified as candidates to create strategic links between the A14 and A12 to the north of Ipswich to facilitate economic and residential growth. The indicative routes are illustrated in **Figure 35** and were used to assess the merits of the following alignments;

- A predominately east-west strategic route to the north of Ipswich, known as the Outer Route
- A southern route approximate to the 1990's route, known as the Inner Route
- A hybrid route between the Inner and Outer routes with greater potential to serve both strategic east-west routes and radial route connections with Ipswich, known as the Middle Route

Figure 35 Ipswich Northern Routes Alignment Testing (2017)



To test the initial viability of these routes, a series of early assessment transport model simulations were produced. These assessments were also accompanied by desktop junction assessments and constraints mapping exercises to identity any potential issues that would prevent an alignment from being feasible. The process looked at a range of factors including, but not confined to; heritage, environment, ecology, topography, property and utilities. The process highlighted that there were a number of environmentally sensitive areas to the north of Ipswich and areas of planned redevelopment in addition to a high-pressure gas main.

At this stage in the process, a number of assumptions were made regarding how and where the route might connect to the existing road network. Inner, middle and outer alignments were all tested as single lane (60mph) and two-lane (70mph) links.

Network summary statistics were produced for both the do-minimum scenario and the various scheme options to allow a general network-wide comparison to be made. The process revealed that all of the schemes were able to offer a net reduction in the total amount of time spent travelling compared to the do-minimum scenario, regardless of the alignment or number of lanes.

It was found that the dual carriageway options were consistently best placed to reduce total travel times, largely due to the higher speeds that can be achieved. The model testing also highlighted that single carriageway alignments closer to Ipswich were more effective at reducing travel times, whereas, the various dual carriageway options showed more variability in travel time savings.

7.2 REVIEW OF SCHEME OBJECTIVES

To enable an assessment of the viability of potential options against what an intervention is attempting to achieve, scheme objectives have been developed. The objectives take into account a range of indicators from congestion to the environment and economy. The scheme objectives have evolved over time through stakeholder engagement, and the current scheme objectives are outlined in **Table 40.** The objectives are used as the basis for option development.

Table 40 Scheme Objectives

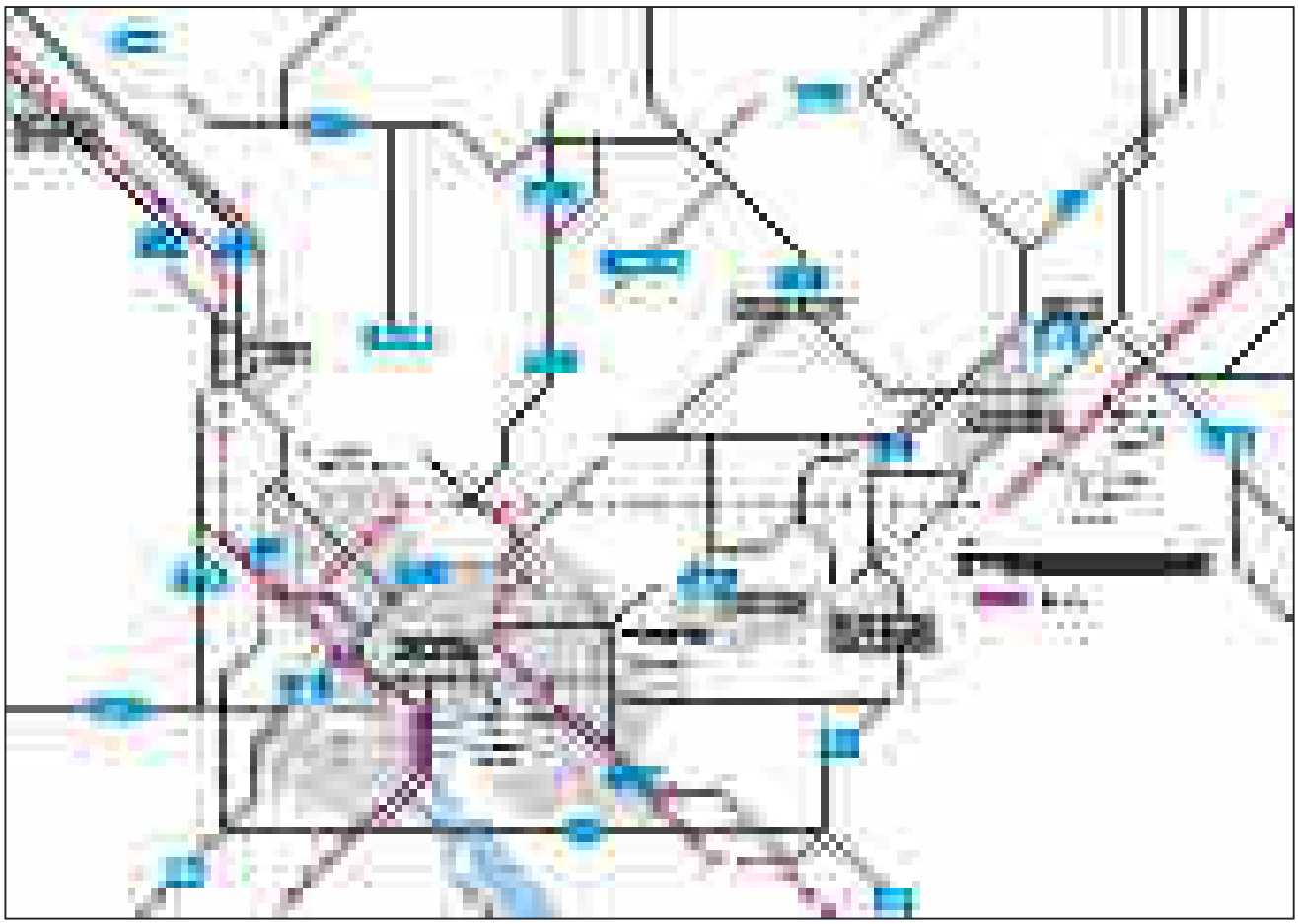
Objective
Provide additional transport capacity to enable planned and future residential and employment growth in the wider Ipswich area.
Reduce congestion within Ipswich Town Centre, including along the A1214 corridor.
Positive impact on the strategic road network including between the Copdock Roundabout – junction 55, the Orwell Bridge, and Sevens Hills Roundabout – junction 58, and improve the connection between the A14 and A12 for vehicles transiting to the north of Suffolk and Norfolk.
Improve resilience of road network when the Orwell Bridge is shut.
Improve Sustainable methods of transport within the East to West corridor to the north of Ipswich and links from the north of Ipswich to the Town Centre.
Improve air quality and reduce noise on existing corridors.
Enable economic growth for wider Ipswich area by improving connectivity and accessibility.
Supporting economic growth and better connectivity to the Suffolk Energy Coast.

7.3 LONG LIST OF OPTIONS

7.3.1 GEOGRAPHIC AREA

The scheme objectives set out in **Table 40** refer to the wider Ipswich area. This is defined as the entirety of Ipswich and surrounding undeveloped area, some of which is allocated for future development. A plan showing the study area, within which options are to be developed, is shown in **Figure 36**.

Figure 36 Broad Geographic Study Area for Option Generation



7.3.2 OPTION GENERATION

In response to the 'Need for Intervention' (**Chapter 5**) and the Scheme Objectives (**Table 40**), a wide range of options for intervention were considered across a range of modes and methods, including public transport, infrastructure, traffic management and smart technology. Options were generated through the review of previous and current studies, stakeholder engagement and a technical appraisal of potential interventions.

Site Visit

An extensive site visit was undertaken on Tuesday 06 September 2016, by two WSP staff. The site visit comprised of travelling along all the northern radial routes from the A1214, extending to Coddenham, Witnesham and Grundisburgh to the north, Woodbridge to the east, and B1113 to the west. A detailed study of the areas in the vicinity of the strategic road junctions at the A14 and A12 was also undertaken.

The purpose of the site visit was to record visible existing constraints within the area to inform the development of potential options. The site visit commenced immediately after the AM peak, and extended into the PM peak, and so it was possible to observe directly typical PM peak flows.

Stakeholder Engagement

In order to define the scheme objectives and to assist the initial development of options, a workshop was held on Tuesday 18 October 2016, attended by key stakeholders, including elected members of the local authority, scheme partners and representatives of the local highway authority. Participants to the workshop included:

- East Suffolk combined authority (SCDC and Waveney District Council (WDC))
- West Suffolk combined authority (St Edmundsbury Borough Council (SBC) and Forest Heath District Council (FHDC))
- Babergh District Council
- Mid Suffolk District Council (MSDC)
- Ipswich Borough Council
- Suffolk County Council
- WSP (hosts)

Participants were presented with details of the local environmental constraints mapping and an indication of the impact on the local and SRN of traffic growth forecasts.

Subsequent workshops were held on Thursday 27 July 2017, and Wednesday 07 February 2018 that were used to further refine the scheme objectives and options.

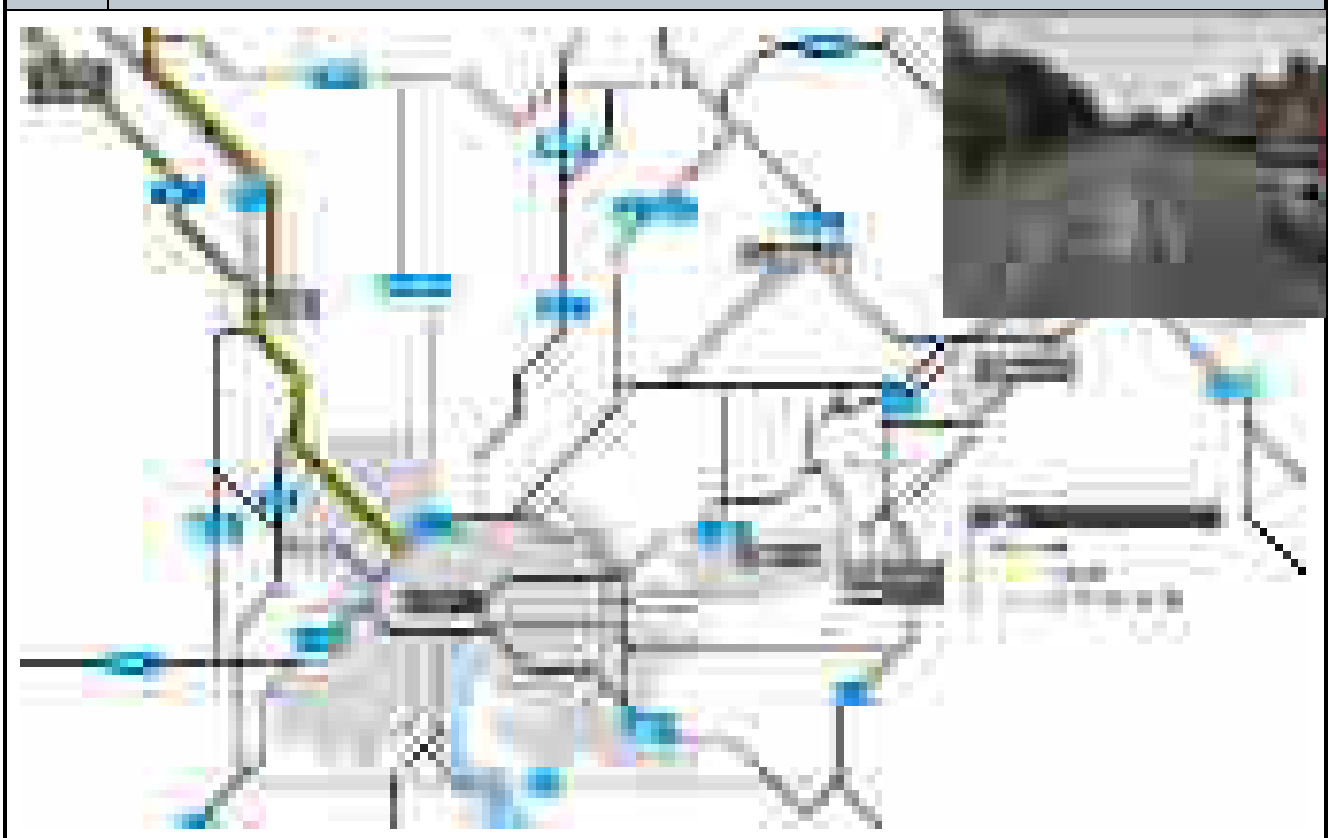
7.3.3 LONG LIST OF OPTIONS

A total of 31 interventions have been identified, with an additional 'Do Nothing' scenario included as a baseline comparator. The long list of options generated are summarised in **Table 41.** Each option is described in more detail on the following pages.

Table 41 Long List of Options

Category	ID	Option Name
Bus	1	Radial Route - Norwich Road - former Park & Ride
	2	Radial Route - Henley Road
	3	Radial Route - Westerfield Road
	4	Radial Route - Tuddenham Road
	5	Radial Route - Kesgrave Road
	6	Light Rail Transit (LRT) Orbital
	7	Bus Rapid Transit (BRT) Orbit
Rail	8	Increased Frequency of Rail Service
	9	New rail station at Gt Blakenham
	10	New rail station at Martlesham
	11	Capacity improvements on Felixstowe branch line
	12	Improved Connectivity at existing stations
Road	13	Non-Strategic Eastern relief road
	14	Non-Strategic Northern relief road
	15	Non-Strategic Northern fringe relief road
	16	A14 Junction 53 capacity improvements
	17	A12 / A1214 Main Road / Kesgrave signalised roundabout improvements
	18	Outer Highway Route - Single Carriageway
	19	Outer Highway Route - Dual Carriageway
	20	Mid Highway Route - Single Carriageway
	21	Mid Highway Route - Dual Carriageway
	22	Inner Highway Route - Single Carriageway
	23	Inner Highway Route - Dual Carriageway
	24	New River Orwell Bridge Crossing
	25	Tunnel of River Orwell
Smart Technology	26	Smart Parking
	27	Integrated Smart Public Transport
	28	Wide scale traffic signal upgrades
	29	Improved Public Transport Real Time Passenger Information (RTPI)
Other	30	Car Parking levy
	31	Congestion charging in Ipswich centre
	32	Do Nothing

1	Radial Route - Norwich Road - former Park & Ride



Norwich Road is served by an existing in-bound Bus Priority Lane operating 24-hours. This option proposes to extend the bus lane on the approach to the A1214 junction, from Kitchener Road, to Westwood Avenue. This would involve the removal of the existing right-turn lane leading to Richmond Road, and Brookes Hall Road. Further work will be required to measure queue lengths and right-turn counts to assess the impact to through flow with the loss of these right-turn lanes. The overall additional length of bus lane is approximately 400m. Traffic data indicates queuing or slow-moving traffic over this section of route during the AM peak, suggesting some benefit to bus journey times with the provision of an additional segregated bus priority lane over this section of route. Unfortunately, the onward route beyond the A1214 junction is too constrained to accommodate an addition bus lane.

Opportunities

- Provision of 400m extension of existing in-bound bus lane on approach to the A1214
- Explore possible junction improvement at the A1214 double mini roundabout – potential conversion to single roundabout or signalisation
- The reopening of the Norwich Road Park & Ride site would create an opportunity to encourage modal shift from car to bus, and consequently a reduction in car vehicle trips on the Norwich Road radial route
- Explore opportunity to reopen Norwich Road Park & Ride

Impacts

Currently the A1156 Norwich Road serves bus routes 113, 114, 87, 88, 88A, 89 and 89A, with services up to every 30-minutes. Extension of the existing in-bound bus lane would offer a marginal improvement to journey times, giving additional priority to buses where there is typically congestion.

Image from Google Earth Street View (Date Accessed: 20/02/18) WSP licence key JCPMZ71UJG8ZM27

2	Radial Route - Henley Road

This option comprises improvements to the Henley Road radial route to / from north Ipswich. The option is mainly focussed upon bus priority but aims to improve the route for users of all modes of transport. Henley Road is an unclassified radial route serving the Ipswich Northern Fringe Future Garden Suburb development area and outlying rural settlements of Henley and Coddenham. Henley Road crosses over the Ipswich-Lowestoft railway line approximately 500m north of the A1214 junction. This bridge represents a key constraint on the route due to available width limiting opportunities for widening of the carriageway without altering the structure. Additionally, to the south of the rail bridge, the road is flanked predominately by residential properties with frontage access. The limited available space within the highway confines the extents of priority bus lane to just south of the junction with Dales Road where the highway measures approximately 14.8m in width, allowing the introduction of approximately 400m of bus priority lane.

Opportunities

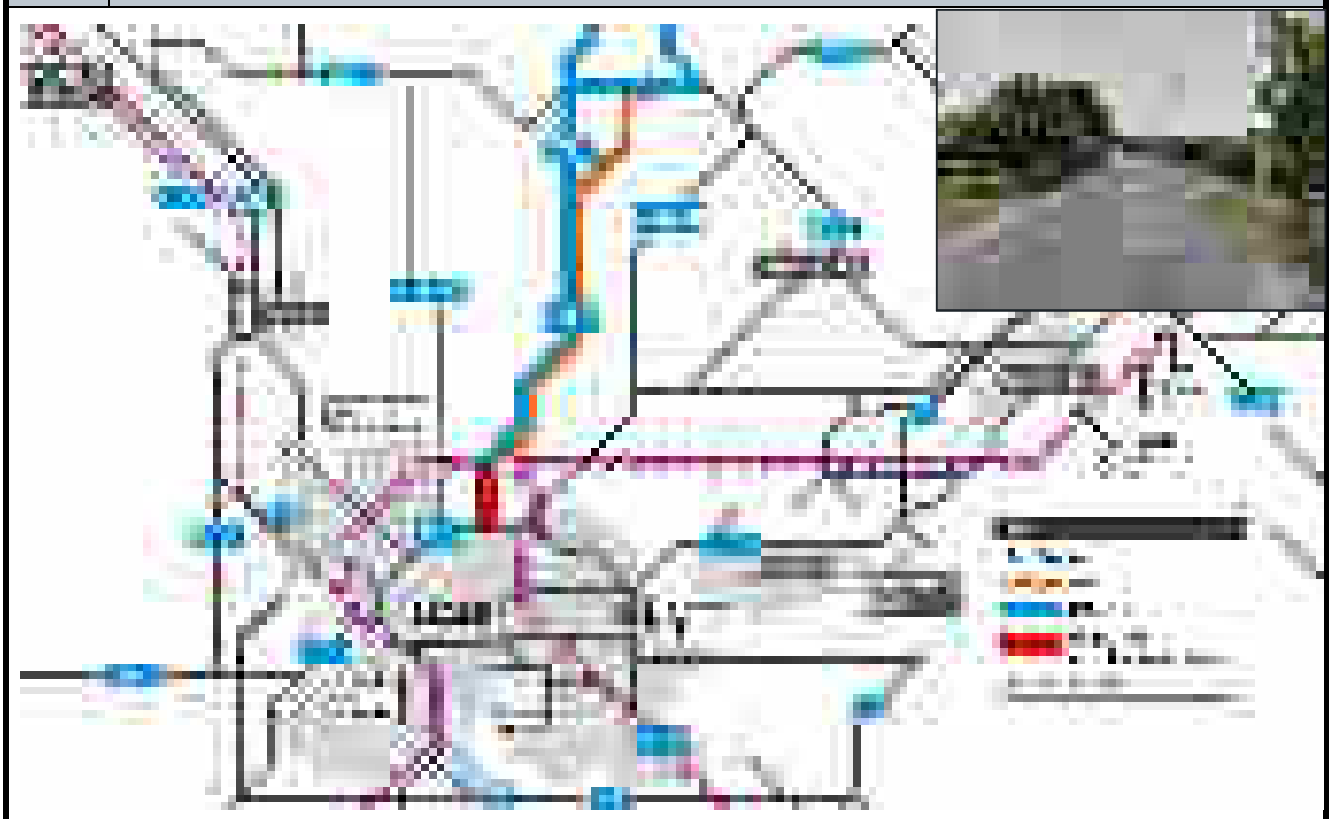
- Provision of approximately 400m in-bound bus lane north of the A1214 signalised junction
- Length of bus lane is equivalent to in-bound AM peak traffic queue, enabling some journey time savings
- Bus and cycle priority at A1214 signalised junction
- Explore options for improved bus stop infrastructure
- Improvements to bus services serving future development north of Ipswich

Impacts

Currently Henley Road serves bus route 116, with six services per day. Provision of an in-bound bus lane would offer improvement to journey times, giving additional priority to buses where there is typically congestion. This would result in a loss of verges and trees.

Image from Google Earth Street View (Date Accessed: 20/02/18) WSP licence key JCPMZ71UJG8ZM27

3	Radial Route - Westerfield Road



Westerfield Road (B1077) is a radial route linking the outlying settlements of Westerfield and Witnesham, also providing access to the Westerfield Railway Station. This option is focussed upon provision of in-bound bus priority but aims to improve the route for users of all modes of transport. The road is predominately rural in character, bounded by agricultural fields, save for the final 270m on the approach to the A1214 junction, whereupon the road is bounded by residential property with frontage access. The highway benefits from a substantial tree lined verge to the east side, with an overall width of approximately 18.5m, creating a boulevard style character with potential capacity for provision of an in-bound bus priority lane extending 250m north of the A1214 junction. Traffic indicates average queue lengths of approximately 120m on the in-bound approach to the A1214 roundabout junction for the AM peak. This route also provides an opportunity for improved bus links to Westerfield Rail Station to create an enhanced local public transport network on this route to accommodate future growth.

Opportunities

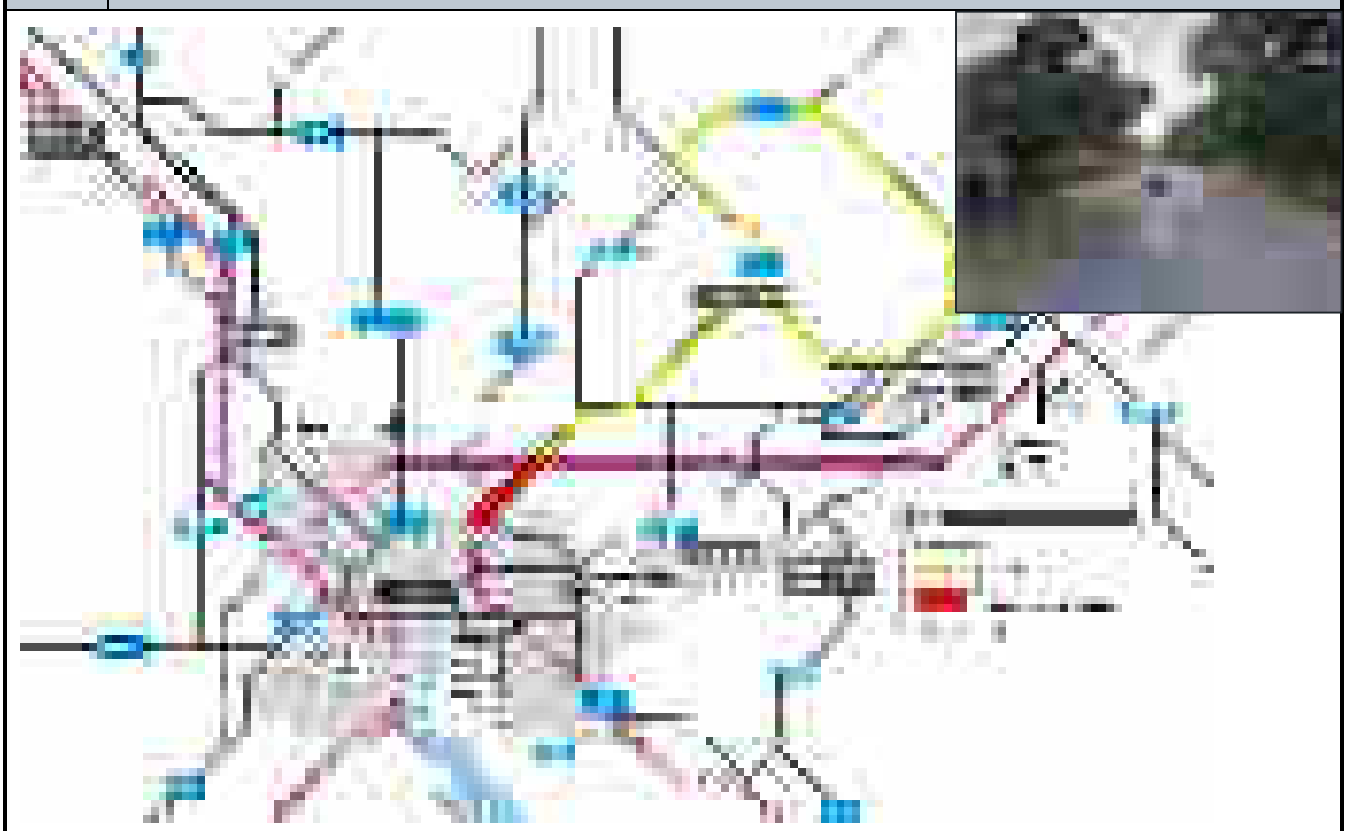
- Currently Westerfield Road serves bus routes 116, 118 and 119 with services up to every 30-minutes. Provision of an in-bound bus lane has potential to reduce journey times by avoiding queuing traffic
- Provision of approximately 250m in-bound bus lane north of the A1214 roundabout
- Opportunity for connection with Westerfield Railway Station
- Bus and cycle priority at the A1214 signalised junction
- Improved bus stop infrastructure

Impacts

- Improvements to the radial route would promote bus travel and modal shift from car to bus in future development at the northern fringe of Ipswich
- Creation of a bus priority lane along this route may however result in the loss of several mature trees

Image from Google Earth Street View (Date Accessed: 20/02/18) WSP licence key JCPMZ71UJG8ZM27

4	Radial Route - Tuddenham Road



Tuddenham Road is an unclassified radial route serving the outlying settlements of Tuddenham St Martin and Grundisburgh beyond. This option comprises improvements to the Tuddenham Road radial route to / from north-east Ipswich. The option is mainly focussed upon bus priority but aims to improve the route for users of all modes of transport. Currently Tuddenham Road serves bus routes 70 and 70A with six services per day. The route crosses over the Felixstowe and Lowestoft rail branch lines over narrow bridges. The Felixstowe line rail bridge, located approximately 480m north-west from the A1214 junction, is comprised of two lanes with a footway to the west side only, with an overall clear distance between parapets of approximately 6.7m. The Lowestoft line is much narrower, at approximately 5.5m overall, with no footway. South of the Felixstowe line rail bridge, the highway corridor widens to approximately 18m, with wide tree lined verges. This option proposes to introduce an in-bound priority bus lane for approximately 250m. Traffic data indicates average queue lengths of approximately 125m on the in-bound approach to the A1214 roundabout junction for the AM peak.

Opportunities

- Provision of approximately 250m of in-bound bus lane north of A1214 roundabout
- Bus and cycle priority at the A1214 roundabout
- Improvements to the radial route would promote bus travel and modal shift from car to bus
- Improved bus stop infrastructure

Impacts

Construction of a bus priority lane may result in the loss of several mature trees along this route

Image from Google Earth Street View (Date Accessed: 20/02/18) WSP licence key JCPMZ71UJG8ZM27

5	Radial Route - Kesgrave Road

This option comprises improvements to the Kesgrave Road (A1214). This is a primary radial route linking Ipswich Town Centre with the major employment centre of Martlesham, the A12, and Martlesham Park & Ride. The route benefits from a partial bus priority lane from the A1189 junction Heath Road to Playford Road, a distance of 200m. Kesgrave Road varies in width and character, bounded by a mix of residential property frontages, school, and open space parkland. Significant portions of the route benefit from wide open verges, with capacity to incorporate in-bound bus priority lanes. A section of bus lane is located eastbound on the approach to the Park & Ride access road and westbound from Wards View to the junction of Ropes Drive. The option is mainly focussed upon bus priority, extending the existing in-bound bus lanes that are present over part of the route, but aims to improve the route for users of all modes of transport. Currently Kesgrave Road serves bus routes 63, 64, 65 and 65B with services up to every 30-minutes. Traffic data identifies a number of key congestion hot spots along the route, mixed with short sections of free-flowing traffic. Provision of bus priority along the congested sections of route would offer some journey time savings for Park & Ride and regular bus services, with potential to improve the attractiveness of public transport and increase modal shift from private car.

Opportunities

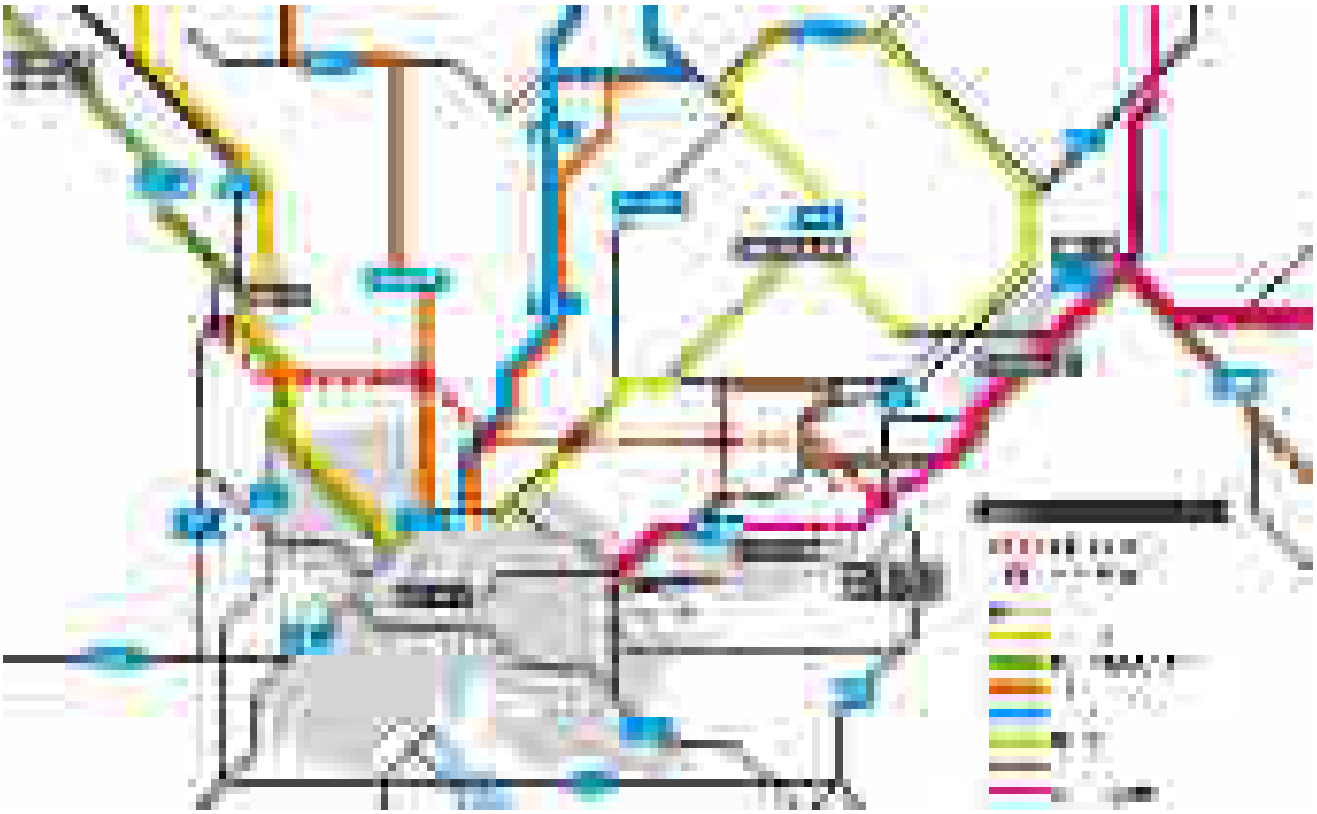
- Provision of approximately 4.8km in-bound bus lane between Martlesham Park & Ride and the A1189 roundabout (Ipswich Hospital)
- Bus and cycle priority at the A1214 roundabout
- Supporting facilities to improve walking and cycling
- Widening of route for NMUs
- Improved bus stop infrastructure

Impacts

Large number of private access points directly onto highway is a constraint to delivery.

Image from Google Earth Street View (Date Accessed: 20/02/18) WSP licence key JCPMZ71UJG8ZM27

6	Light Rail Transit (LRT) Orbital



This option comprises the construction of a LRT orbital route (e.g. tram) north of Ipswich linking Claydon and Martlesham. Bus / LRT interchange points would be located along the route, allowing access to / from Ipswich Town Centre.

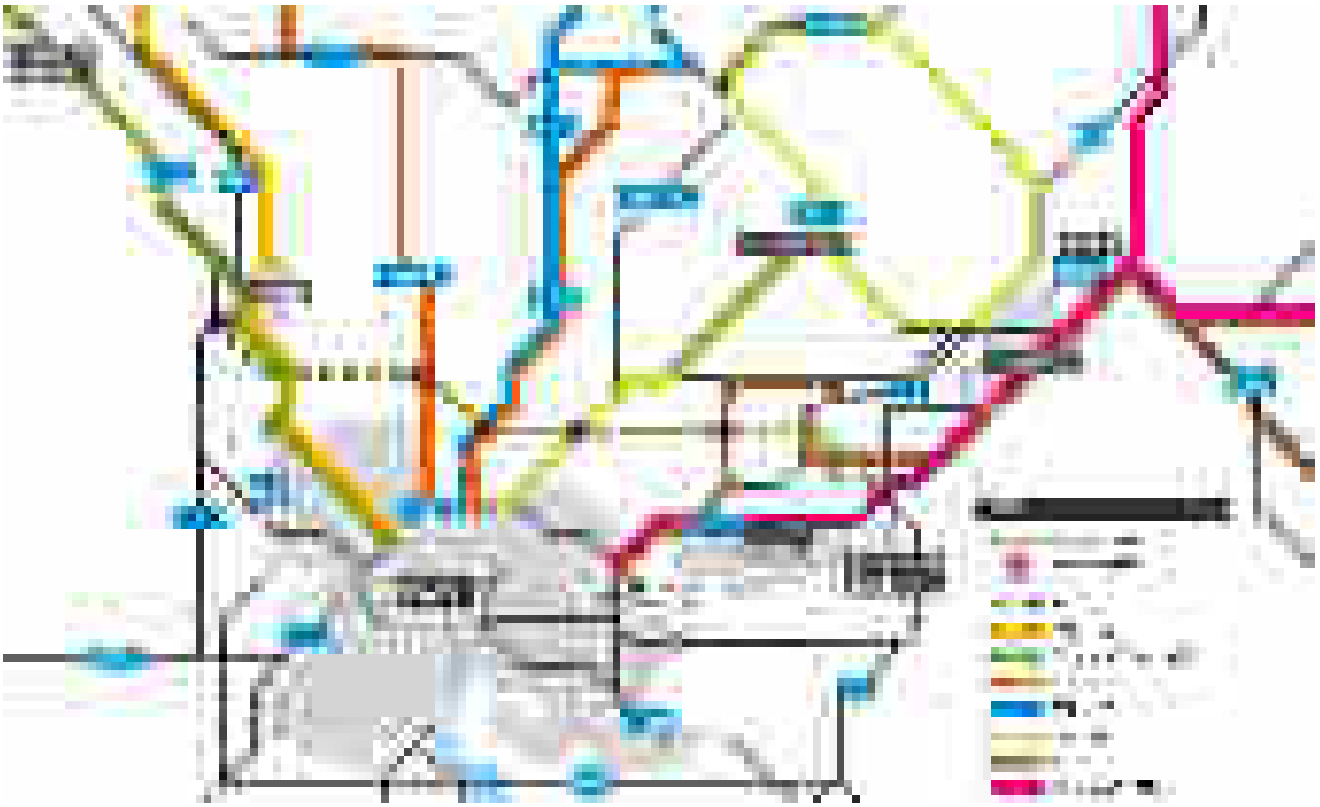
Opportunities

- Reduction in journey times
- NMU provisions alongside route
- Construction of a traffic free route north of Ipswich
- Road / bus / rail interchange points
- Improved links to key employment area east of Ipswich
- Transport hubs at ends of LRT
- Improved connectivity for existing and future development

Impacts

The LRT route would provide a non-highway link north of Ipswich, enabling travel east and west via reliable public transport without congestion. A northern LRT route would provide good connectivity to / from existing and future development on the northern fringe of Ipswich. The LRT would provide a congestion-free route from the A14 to / from the key employment area east of Ipswich. Construction would be on third party land, with planning, land purchase and environmental impacts. A new bridge over the A14 is required.

7	Bus Rapid Transit (BRT) Orbit



This option comprises the construction of a BRT orbital route north of Ipswich linking Claydon and Martlesham. Interchange points with other bus services on radial routes would be incorporated allowing access to / from Ipswich Town Centre.

Opportunities

- Reduction in journey times
- NMU provisions alongside route
- Construction of a traffic free route north of Ipswich
- Road / bus / rail interchange points
- Improved links to key employment area east of Ipswich
- Transport hubs at ends of BRT
- Improved connectivity for existing and future development

Impacts

The BRT route would provide a non-highway link north of Ipswich, enabling travel east and west via public transport. A northern BRT route would provide good connectivity to / from existing and future development on the northern fringe of Ipswich. The LRT would provide a congestion-free route from the A14 to / from the key employment area east of Ipswich. Construction would be on third party land, with planning, land purchase and environmental impacts. A new bridge over the A14 is required.

8	Increased Frequency of Rail Service

This option would explore opportunities to increase passenger train frequency on routes to / from Ipswich, particularly during the typical commuting periods. Currently an hourly service operates on these routes to a number of destinations. An increase in frequency would deliver a more attractive transport option for getting to / from Ipswich, particularly if focussed around the peak congestion periods on the road network. It is envisaged that the increased attractiveness of a more regular service would result in a modal shift away from the private car.

Opportunities

- More regular rail services to / from Ipswich on the Lowestoft and Felixstowe branch lines
- Greater flexibility for residents / workers / visitors of Ipswich
- Encourage more potential rail passengers to travel to / from Ipswich

Impacts

Availability of network capacity and rolling stock needs to be investigated with Network Rail and train operating companies to determine the viability of increased frequency of service.

9	New rail station at Gt Blakenham

This option comprises a new 'parkway' style railway station being constructed at Great Blakenham, approximately 7km north-west of Ipswich Town Centre. A new rail station at Great Blakenham on the Great Eastern Main Line (Ipswich to Norwich) would enable an extension of Ipswich's rail catchment. The location of the station would provide a strategic transport hub at which interchanges between modes can be carried out, serving the northern Ipswich area, providing relief to the congested road network entering / exiting Ipswich.

Opportunities

- Provide opportunity for journey start / completion by rail
- Better connectivity between Great Blakenham area and Ipswich Town Centre
- Mode interchange location in Great Blakenham

Impacts

Availability of network capacity (e.g. forward headway) needs to be investigated with Network Rail and train operating companies to determine the viability of a new rail station at Great Blakenham.

10	New rail station at Martlesham

This option comprises of a new 'parkway' style railway station being constructed at Martlesham, approximately 8km east of Ipswich Town Centre. A new rail station at Martlesham on the Lowestoft Line (Ipswich to Lowestoft) would enable an extension of Ipswich's rail catchment. The location of the station would provide a local transport hub at which interchanges between modes can be carried out, serving the northern Ipswich area, providing relief to the congested road network entering / exiting Ipswich.

Opportunities

- Provide opportunity for journey start / completion by rail
- Better connectivity between Martlesham area and Ipswich Town Centre
- Mode interchange location in Martlesham
- Better rail connectivity to / from major employment area

Impacts

Availability of network capacity (e.g. forward headway) needs to be investigated with Network Rail and train operating companies to determine the viability of a new rail station at Martlesham.

11	Capacity improvements on Felixstowe branch line

The existing Ipswich to Felixstowe line is single tracked. Additional twin tracking or passing loops would allow increased frequency of train service. Some works are already underway as part of existing route improvements by Network Rail to increase freight capacity by 30% by 2029, however additional works are not currently in Network Rail forecast investments plan. Enabling a more frequent rail service on the Felixstowe branch line is likely to result in rail becoming a more attractive and feasible option for people carrying out trips to and from south-east Ipswich. In turn, this could result in a modal shift, away from the private car in particular, reducing the pressure on the highway network and contributing to reduced congestion and improved air quality.

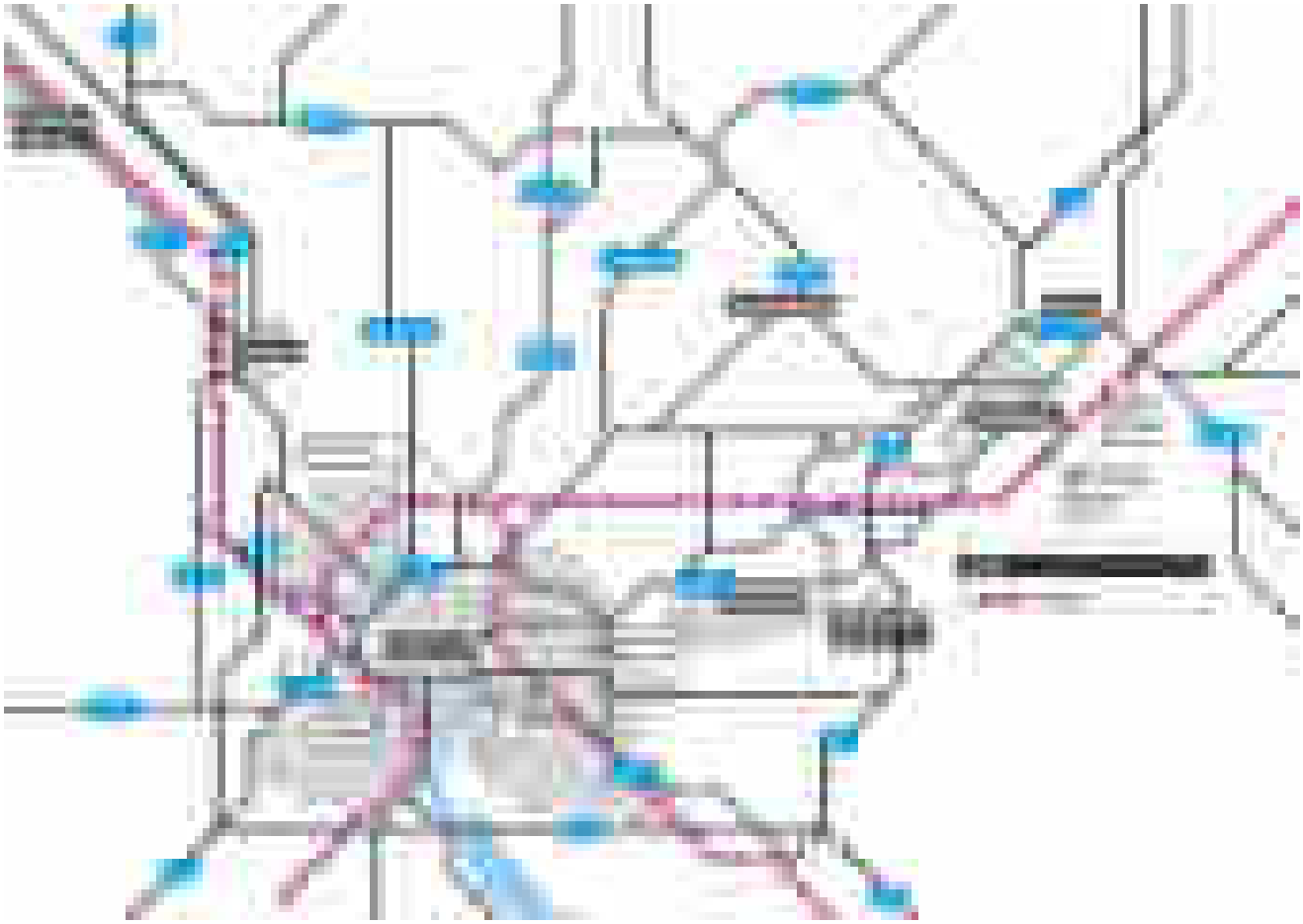
Opportunities

- Increased frequency of train service on Felixstowe branch line
- Increased attractiveness of rail service
- Enable greater passenger train and freight capacity

Impacts

This needs to be investigated with Network Rail and train operating companies to determine the viability of further capacity improvements on the Felixstowe branch line.

12	Improved Connectivity at existing stations



Expansion of the existing Westerfield Station including provision of additional car and cycle parking to create a Rural Hub Parkway station for improved connectivity with Ipswich Centre, East Suffolk, and the strategic main line railway with onward links to London, Cambridge and Norwich. Expanding Westerfield Rail Station to accommodate greater parking provision and improve connectivity between modes would enable a multi-modal interchange point to be established. Onward travel to Ipswich could be completed on foot, by bicycle or by bus.

Opportunities

- Establish a multi-modal transport hub at Westerfield Station
- Connect with existing bus services on Westerfield Road, with direct links to Ipswich Town Centre
- Encourage sustainable travel choices amongst residents and workers of Ipswich northern fringe

Impacts

Westerfield Station is within the walking and cycling catchment of future development on the northern fringe of Ipswich; therefore, improvements to the facilities, level of service and travel options available at this location will enable a culture of sustainable travel choices to be embedded within these forthcoming developments.

13	Non-Strategic Eastern relief road

This option comprises the provision of a non-strategic relief road connecting Tuddenham Road with the A12 at its junction with Kesgrave Road and the A1214. An eastern relief road would provide an alternative route for many motorists, relieving congestion on the A1214 and reducing the proportion of traffic entering Ipswich Town Centre.

Opportunities

- Alleviate congestion on the A1214
- Provide spine road for development at north east Ipswich
- Developer led funding
- Reduce traffic to / from Ipswich Town Centre

Impacts

The location of the relief road provides an opportunity to seek developer funding to contribute to its construction and maintenance, through Ipswich Northern Fringe development.

14	Non-Strategic Northern relief road

This option comprises the provision of a non-strategic relief road connecting the A14 at Junction 53 to Tuddenham Road. A northern relief road would provide an alternative route for many motorists, relieving congestion on the A1214 and A1156 Norwich Road, and reducing the proportion of traffic entering Ipswich Town Centre.

Opportunities

- Alleviate congestion on the A1214 and A1156 Norwich Road
- Provide spine road for development at north west Ipswich
- Developer led funding
- Reduce traffic to / from Ipswich Town Centre

Impacts

The location of the relief road provides an opportunity to seek developer funding to contribute to its construction and maintenance, through Ipswich northern fringe development.

15	Non-Strategic Northern fringe relief road

This option comprises the provision of a non-strategic relief road connecting the A14 at Junction 53 to Humber Doucy Lane, linking to the A1214. A northern fringe relief road would provide an alternative route for many motorists, relieving congestion on the A1214 and A1156 Norwich Road, and reducing the proportion of traffic entering Ipswich Town Centre.

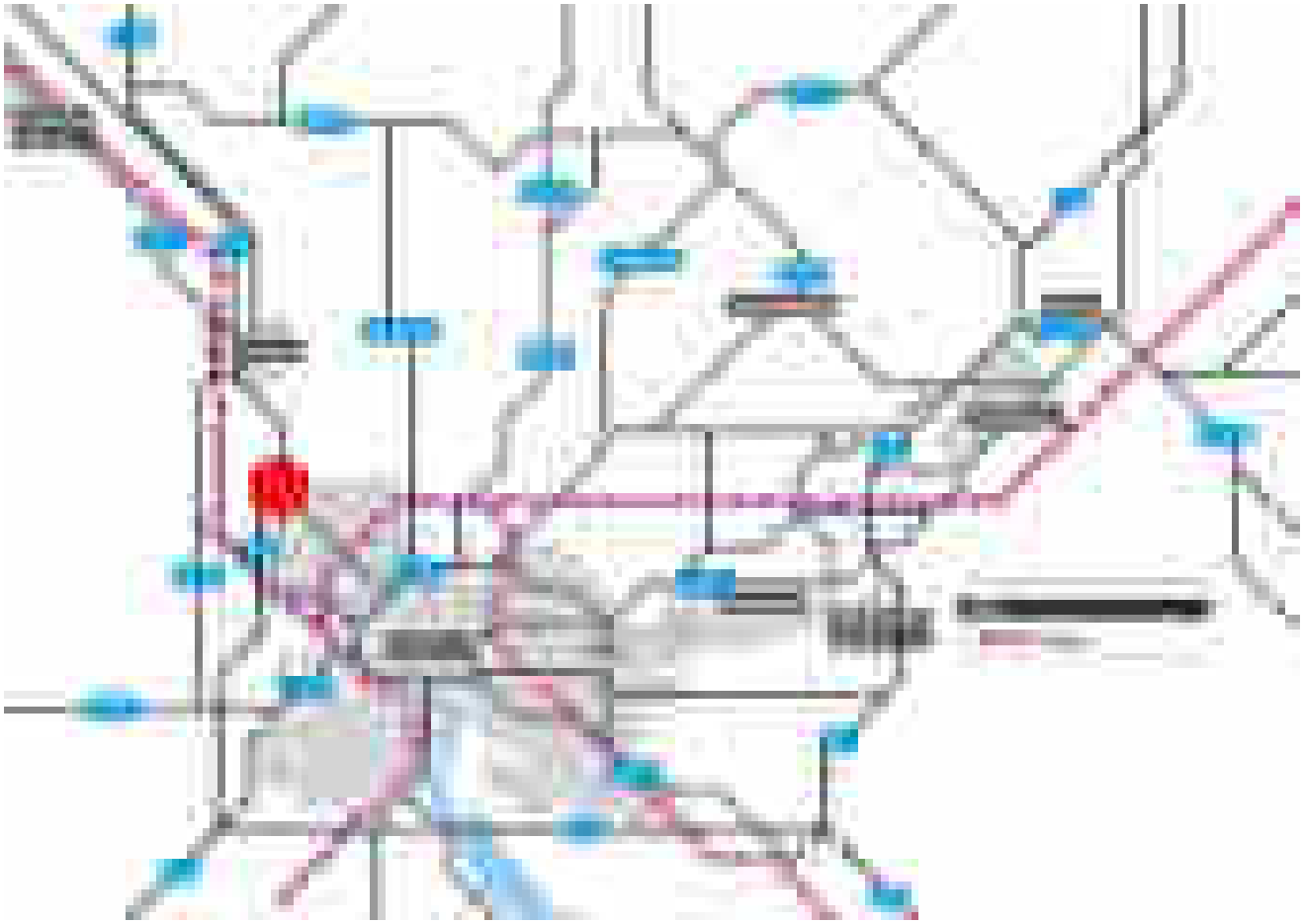
Opportunities

- Alleviate congestion on the A1214 and A1156 Norwich Road
- Provide spine road for development at north west Ipswich
- Developer led funding
- Reduce traffic to / from Ipswich Town Centre
- Improvements to Humber Doucy Lane

Impacts

The location of the relief road provides an opportunity to seek developer funding to contribute to its construction and maintenance, through Ipswich northern fringe development.

16	A14 Junction 53 capacity improvements



This option seeks to introduce capacity improvements to the A14 Junction 53.

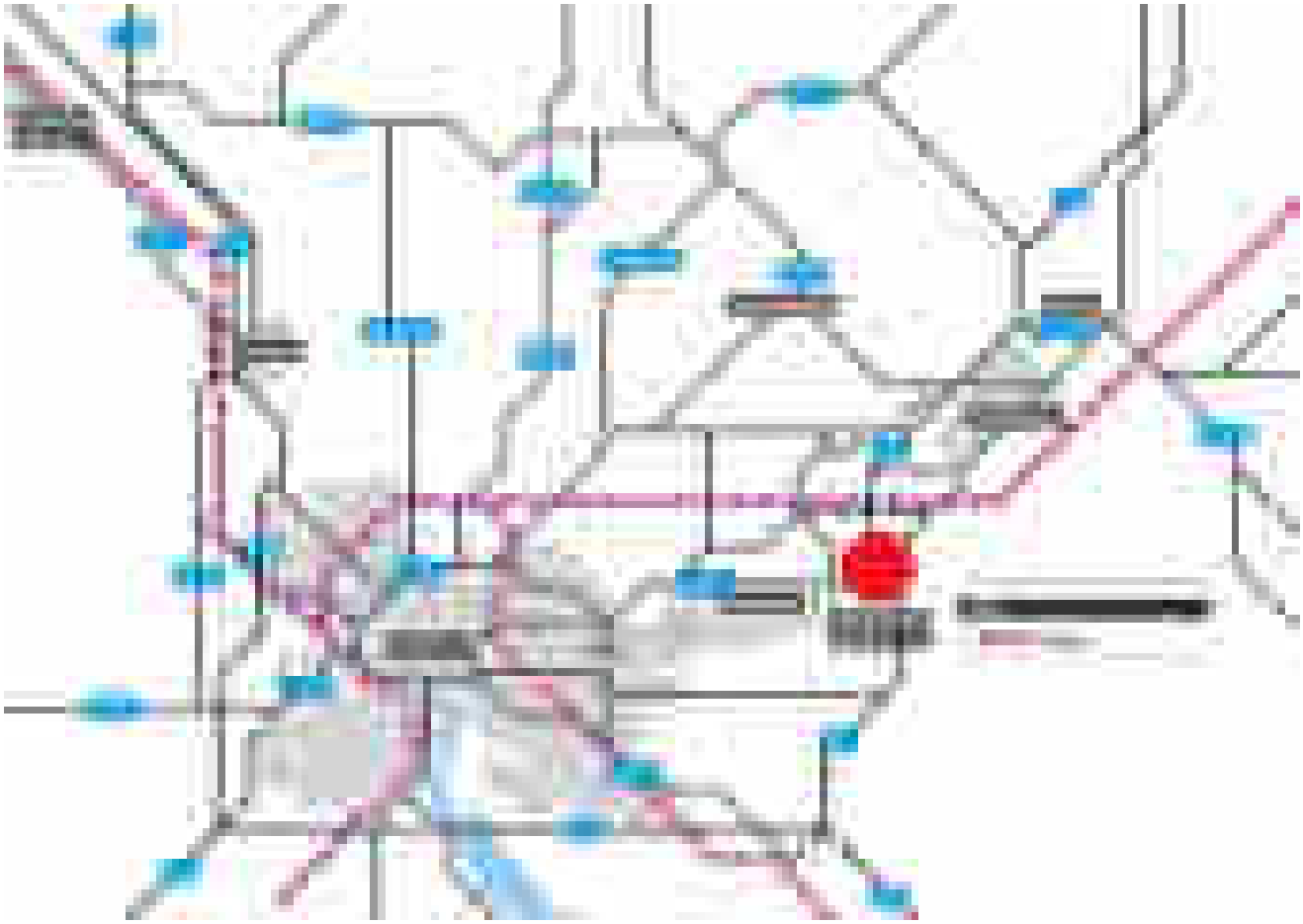
Opportunities

- Reduce congestion at junction
- Reduce journey times
- Improve safety

Impacts

Currently there are typically long queues on the A14 southbound off slip in the AM and PM peak periods, often tailing back onto the main A14 carriageway. Capacity improvements at the junction would alleviate congestion and improve safety.

17	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvements



This option comprises improvements to the A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout.

Opportunities

- Reduce congestion at junction
- Reduce journey times
- Improve safety

Impacts

Currently there are typically long queues on the A1214 in the AM peak period and on all arms during the PM peak period. Capacity improvements at the junction would alleviate congestion and improve safety.

18	Outer Highway Route - Single Carriageway

This option comprises a new single carriageway highway route between the A14 near the junction with the A140, and the A12 north of Woodbridge.

Opportunities

- Single carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

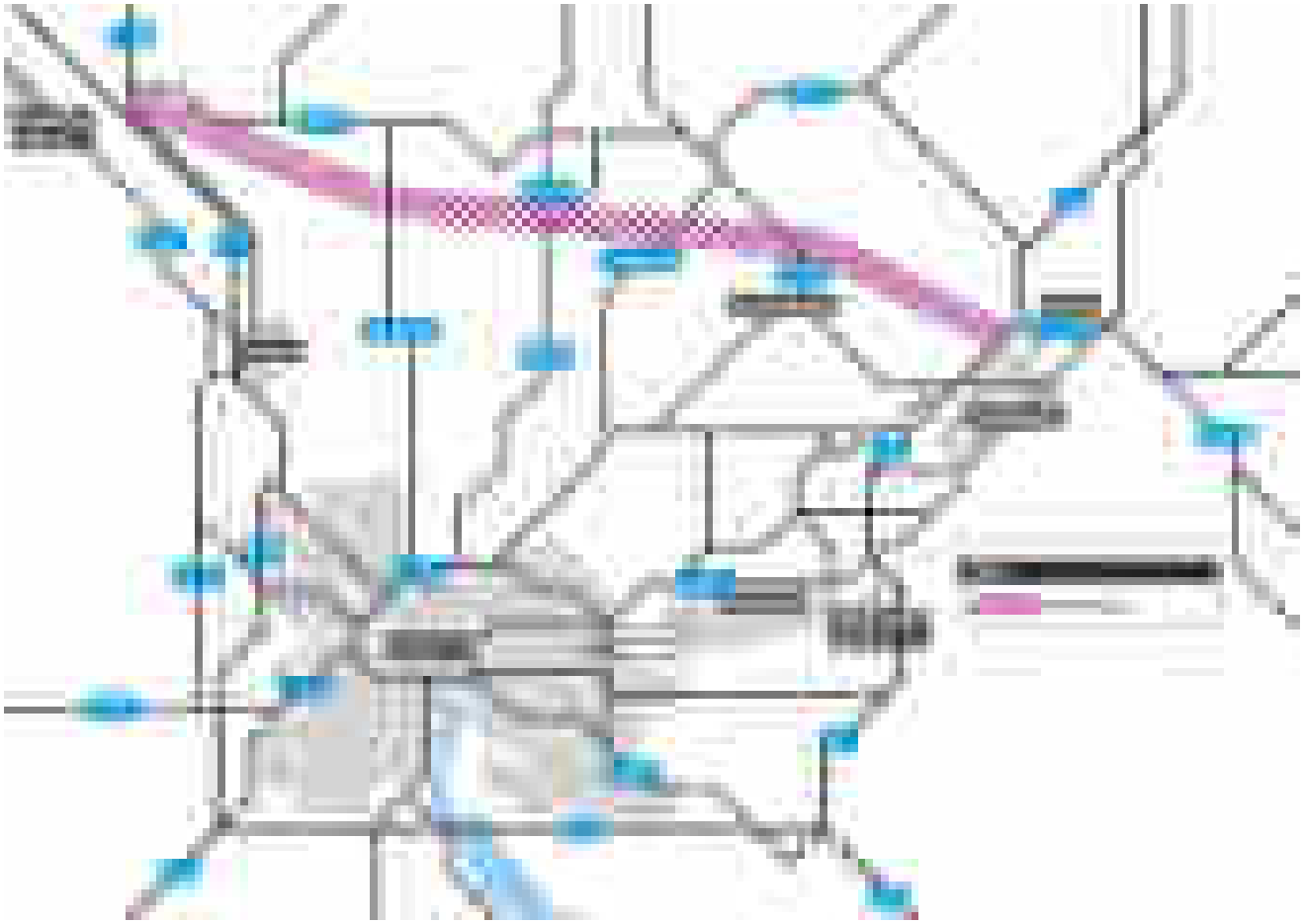
Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new link would primarily function as a bypass of Ipswich for through traffic, with destinations east or west of Ipswich.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich Town Centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

19	Outer Highway Route - Dual Carriageway



This option comprises a new dual carriageway highway route between the A14 near the junction with the A140, and the A12 north of Woodbridge.

Opportunities

- Dual carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new link would primarily function as a bypass of Ipswich for through traffic with destinations east or west of Ipswich.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich town centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

20	Mid Highway Route - Single Carriageway

This option comprises a new single carriageway highway route between the A14 near Claydon, and the A12 at Woodbridge.

Opportunities

- Single carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new road link could act as the northern part of a ring road but would also function as a bypass of Ipswich for through traffic with destinations east or west of Ipswich.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich town centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

21	Mid Highway Route - Dual Carriageway

This option comprises a new dual carriageway highway route between the A14 near Claydon, and the A12 at Woodbridge.

Opportunities

- Dual carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

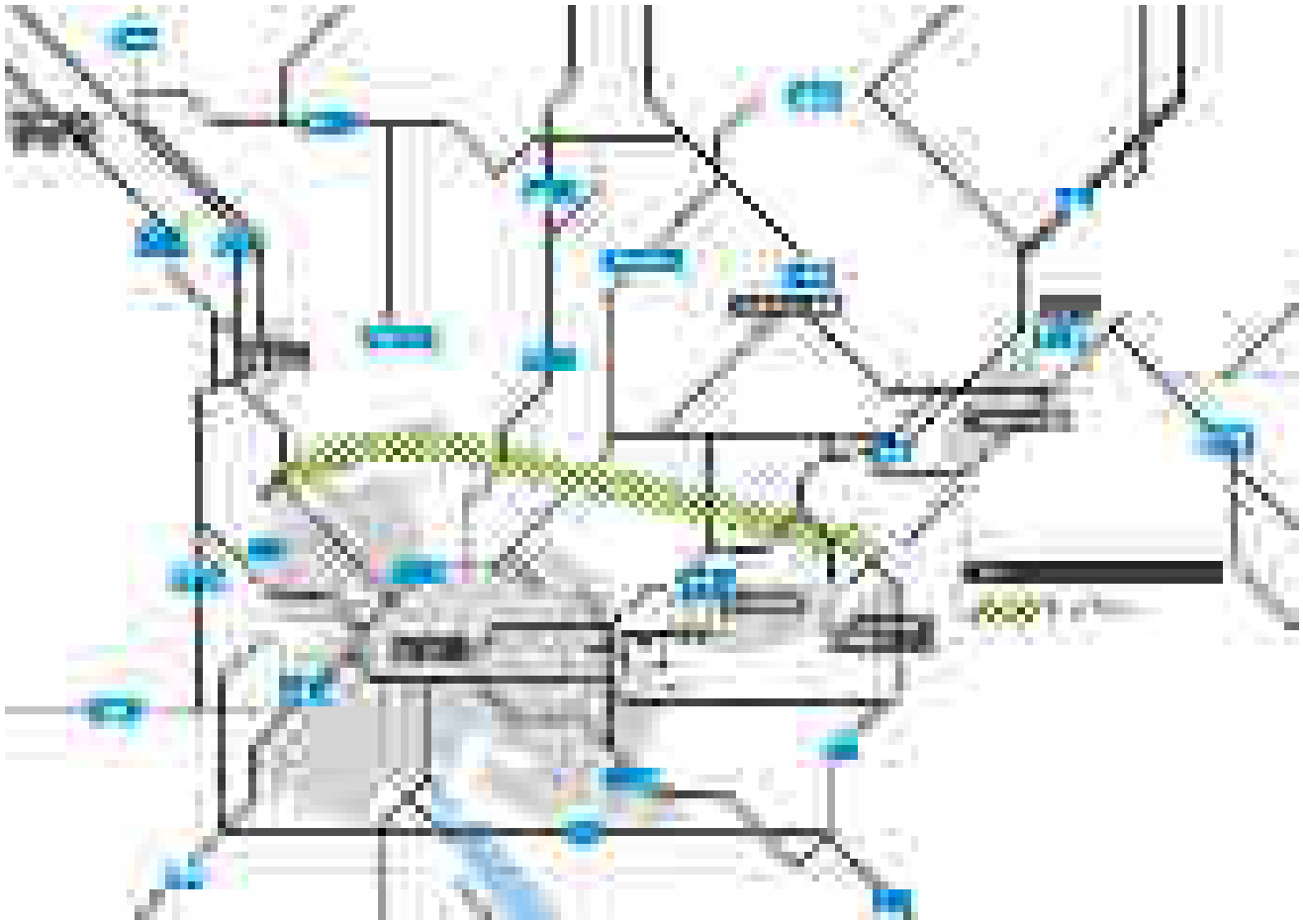
Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new road link could act as the northern part of a ring road but would also function as a bypass of Ipswich for through traffic with destinations east or west of Ipswich.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich Town Centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

22	Inner Highway Route - Single Carriageway



This option comprises a new single carriageway highway route between the A14 near Claydon, and the A12 near Martlesham.

Opportunities

- Single carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

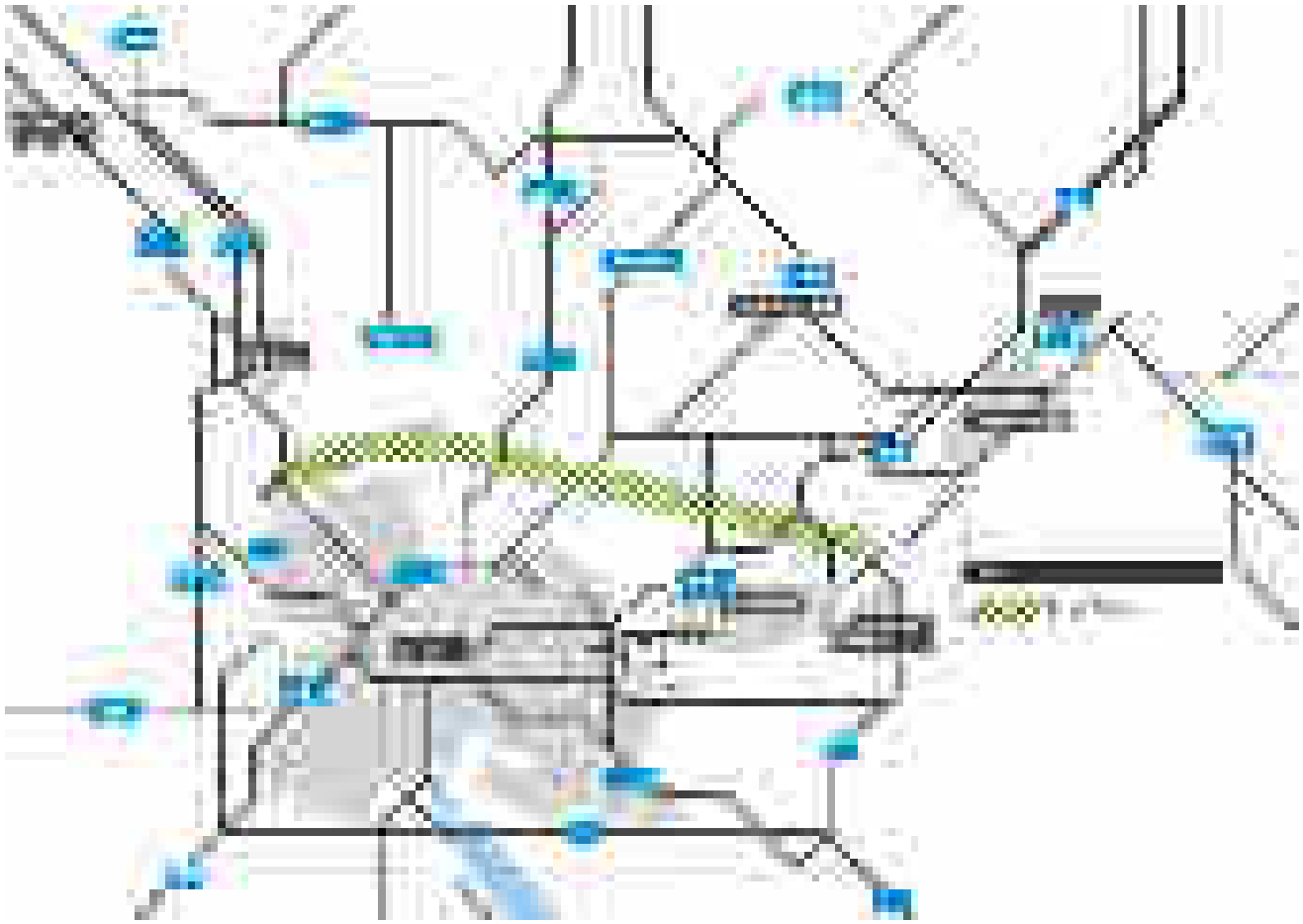
Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new road link would complete the loop around Ipswich, enabling the circulation of traffic rather than necessitating routing through the town centre.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich town centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

23	Inner Highway Route - Dual Carriageway



This option comprises a new dual carriageway highway route between the A14 near Claydon, and the A12 near Martlesham.

Opportunities

- Dual carriageway strategic link road north of Ipswich
- Reduction in journey time for east-west journeys
- Interchanges with key radial routes

Impacts

The construction of a northern link road between the A14 and A12 would enable relief of the roads in and around Ipswich, particularly from through traffic. The new road link would complete the loop around Ipswich, enabling the circulation of traffic rather than necessitating routing through the town centre.

By improving east-west links, the route would help promote economic growth on the Suffolk coast.

Interchanges with key radial routes would improve connectivity at outlying villages and distribute traffic into Ipswich town centre more regularly, easing congestion currently experienced on radial routes from the A14 (Norwich Road) and A12 (A1214).

24	New River Orwell Bridge Crossing

This option comprises the construction of a new bridge over the River Orwell, with greater resilience than the current bridge.

Opportunities

- Improve resilience of Orwell bridge to weather conditions

Impacts

A new, more resilient Orwell crossing on the A14 would reduce the frequency with which the A14 is closed. At present this causes significant congestion through Ipswich Town Centre because vehicles, including large numbers of heavy goods vehicles, reroute to cross the river in the Town Centre. Reducing the frequency at which this occurs would significantly improve transport conditions within the wider Ipswich area.

25	Tunnel of River Orwell

This option comprises the construction of a tunnel under the River Orwell.

Opportunities

- Remove the impact of weather conditions on the Orwell bridge crossing
- Reduce traffic noise impacts

Impacts

A tunnel beneath the River Orwell would contribute to reducing congestion and journey rerouting via the non-strategic road network and Ipswich town centre currently caused by closure of the Orwell bridge. This would result in a more resilient road network, improving reliability for road users and promoting economic growth.

26	Smart Parking

This option comprises the introduction of smart parking signage that directs users to free parking spaces to reduce hunting trips.

Opportunities

- Reduce hunting trips
- Live car park information and directions
- Optimized parking
- Integrated payment system
- Better informed travel choices

Impacts

This technology would promote better informed road user choices, and reduce the time spent searching for a car parking space within the town centre, freeing up road space and reducing congestion.

27	Integrated Smart Public Transport

This option comprises the introduction of integrated ticketing systems between operators and public transport modes.

Opportunities

- Increased convenience for passengers
- Increased public transport attractiveness
- Streamlining of systems between operators and across all forms of public transport
- Cashless transactions
- Improved user experience

Impacts

Integrated systems between operators and public transport modes would increase the attractiveness of bus and rail travel to potential users. Smart ticketing eliminates the need for passengers to carry cash or have the correct change, further promoting public transport as a convenient means of travel.

It is envisaged that such an intervention would result in a modal shift towards public transport, in particular, reducing the proportion of people opting to travel by car, hence reducing congestion.

28	Wide scale traffic signal upgrades

This option comprises an upgrade to an Urban Traffic Control (UTC) signalised network.

Opportunities

- Coordinated signalised junctions throughout Ipswich
- Journey times optimised for greater capacity

Impacts

UTC is the method of coordinating traffic signals in a network by the use of timing plans loaded on a central computer. These plans can be optimised so that they vary depending on the time of day or for special events or incidents. Through the implementation of UTC, it is envisaged that journey times will be optimised to deliver the most efficient operation of the highway network.

29	Improved Public Transport Real Time Passenger Information (RTPI)

This option comprises wide scale improvements to the level of Real Time Passenger Information (RTPI) available in the greater Ipswich area.

Opportunities

- Live information for passengers
- Data for operators to promote more efficient services
- Allow quicker response to incidents and means of informing passengers

Impacts

RTPI would enable more informed passenger choices, providing live information about the next service in addition to incident information. This would enable users to plan their journeys more effectively and increases the attractiveness of public transport as a travel option.

In addition to aiding passengers, the data collected through the use of RTPI systems helps operators manage the network more effectively and make informed decisions to improve the efficiency of existing services.

30	Car Park Levy

This option comprises the introduction of a car parking levy in Ipswich Town Centre at employment premises.

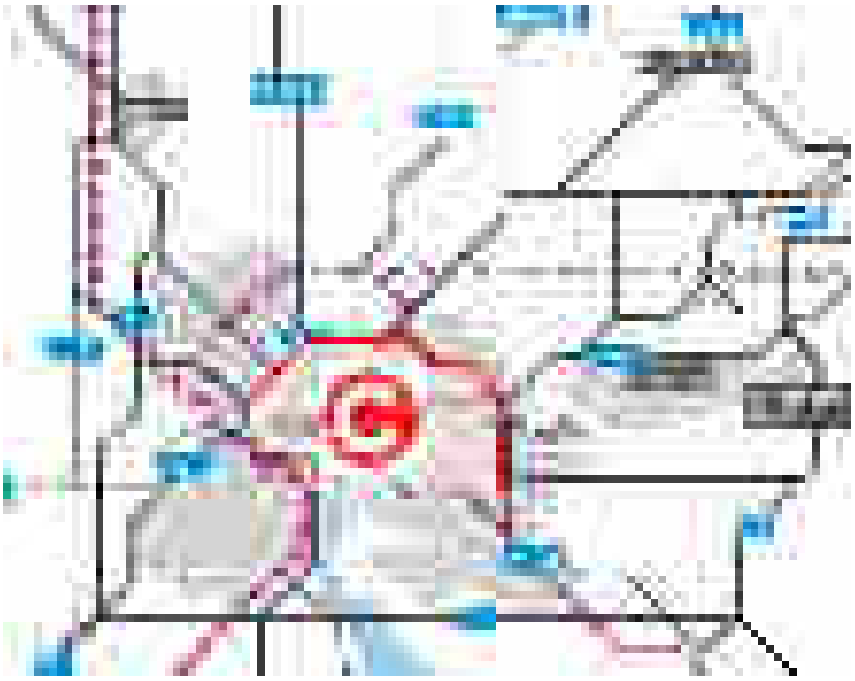
Opportunities

- Discourage the use of the private car, encouraging more sustainable modes of travel
- Financial incentive for companies to promote sustainable travel
- Generate income which can be reinvested in further transport improvements

Impacts

The introduction of a car parking levy would encourage the use of more sustainable modes of transport for entire journeys, or for journey completion.

31	Congestion charging in Ipswich centre



This option comprises the introduction of a congestion charge cordon around Ipswich Town Centre.

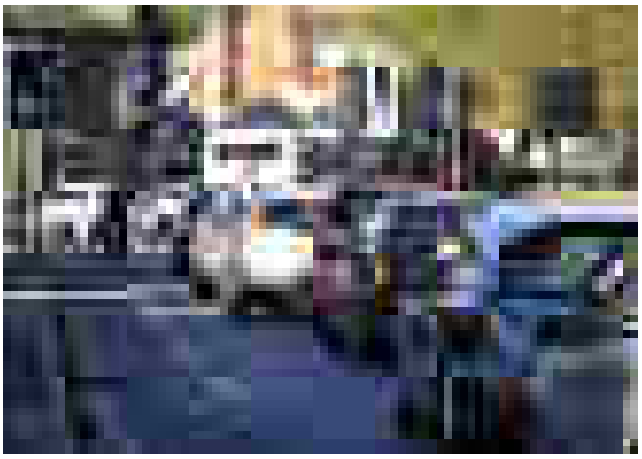
Opportunities

- Discourage journeys through Ipswich Town Centre, enabling public transport services to operate with less delay
- Generate income which can be reinvested in further transport improvements

Impacts

- Complex technical challenges associated with the introduction monitoring and enforcement systems
- Displacement of some motorist to non-charged areas
- Risk of loss of business within Charging Zones
- Scheme required complimentary improvements to Public Transport to enable movement of displaced motorist

32	Do Nothing



This option would comprise no intervention, continuing the current situation into the future.

Opportunities

- No opportunity to reduce or manage the existing traffic conditions
- No opportunity to accommodate future economic and population growth
- No opportunity to improve air quality and noise issues
- No opportunity to improve quality of life

Impacts

Parts of the existing transport network are already at, or exceeding capacity, resulting in lengthy delays and congestion. This a significant constraint to population and economic growth.

8 FURTHER ASSESSMENT OF POTENTIAL OPTIONS

This chapter provides a more in-depth review of the Options presented in **Chapter 7**.

8.1 OPTION ASSESSMENT

The Long List of Options was generated following a series of site visits, stakeholder workshops, and a review of observed traffic data. All these tools were an essential contribution to the development of the options. The proposed options are intentionally schematic in order to avoid property blight at this early stage of options assessment.

The proposed options have been further assessed not only against the scheme objectives, but also strategic benefits, technical and environmental constraints. The evaluation considered the following elements such as Strategic Fit and Economic Impact, including impact on the economy, environment, society, public accounts and distributional impacts

The strategic case was considered in terms of strategic fit with national and local policy and the intervention specific objectives; social impacts as well as a high-level assessment of potential value for money (VfM), based upon relative cost for each option derived from the scale of works; however, due to the early stage of the scheme development, a detailed financial, commercial and economic case, including Benefit Cost Ratio (BCR), were excluded from this stage of assessment.

The assessment of the impacts of each of the options was predominantly qualitative in nature at this stage while suitable transport modelling tools were being developed.

Due to these factors, alongside the large number of options being considered, the focus was placed upon the strategic fit.

The strategic fit considered how each package aligns with national and local policies. Key policy documents were reviewed, and consideration was given to the overriding vision as well as the headline objectives. Subsequently, a qualitative assessment was made to convey how each package of options aligned with the objectives of the policy documents, with a consideration of the likely impacts of the respective package.

The national and local policies are set out in detail in the Study Stage 1 report. The assessment of the strategic fit also reviewed how each package is anticipated to perform against the intervention-specific objectives.

An overview of the Options by Category is presented in the following section 8.1.1.

8.1.1 OVERVIEW OF OPTIONS BY CATEGORY

Bus

High-quality bus services, that are attractive to the public, are dependent upon creating a convenient, reliable, affordable, regular and frequent service that is capable of operating with minimal delay, ideally segregated from normal traffic flow.

Where bus services share road space with other users, this increases the likelihood of delays, bunching of services, and timetable slippage that decreases the benefits and attractiveness of bus services and increases operational costs.

Provision of bus priority lanes at key congestion hot spots enables buses to 'by-pass' congestion and flow more freely, however, the ability to introduce new bus lane infrastructure is constrained by existing frontage development along the key radial routes. Generally, the radial routes are bounded by residential and commercial property, with multiple private access points, highway junctions and pedestrian crossing points, limiting the extent of any bus priority and / or cycle lanes. Therefore, the overall journey time savings are limited in the context of the overall journey, and do not solve the underlying causes of traffic congestion on the route.

The bus options seek to confine works to within the existing public highway to avoid acquisition of third-party land and complex engineering works associated with the diversion and / or protection of existing public utility apparatus found within existing footways / verges.

Highways

Strategic orbital highway options offer benefits to all road users including private cars, commercial vehicles, and public transport. The orbital routes allow connectivity between radial routes, increasing the opportunities to diversify flow across all routes and reduce stress points within the network, particularly at the primary connections to north Ipswich (A14 Junction 53, and A12 Kesgrave / Martlesham junctions).

The outer alignment primarily draws vehicles from the B1078, with smaller reductions on the route via Great Bealings and on the A14 (south of Ipswich). The inner route primarily draws vehicles from the A14 (south of Ipswich) and a number of east-west routes in Ipswich (including the A1214 ring road), with smaller reductions on the route via Great Bealings and the B1078. The middle route offers a hybrid solution, which attracts both strategic and urban trips.

Essentially, all of the alignments cater for strategic trips (longer distance trips) in some way, but only the inner and middle options reduce traffic in the town centre. All alignments cater for all modes of road transport including private car, commercial, and public transport. Strategic cycle infrastructure can be incorporated within the schemes improving opportunities for sustainable transport.

At this stage of testing, the modelling has indicated some capacity limitations at the A14 / Bury Road connection point and at all connection points on the A12, which mainly stem from these locations being over capacity before the introduction of any scheme. Consideration of grade-separated layouts in these locations is explored in more detail in the following sections.

Outer Route – A140 / A14 Junction 51

There is an opportunity to create a five-arm roundabout on the existing A140 dual carriageway, located at the existing junction with the B1078 Needham Road and Coddenham Road. TD 16/07 (*Geometric Design of Roundabouts*) of the DMRB states that:

"If a Normal Roundabout has more than four arms, it becomes large with the probability that higher circulatory speeds will result."

In terms of the size of a five-arm roundabout at this location, an important consideration as part of any future design work will be to ensure that the right balance is struck between having a roundabout with sufficient capacity, whilst restricting the likelihood of high circulatory speeds.

It is reasonable to assume that a predominant movement for westbound vehicles on the outer route will be to turn left at the proposed roundabout onto the A140, towards the A14 Junction 51. It is likely that journey times for this manoeuvre could be improved if a segregated left-turn lane was provided. The provision of a segregated left-turn lane in accordance with TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB, should be considered if the predicted Ratio of Flow to Capacity (RFC) of the outer route arm is greater than 0.85.

NCN Route 51 passes through the existing junction and there are at-grade facilities for cyclists using this route. With this in mind, it will be particularly important to ensure that appropriate provision is made for cyclists as part of the development of a roundabout design. Referring to Interim Advice Note 195/16 (*Cycle Traffic and the Strategic Road Network*) and Table 6/1 of TD 16/07 (*Geometric Design of Roundabouts*) of the DMRB, options to be considered should include a separate cycle track around the outside of the junction with cycle crossings or grade-separated cycle tracks around and / or across the junction. Reference to TA 90/05 (*The Geometric Design of Pedestrian, Cycle and Equestrian Routes*) and TA 91/05 (*Provision for Non-Motorised Users*) of the DMRB should also be made in developing appropriate facilities for NMUs at this location.

Outer Route – A12 / A1152 Woods Lane roundabout, Woodbridge

By connecting the outer route to the A12 at this location, an existing three-arm roundabout would be converted to a four-arm roundabout. As part of this conversion, it is possible that the size of the roundabout may need to be increased for capacity purposes, although it will be important to ensure that the right balance is struck between having a roundabout with sufficient capacity, whilst restricting the likelihood of high circulatory speeds.

There are some existing off-carriageway cycle facilities present in the south-east corner of the junction. It will be important to ensure that the existing cycle facilities are reviewed, and appropriate provision is made for cyclists across the whole junction, with reference to Interim Advice Note 195/16 (*Cycle Traffic and the Strategic Road Network*) and TD 16/07 (*Geometric Design of Roundabouts*) of the DMRB.

Middle Route – B1113 / A14 Junction 52

There is an opportunity to introduce a four-arm roundabout on the existing B1113 Bramford Road. For westbound vehicles on the B1113 major road, left-turn manoeuvres at the proposed roundabout onto the middle route are expected to be the predominant movement from this arm. With this in mind, the provision of a segregated left-turn lane in accordance with TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB, on this arm should be considered, particularly if this arm is predicted to have an RFC greater than 0.85, without a segregated left-turn lane.

The potential tie-in of a segregated left-turn lane in the south-east quadrant of the proposed roundabout would need to be investigated with regard to the nearby existing railway bridge on the B1113 and proposed bridge over the railway on the middle route. Additional earthworks (embankment) would be required for a segregated left-turn lane at this location, and it is possible that some form of modification to the existing bridge on the B1113 may also be required.

Middle Route – A12 / B1079 Grundisburgh Road roundabout, Woodbridge

There is an opportunity to tie-in in to the B1079 Grundisburgh Road to the west of the A12, then to join the A12 at the existing A12 / A1079 roundabout junction. This is located at a point where the existing B1079 has a 'dog leg' alignment and there is a T-junction with a minor road to the south of the B1079.

The predominant movement for vehicles on the A12 northbound could be a left turn at the B1079 roundabout, in order to access the proposed middle route. It is likely that journey times for this manoeuvre would be improved if a segregated left-turn lane was provided. The provision of a segregated left-turn lane, in accordance with TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB, is recommended if the predicted RFC of the A12 northbound arm is greater than 0.85 and the flow criteria described in paragraph 2.3.2 of TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB is met. At this location, it would appear that the close proximity of the garden centre property boundary, in relation to the existing roundabout, would introduce a potential constraint to any potential road widening works.

Inner Route – A14 Junction 53 / A1156 Bury Road

The weaving length between the existing A14 Junction 52 southbound on-slip and A14 Junction 53 southbound off-slip, measured in accordance with Figure 4/9 of TD 22/06 (*Layout of Grade Separated Junctions*) of the DMRB, is approximately 630m. This is approximately one-third less than the desirable minimum weaving length of 1km for rural all-purpose roads. As the proposed relocation of the A14 Junction 53 southbound off-slip will be further north, this will mean that the weaving length relaxation, permitted by Interim Advice Note 198/17 (*Existing Dual Carriageway All-Purpose Trunk Road Network: Additional Requirements and Relaxations*), for such instances cannot be achieved, subsequently a Departure from Standard (DfS) will be required.

The A14 forms part of the SRN, which HE is responsible for. Therefore, a DfS for non-compliant weaving length would need to be discussed with HE at the earliest opportunity. It is also recommended that design year flows, in a format that can be reviewed against Figure 4/14 of TD 22/06 (*Layout of Grade Separated Junctions*) of the DMRB, are obtained and analysed as part of this issue. Due to the amount by which the existing weaving length is below the desirable minimum, without taking into account the further reduction in weaving length described above, and the expected increase in traffic using this off slip to access the inner route, it is considered unlikely that HE would approve such a DfS.

A predominant movement for vehicles on the A14 southbound off-slip is likely to be a left turn at the proposed northern roundabout, onto the proposed inner route. It is likely that journey times for this manoeuvre would be improved if a segregated left-turn lane was provided. The provision of a segregated left-turn lane in accordance with TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB, is recommended if the predicted RFC of the off-slip arm is greater than 0.85 and the flow criteria described in paragraph 2.3.2 of TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB is met. Even if the predicted RFC on this approach is below 0.85, consideration should still be given to providing a segregated left-turn lane to mitigate the potential likelihood of vehicles queuing back onto the A14 southbound main carriageway during peak periods, and resulting risk of conflict with high-speed mainline traffic.

It is recommended that further investigation is undertaken regarding the nature of existing strategic utilities and whether alternative locations for a junction with the A14, should instead be considered.

Inner Route – A12 / A1214 Main Road roundabout, Martlesham

There is an opportunity to form a tie-in at the existing A12 / A1214 roundabout. Increasing the size of the circulatory carriageway and localised widening of existing approaches should be considered to provide an appropriate level of capacity. It is recommended that traffic modelling is undertaken to identify the extent of mitigation.

It appears that a segregated left-turn lane is proposed for vehicles turning left from the inner route onto the A12 northbound. It is recommended that the flow criteria, described in paragraph 2.3.2 of TD 51/17 (*Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*) of the DMRB, is checked to determine whether the provision of a segregated left-turn lane at this location should be assessed further.

The alignment of the existing A12 northbound approach to the roundabout and proposed north-westbound inner route, either side of the roundabout, are such that the inner route could easily be mistaken by northbound drivers as the A12, or straight-ahead, manoeuvre.

Light Rail Transit & Bus Rapid Transit

The LRT and BRT orbital routes both require the construction of dedicated off-highway infrastructure in order to:

- Minimise conflict with other road users
- Increase average transit speeds, therefore reducing journey times
- Increase service reliability
- Reduce on-corridor congestion among general traffic
- Improve modal share of pedestrians and cyclists by providing a dedicated path alongside the route
- Increase patronage by making journeys faster and more reliable than private car journeys

Both options will create opportunities to convey large numbers of passengers quickly and reliably, creating links to the existing radial routes and national rail services improving connectivity with onwards journeys.

LRT and BRT have the opportunity to create an attractive alternative to private car, encouraging modal shift to public transport.

Strategic Park & Ride facilities with good connections to the A14 and A12 SRN, and National Rail network, will be required to capture trips off these networks, and further work will be required to determine the optimum location and capacity of these sites.

However, the route is confined to a single corridor, with no capacity to accommodate local and strategic commercial trips, thus limiting the potential to improve commercial accessibility to the Suffolk Energy Coastal and alleviate congestion of the SRN.

Additionally, links to radial routes may require mode change for patrons wishing to continue into Ipswich Town Centre, particularly in the case of an LRT. Mid-journey interchanges reduce the attractiveness of trips made by public transport.

Smart Parking

Smart Parking utilises technology to monitor the availability of parking spaces and provide real-time information by means of a mobile application and RTPI displays to inform and direct users to the available parking space. The benefits are focussed on a reduction of hunting trips made by users searching for parking spaces, adding to unnecessary vehicle trips on parts of the road network, and congestion. Smart Parking can be linked to payment systems to replace manual cash point of sale transactions, to reduce operational and management costs and improve the user experience.

Smart Parking does not however encourage modal shift to non-car-based modes and may encourage greater uptake of car-based trips due to greater certainty of the ability to park within the Town Centre.

Real Time Passenger Information

RTPI forms part of a cohesive public transport network by way of digital information screens at bus stops, and mobile applications to inform passengers of service and journey times. The aim is to improve the experience for users, reducing waiting time at stops, reduce overall journey time, improve journey planning, inform users of the status of the current services with improved certainty of arrival, and encourage modal shift to public transport.

8.2 MODELLING & APPRAISAL METHODOLOGY

This OAR has demonstrated that there is a strong case for further progress to develop strategic highway options to the north of Ipswich. The next stage will be to develop a Strategic Outline Business Case (SOBC). Prior to producing the SOBC, the first step will be to agree the modelling and appraisal approach within an ASR. The development of the SOBC will focus upon the strategic and economic cases, drawing in the results of the forecasting and economic appraisal and quantified wider impacts to provide the level of certainty to move the project forward and seek preferred options. The key steps as part of the next stage to producing the SOBC will be:

- Environmental input appraisal and to produce Appraisal Summary Tables (AST). Advice will be given on the feasibility of package options to provide improvements in Value for Money (VfM) and information for the SOBC
- Public / stakeholder consultation, including community engagement, Community Consultation Plan, report of consultation
- Modelling and testing options and producing outputs suitable for economic appraisal and land use changes using the SCTM;
- Producing the economic case – Transport Economic Efficiency (TEE) tables and Transport Users Benefit Appraisal (TUBA)

- Developing the five cases and implementation strategy in accordance with the DfT's WebTAG and the Treasury Green Book;
- Utilise David Simmonds Consultancy (DSC) UK Delta land use / economy model to develop a land use / wider economic benefit element with detail for Suffolk and to strengthen strategic and economic case and develop a wider picture of the zone of influence outside Suffolk to the East of England and UK to understand aspects such as additionality element to case
- Related to above and given wider UK relationship to ports / industrial strategy to strengthen the strategic case, provide an understanding of freight patterns / movements from ports and related economic aspects of a Northern Route with the A12 and A14

The next stage will also consider the DfT's *Rebalancing Toolkit*, citing Suffolk's lack of a motorway necessitating the need for priority in the Major Roads Network (MRN) funding programme.

The economic appraisal will address both the direct transport impacts and the wider economic benefits, consistent with current guidance. Economic impacts comprise several different elements. We have liaised closely with DfT during the consultation phase of the revised wider economic impacts guidance, released in early 2018. As well as transport appraisal-related guidance, we will also draw on other guidance that is increasingly important in scheme appraisal, including Ministry of Housing, Communities and Local Government guidance on land value gain. The levels of economic analysis, utilising the Delta land use model, will consider:

- Level 1: conventional (or direct) transport economics impacts. These are the traffic model-based improvements, including monetised journey time benefits and accident reduction benefits
- Level 2: these cover wider impacts such as agglomeration improvements (where productivity – Gross Domestic Product (GDP) per worker – is enhanced following a transport intervention), output change in imperfectly competitive markets (a standard DfT WebTAG measure of wider impacts) and labour supply impacts
- Level 3: these impacts cover dependent development (land value gains from unlocked residential development), moves to more or less productive jobs (another standard DfT WebTAG measure) and supplementary economic modelling (such as additionality)

For the conventional (or direct) impacts we will use TUBA to process the outputs from the SCTM. This approach will be the most appropriate to being able to develop an understanding of the case within the SOBC, at both a local (land use / growth related), regional and national level for any of the shortlisted options within this OAR, to enable determination of potential preferred options and understanding the case to move towards the next stage of an OBC.

8.3 DELIVERY

At this early stage, it is not determined as to the proposed adopted key means of delivery, for example Local Authority Major Scheme, part of the SRN through HE's Project Control Framework (PCF) or the emerging MRN programme. The nature of the preferred option will shape the delivery route, and whether a local major road or an extension to the SRN. As such, at this stage the programme delivery organisation has not been developed and a delivery programme is not currently available. However, there is evidence of the local authority delivering similar projects in terms of scale and complexity.

For this stage (Option Assessment), WSP has been commissioned to develop traffic models and undertake an early appraisal and feasibility assessment of a range of options. Furthermore, detailed specification and appraisal will be undertaken during the next stage as part of developing the SOBC and will include the development of a detailed delivery programme.

It should be noted that the earlier phases of project delivery can have a significant impact on the relationship with the local community and their early (and lasting) impressions of schemes. Many stakeholders will have contact with other opinion formers and influencers, so it is vital to keep stakeholders informed and to be as open as possible with communications. As a result, engagement will start during the options phase of the process and will continue throughout the other preparation and delivery stages of scheme development, including during the development of the SOBC.

A number of options have been considered within this OAR. They represent significant construction projects which will require a detailed procurement plan to ensure timely delivery. Outline project plans will be developed once the SOBC is underway. At this stage, the timeline for project delivery is only indicative and will be subject to change as the business case process develops. However, it will comprise a standard project lifecycle, standard deliverables, governance arrangements and project control processes, which all major projects must adhere to as part of the development and delivery of a scheme. This will include effective management of risk and costs. These should be seen as distinct from scheme outputs, which in layman's terms can be described as the service specification or the services to be provided. These services should be described in the context of the outputs of outcomes that the scheme must deliver. In the case of this scheme, a required outcome is improved connectivity to the north of Ipswich to support growth in the area. This outcome will be achieved by delivery of the emerging options within this OAR.

8.4 SIFTING PROCESS

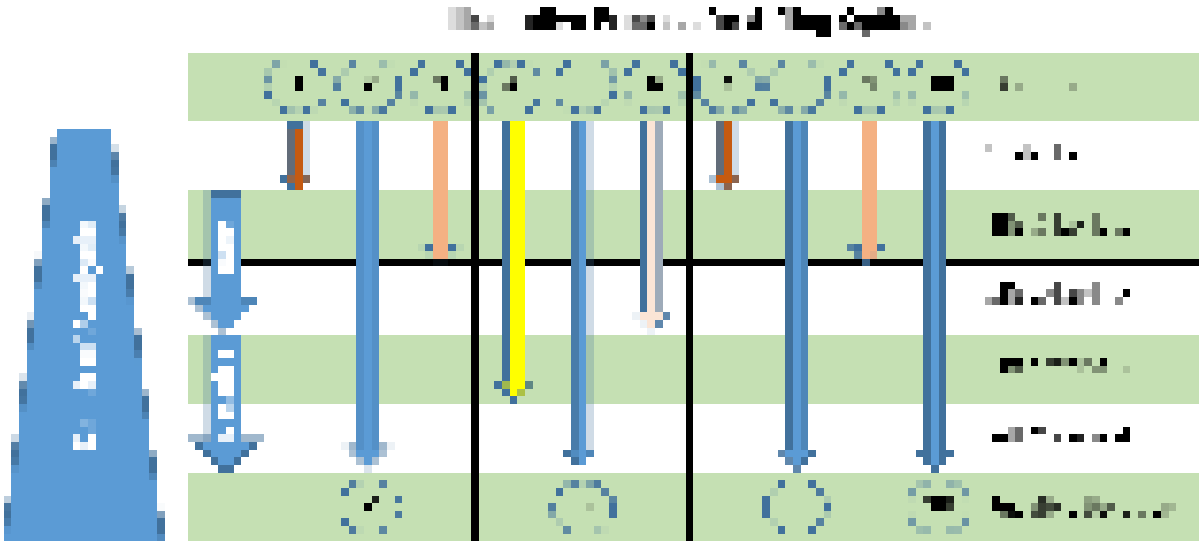
The sifting process was comprised of two stages:

- An initial appraisal of each options' alignment with the scheme objectives
- Analysis of each option using the DfT's EAST

The initial appraisal of each option was carried out relative to each of the scheme objectives set out in **Section 7.2**.

This initial appraisal demonstrated which of the options would provide the most beneficial impact in relation to the scheme objectives. However, this method does not consider any other key factors that determine the suitability of option. **Figure 37** provides the illustrative process for sifting options.

Figure 37 Illustrative Process for Sifting Options



8.5 OPTION SIFTING

8.5.1 INITIAL APPRAISAL

Following the production of a long list of options (described in **Section 7.3**), a high-level scoring / sifting exercise was undertaken to assess each option against the project objectives. This first stage was designed to ensure that each of the options directly addressed the project objectives, and to identify any potential show-stoppers, prior to moving to the more detailed DfT EAST analysis.

The initial sift conducted a qualitative assessment of the scale of impact of each option against:

- the intervention specific objectives
- deliverability criteria
- feasibility criteria

The initial sift provided a useful audit trail for the options considered and discounted at an early stage. All of the options were assessed against the objectives, with a score allocated based on the anticipated impact. A qualitative score was assigned using a 1-7-point scale as summarised in **Table 42**:

Table 42 Qualitative Scoring Scale

Score	Impact
7	Large Beneficial
6	Moderate Beneficial
5	Slight Beneficial
4	Neutral
3	Slight Adverse
2	Moderate Adverse
1	Large Adverse

The EAST approach to scoring is intended as a flexible decision support tool to identify relative benefits/dis-benefits between options, allowing the project to determine its own assessment criteria, thresholds and scoring methodology with options assessed using the same scoring system.

The scheme acknowledges that the standard DfT WebTAG guidance includes a 1-5 point scale for scoring options; however a 1-7 point scale was adopted to provide greater differentiation between options, in particular for similar options where subtle but measurable benefits might otherwise receive identical scores when assessed against a 1-5 point scale. A 1-7 point scale is also aligned with the TAG approach to Environmental Assessment scoring.

The findings of the initial sifting exercise are presented in **Table 43**, and summarised in **Table 44**.

Table 43 Option Assessment against Objectives

	1	2	3	4	5	6	7
	Radial Route - Norwich Road - former P&R	Radial Route - Henley Road	Radial Route - Westerfield Road	Radial Route - Tuddenham Road	Radial Route - Kesgrave Road	LRT Orbital	Bus Rapid Transit Orbit
							
Brief Option Description	Improvement to radial bus and cycle route	Improvement to radial bus and cycle route	Improvement to radial bus and cycle route	Improvement to radial bus and cycle route	Improvement to radial bus and cycle route	Orbital Lightrail Rapid Transit Route linking Gt Blakenham to Martlesham	Orbital Bus Rapid Transit Route linking Gt Blakenham to Martlesham
Additional Transport Capacity to enable growth:	4	4	4	4	4	5	5
	Bus lanes already present over most of route; however limited potential for additional capacity to accommodate development growth in immediate area due to existing constraints	Marginal improvements on individual radial route with moderate journey time savings offers limited opportunity to support growth in wider Ipswich area. Additional benefits possible if included within a package of measures			Bus lanes already present over most of route; however limited potential for additional capacity to accommodate development growth in immediate area due to existing constraints	Would only cater for fixed orbital movements only so while a more strategic scheme only localised benefits to growth.	Provides a flexible system (with wider connections and route extensions) for both orbital and other movements so could have wider benefits for growth beyond northern fringe.
Reduce congestion in Ipswich Town Centre:	5	5	5	5	5	5	5
	Some positive impact on Ipswich Town centre with mode shift to public transport - but limited opportunity to extend existing bus priority lanes.	Slight positive impact on Ipswich Town centre with mode shift to public transport with creation of new sections of bus priority lanes			Slight positive impact on Ipswich Town centre with mode shift to public transport - but limited opportunity to extend existing bus priority lanes.	Some slight positive impact on Ipswich Town centre with mode shift to public transport and creation of west-east link from Northern Fringe to Martlesham employment areas	
Positive impact on SRN & A14 /A12 connectivity:	4	4	4	4	4	5	5
	Northern radial bus routes offer negligible impact on the SRN and offer no benefit to commercial vehicle trips					Likely to have limited positive affect on SRN traffic flows	
Mitigate Orwell Bridge related congestion:	4	4	4	4	4	4	4
	Northern radial bus routes offer negligible impact to mitigating Orwell congestion					Potential to remove some east -west commuter trips from the Orwell Bridge, linking West Ipswich and Northern Fringe to Martlesham employment area, however likely to have limited impact on overall Orwell Bridge traffic flows. No impact on commercial trips	
Improve Sustainable Modes of Transport:	5	5	5	5	6	7	7
	Some positive impact to supporting mode sift to public transport				Positive impact by improving existing Park & Ride links to town centre	Potential for significant benefits encouraging mode shift to public transport	
Improve Air Quality and Reduce Noise:	5	5	5	5	5	6	6
	Some positive impact to supporting mode sift to public transport					May reduce some town centre traffic and improve air quality in the northern growth area of Ipswich.	May reduce some town centre traffic and improve air quality in the northern growth area of Ipswich.
Enable economic growth in wider Ipswich:	4	4	4	4	4	5	5
	Limited opportunity to support growth in wider Ipswich area, and offer no benefit to commercial vehicle trips Additional benefits for if included within a package of measures					Some positive benefit for economic growth with creation of west-east link from Northern Fringe to Martlesham employment areas. No benefit to commercial vehicle trips on strategic East-West routes.	
Enable growth in Suffolk Energy Coast:	4	4	4	4	4	5	5
	Northern radial bus routes offer limited opportunity to support growth in the Suffolk Energy Coast and provide no benefit to commercial vehicle trips on strategic East-West routes.					Some positive benefit for economic growth with creation of west-east link from Northern Fringe to Martlesham employment areas. No benefit to commercial vehicle trips on strategic East-West routes.	
AVERAGE	4.375	4.375	4.375	4.375	4.5	5.25	5.25

		8	9	10	11	12
		Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations
		Reliant upon train operating company, but additional economic growth could stimulate increased frequency of service	Provision of new 'Parkway' style station to take trips off A14 strategic road network and link to northern Ipswich	Provision of new 'Parkway' style station to take trips off A12 strategic road network and radial routes	Additional twin tracking or passing loops to allow increased frequency of train service*. Some works already underway as part of existing route improvements by Network Rail to increase freight capacity. Additional works not in Network Rail forecast investments plans	Expansion of existing Westerfield Station - provision of additional car and cycle parking to create a Rural Hub Parkway station for improved connectivity with Ipswich Centre, East Suffolk, and strategic main line railway with onward links to London, Cambridge and Norwich
Additional Transport Capacity to enable growth:		5	5	5	5	5
		Could provide additional capacity to cater for growth, but not likely to meet all objectives unless as part of a package of wider transport measures.		Moderate benefits creating a new connection to the main line railway	Moderate benefit with improvements to increase freight capacity from Port of Felixstowe container terminal. Benefits confined to a single corridor	Moderate benefit with improved connectivity to rail network
Reduce congestion in Ipswich Town Centre:		4	4	4	4	4
		Slight benefit with Would be likely to have limited impact on reducing town centre congestion		Moderate benefits by removing some trips bound for Ipswich Station	Unlikely to reduce congestion within town centre.	
Positive impact on SRN & A14 /A12 connectivity:		4	4	4	5	4
		Likely to have negligible impact on SRN			Moderate benefit with improvements to increase freight capacity from Port of Felixstowe container terminal removing trips from the SRN	Likely to have negligible impact on SRN
Mitigate Orwell Bridge related congestion:		4	4	4	4	4
		Unlikely to mitigate Orwell Bridge related congestion				
Improve Sustainable Modes of Transport:		6	6	6	6	6
		Moderate benefit. Rail travel is a key component of a sustainable travel network, and enhancements to the network and services contribute to increased patronage and mode shift from private car.				
Improve Air Quality and Reduce Noise:		5	5	5	4	4
		Slight benefit potentially encouraging some mode shift from private car to train.			Unlikely to have significant impact on AQ&N	
Enable economic growth in wider Ipswich:		5	5	5	4	5
		Slight benefit due to limitation of population having access to the rail network			No significant impact on growth beyond Port of Felixstowe	Slight benefit with due to limitation of population having access to the rail network
Enable growth in Suffolk Energy Coast:		5	4	4	5	4
		Slight benefit with additional services on Lowestoft branch line improving access to Suffolk Energy Coast	Located to the west of Ipswich, unlikely to have significant impact on Suffolk Energy Coast	Slight benefit with new station to east of Ipswich improving access to Suffolk Energy Coast	No significant impact on growth beyond Port of Felixstowe	Unlikely to have significant impact on Suffolk Energy Coast
AVERAGE		4.8	4.6	4.6	4.6	4.5

	13	14	15	16	17
Option	Non-Strategic Partial relief road (Eastern)	Non-Strategic Partial relief road (North)	Non-Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvements
Additional Transport Capacity to enable growth:	5	5	6	4	5
	Additional capacity to accommodate development growth in immediate area only.		Additional capacity to accommodate development growth within a wider area, and opportunities to provide some limited additional resilience to the SRN, resulting in greater positive impact on Ipswich Town centre	Localised capacity improvements to accommodate development growth in immediate area only so will have very limited positive impact on the SRN and Ipswich Town centre	
Reduce congestion in Ipswich Town Centre:	4	5	6	4	4
	Limited positive impact on Ipswich Town centre - east-west trips still reliant upon A1214.	Slight benefit by removing some trips from northern residential development with employment centres A1214	Orbital route enables diversification of trips across northern radial routes and takes East-West trips off A1214.	Very localised works offering negligible positive benefit to reducing congestion in Ipswich town centre	
Positive impact on SRN & A14 /A12 connectivity:	4	4	5	5	5
	Does not create through link to SRN do limited positive impact		Slight positive benefit - character of road will be development led, likely to be a low speed environment, with multiple points of access and internal junctions.	A14 junction improvements work offer slight positive benefit to SRN with reduced congestion on slip roads	A12 junction improvements work offer slight positive benefit to SRN with reduced congestion on slip roads
Mitigate Orwell Bridge related congestion:	4	4	5	4	4
	Lack of contiguous link to SRN does not create any real opportunity to mitigate Orwell congestion		Slight positive benefit - character of road will have limited capacity to receive strategic trips	Very localised works offering negligible positive benefit to mitigating Orwell Bridge	Very localised works offering negligible positive benefit to mitigating Orwell Bridge
Improve Sustainable Modes of Transport:	4	4	4	4	4
	Negligible positive benefit. Unlikely to enable significant mode shift			Negligible positive benefit. Unlikely to enable significant mode shift	
Improve Air Quality and Reduce Noise:	4	4	5	5	5
	Limited opportunity to improve AQ&N in existing corridors		Orbital route enables diversification of trips across northern radial routes and takes East-West trips off A1214 reducing congestion and improving AQ&N.	Slight benefit arising from reduced congestion	
Enable economic growth in wider Ipswich:	5	5	6	4	4
	Slight benefit to economic growth with access to eastern employment areas	Slight benefit to economic growth allowing improved access to the A14 SRN from northern residential areas	Moderate benefit as orbital route creates improved East-West access to the SRN from northern residential areas	Very localised works offering negligible positive benefit to enabling economic growth	
Enable growth in Suffolk Energy Coast:	4	4	5	4	4
	Lack of contiguous link to SRN does not create any real opportunity to support growth in the Suffolk Energy Coast		Slight benefit as orbital route creates improved East-West access to the SRN with limited capacity	Very localised works offering negligible positive benefit to enabling growth within Suffolk Energy Coast	
AVERAGE	4.3	4.4	5.3	4.3	4.4

	18	19	20	21	22	23	24	25
Option	Outer Highway Route - Single Carriageway	Outer Highway Route - Dual Carriageway	Mid Highway Route - Single Carriageway	Mid Highway Route - Dual Carriageway	Inner Highway Route - Single Carriageway	Inner Highway Route - Dual Carriageway	New River Orwell Bridge Crossing	Tunnel of River Orwell
Additional Transport Capacity to enable growth:	6	7	6	7	6	7	4	4
	Provide alternative east-west route allowing traffic to by-pass inner ring road. Provides greater benefit for Strategic Traffic as further from town centre so less positive impact on town centre congestion. Would enable growth in the region and north Ipswich. and an alternative for when A14 issues (operation stack or Orwell Bridge closures)	Provide alternative east-west route allowing traffic to by-pass inner ring road. Provides greater benefit for Strategic Traffic as further from town centre so less positive impact on town centre congestion. Would enable growth in the region and north Ipswich. Provides additional capacity for extended element of SRN. and an alternative for when A14 issues (operation stack or Orwell Bridge closures)	Provide alternative east-west route allowing traffic to by-pass inner ring road. Provides similar positive benefits to strategic traffic and local traffic and fits with northern Ipswich growth. Would enable growth in the region and north Ipswich. An alternative for when A14 issues (operation stack or Orwell Bridge closures). and an alternative for when A14 issues (operation stack or Orwell Bridge closures)	Provide alternative east-west route allowing traffic to by-pass inner ring road. Provides similar positive benefits to strategic traffic and local traffic and fits with northern Ipswich growth. Would enable growth in the region and north Ipswich. Could still form part of SRN and provides additional capacity and resilience to the A14 (and sections of A12). and an alternative for when A14 issues (operation stack or Orwell Bridge closures)	Moderate benefit, providing alternative East-West route allowing traffic to by-pass inner ring road, creating access to potential growth areas to north of Ipswich. Single lane could be a constraint to capacity.	Large benefit provides alternative high capacity East-West route allowing traffic to by-pass inner ring road., and creating access to potential growth areas to north of Ipswich	Negligible benefits. Localised intervention with no additional capacity improvements to wider SRN so limited opportunity to enable growth.	
Reduce congestion in Ipswich Town Centre:	5	5	6	6	6	7	5	5
	Separation distance from town centre offers only slight benefits by removing some East-West trips		Moderate benefit as orbital route enables diversification of trips across northern radial routes and takes East-West trips off A1214.			Large benefit as Inner high capacity orbital route enables diversification of trips across northern radial routes and takes East-West trips off A1214.	Slight benefit provided by resilience of Orwell Crossing improving reliability of SRN taking trips away from Ipswich town centre. Additional capacity to accommodate local junction hopping trips from interchanges either side of Orwell.	
Positive impact on SRN & A14 /A12 connectivity:	5	6	6	7	6	7	5	5
	Slight positive benefit, although capacity of single carriageway has limited capacity to significantly improve links with SRN	Moderate positive benefit provided by capacity of dual carriageway to improve links with SRN, but very remote from strategic trips A12/A14 Orwell	Moderate positive benefit provided by proximity to SRN, but capacity limited by single carriageway	Large positive benefit provided by capacity of dual carriageway to improve links with SRN,	Moderate positive benefit provided by capacity of dual carriageway to improve links with SRN	Moderate positive benefit provided by capacity of dual carriageway to improve links with SRN,	Slight benefit provided by resilience of Orwell Crossing improving reliability of SRN	
Mitigate Orwell Bridge related congestion:	5	6	6	7	6	7	7	7
	Slight positive benefit, separation distance to Orwell and capacity of single carriageway has limited capacity to mitigate Orwell Bridge congestion	Moderate positive benefit, although remote distance from Orwell Bridge limits benefits	Moderate positive benefit, although single carriageway has limited capacity to mitigate Orwell Bridge congestion	Significant positive benefit with highway capacity to mitigate Orwell Bridge congestion	Moderate positive benefit, although single carriageway has limited capacity to mitigate Orwell Bridge congestion	Significant positive benefit with highway capacity to mitigate Orwell Bridge congestion	Provides secondary route in the event of disruption on primary route. provides resilience only for the bridge crossing rather than alternative routes	
Improve Sustainable Modes of Transport:	4	4	5	5	6	6	4	4
	Negligible positive benefit Unlikely to enable significant mode shift		Slight positive benefit allowing orbital trips linking to radial routes and National Rail services (Westerfield Station)		Moderate positive benefit allowing orbital trips linking to radial routes and National Rail services (Westerfield Station) and close to major settlement boundary		Negligible positive benefit	
Improve Air Quality and Reduce Noise:	4	4	5	5	5	5	3	4
	Limited opportunity to improve AQ&N in existing corridors		Slight benefit arising from reduced congestion and removal of trips from Ipswich town centre				Slight AQ&N dis-benefits with additional traffic noise in an elevated position	Tunnel would offer negligible benefits
Enable economic growth in wider Ipswich:	6	7	6	7	6	7	5	5
	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Slight benefit provided by resilience of Orwell Crossing improving reliability of SRN	
Enable growth in Suffolk Energy Coast:	6	7	6	7	6	7	5	5
	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Moderate positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Large positive benefit provided by provision of new strategic infrastructure creating opportunities from growth	Slight benefit provided by resilience of Orwell Crossing improving reliability of SRN	
AVERAGE	5.1	5.8	5.8	6.4	5.9	6.6	4.8	4.9

	26	27	28	29	30	31	32
Option	Smart Parking	Integrated Smart Public Transport	Wide scale traffic signal upgrades	Improved Public Transport RTPI	Car Parking levy	Congestion charging in Ipswich centre	Do Nothing
Description	Parking that directs users to free parking spaces to avoid hunting trips	Integrated ticketing systems between operators and public transport modes	Upgrade to UTC signal control network	Information management on service and journey times	Car Parking levy in Ipswich centre on employment premises	Congestion charge cordon around town centre core	No mitigation to accommodate forecast traffic growth.
Additional Transport Capacity to enable growth:	4	4	5	4	4	4	1
	No additional transport capacity	No additional transport capacity	Slight benefit from intelligent signalling reducing congestion increasing capacity within Ipswich town centre	No additional transport capacity	No additional transport capacity to growth area beyond town centre		Lack of additional capacity will constrain growth
Reduce congestion in Ipswich Town Centre:	5	5	6	4	6	6	1
	Slight benefit from effective parking resulting in a reduction in parking hunting trips	Slight benefit from increased attractiveness of PT and potential mode shift from private car	Moderate benefit from intelligent signalling reducing delay and congestion.	Unlikely to have significant impact on congestion	Moderate benefit from reducing attractiveness of private commuter trips within town centre		Significant negative benefit to mitigating congestion
Positive impact on SRN & A14 /A12 connectivity:	4	4	4	4	5	5	2
	Negligible positive impact on SRN				Slight benefit from fewer vehicle trips to town centre		Moderate negative benefit on SRN
Mitigate Orwell Bridge related congestion:	4	4	5	4	5	5	2
	No mitigation to Orwell Bridge congestion		Moderate benefit from intelligent signalling reducing junction dwell time, resulting in improved traffic flow.	No mitigation to Orwell Bridge congestion	Slight benefit from fewer vehicle trips to town centre releasing additional capacity		Moderate negative benefit on Orwell related congestion
Improve Sustainable Modes of Transport:	4	5	5	5	6	6	1
	No benefit to Sustainable Transport	Slight benefit from increased attractiveness of PT and potential mode shift from private car	Slight benefit from reduced traffic delay improving reliability and attractiveness of bus services encouraging mode shift from private car	Moderate benefit from increased attractiveness of PT and potential mode shift from private car			Significant negative benefit to improving sustainable transport
Improve Air Quality and Reduce Noise:	5	4	4	5	5	5	1
	Slight benefit from reduction in parking hunting trips	Unlikely to result in significant benefit to AQ&N	Slight reduction in queuing traffic but needs to be combined with other measures to reduce total number of vehicle trips.	Moderate benefit from increased attractiveness of PT and potential mode shift from private car			Significant negative benefit to improving AQ&N
Enable economic growth in wider Ipswich:	4	4	4	4	4	4	2
	No significant scope to enable economic growth in wider Ipswich area						Moderate negative benefit to enabling growth
Enable growth in Suffolk Energy Coast:	4	4	4	4	4	4	2
	Unlikely to enable economic growth in Suffolk Energy Coast						Moderate negative benefit to enabling growth
AVERAGE	4.3	4.3	4.6	4.3	4.9	4.9	1.5

Table 44 Option Assessment against Objectives Summary of Results

	Option	Additional Transport Capacity to enable growth:	Reduce congestion in Ipswich Town Centre:	Positive impact on SRN & A14 / A12:	Mitigate Orwell Bridge related congestion:	Improve Sustainable Modes of Transport:	Improve Air Quality and Reduce Noise:	Economic growth in wider Ipswich:	Growth in Suffolk Energy Coast:	Objectives Achieved	Average Score	Aggregate score of Positive Benefits
1	Radial Route - Norwich Road - former P&R	4	5	4	4	5	5	4	4	3	4.4	3
2	Radial Route - Henley Road	4	5	4	4	5	5	4	4	3	4.4	3
3	Radial Route - Westerfield Road	4	5	4	4	5	5	4	4	3	4.4	3
4	Radial Route - Tuddenham Road	4	5	4	4	5	5	4	4	3	4.4	3
5	Radial Route - Kesgrave Road	4	5	4	4	6	5	4	4	3	4.5	4
6	LRT Orbital	5	5	5	4	7	6	5	5	7	5.3	10
7	Bus Rapid Transit Orbit	5	5	5	4	7	6	5	5	7	5.3	10
8	Increased Frequency of service	5	4	4	4	6	5	5	5	5	4.8	6
9	New rail station at Gt Blakenham	5	4	4	4	6	5	5	4	4	4.6	5
10	New rail station at Martlesham	5	4	4	4	6	5	5	4	4	4.6	5
11	Capacity improvements on Felixstowe branch line	5	4	5	4	6	4	4	5	4	4.6	5
12	Improved Connectivity at existing stations	5	4	4	4	6	4	5	4	3	4.5	4
13	Non-Strategic Eastern relief road	5	4	4	4	4	4	5	4	2	4.3	2
14	Non-Strategic Northern relief road	5	5	4	4	4	4	5	4	3	4.4	3
15	Non-Strategic Northern fringe relief road	6	6	5	5	4	5	6	5	7	5.3	10
16	A14 Junction 53 capacity improvements	4	4	5	4	4	5	4	4	2	4.3	2
17	A12 / A1214 Main Road / Kesgrave improvements	5	4	5	4	4	5	4	4	3	4.4	3
18	Outer Highway Route - Single carriageway	6	5	5	5	4	4	6	6	6	5.1	9
19	Outer Highway Route - Dual carriageway	7	5	6	6	4	4	7	7	6	5.8	14
20	Mid Highway Route - Single carriageway	6	6	6	6	5	5	6	6	8	5.8	14
21	Mid Highway Route - Dual carriageway	7	6	7	7	5	5	7	7	8	6.4	19
22	Inner Highway Route - Single carriageway	6	6	6	6	6	5	6	6	8	5.9	15
23	Inner Highway Route - Dual carriageway	7	7	7	7	6	5	7	7	8	6.6	21
24	New River Orwell Bridge Crossing	4	5	5	7	4	3	5	5	5	4.8	6
25	Tunnel of River Orwell	4	5	5	7	4	4	5	5	5	4.9	7
26	Smart Parking	4	5	4	4	4	5	4	4	2	4.3	2
27	Integrated Smart Public Transport	4	5	4	4	5	4	4	4	2	4.3	2
28	Wide scale traffic signal upgrades	5	6	4	5	5	4	4	4	4	4.6	5
29	Improved Public Transport RTPI	4	4	4	4	5	5	4	4	2	4.3	2
30	Car Parking levy	4	6	5	5	6	5	4	4	5	4.9	7
31	Congestion charging in Ipswich centre	4	6	5	5	6	5	4	4	5	4.9	7
32	Do Nothing	1	1	2	2	1	1	2	2	0	1.5	-20

8.5.2 INITIAL RANKING OF OPTIONS

The initial option sifting allowed the options to be ranked in order of "Average Score" and "Aggregated score of Positive Benefits". The ranking was the same for both approaches, with the strategic highway routes achieving the highest scores. The rankings are illustrated in **Table 45**.

Table 45 Option Ranking – average score against objectives

	Option	Objectives Achieved	Average Score	Aggregate score of Positive Benefits	Ranking
23	Inner Highway Route - Dual Carriageway	8	6.6	21	1
21	Mid Highway Route - Dual Carriageway	8	6.4	19	2
22	Inner Highway Route - Single Carriageway	8	5.9	15	3
20	Mid Highway Route - Single Carriageway	8	5.8	14	4
19	Outer Highway Route - Dual Carriageway	6	5.8	14	5
6	LRT Orbital	7	5.3	10	6
7	Bus Rapid Transit Orbit	7	5.3	10	7
15	Non Strategic Northern fringe relief road	7	5.3	10	8
18	Outer Highway Route - Single Carriageway	6	5.1	9	9
25	Tunnel of River Orwell	5	4.9	7	10
30	Car Parking levy	5	4.9	7	11
31	Congestion charging in Ipswich centre	5	4.9	7	12
8	Increased Frequency of service	5	4.8	6	13
24	New River Orwell Bridge Crossing	5	4.8	6	14
9	New rail station at Gt Blakenham	4	4.6	5	15
10	New rail station at Martlesham	4	4.6	5	16
11	Capacity improvements on Felixstowe branch line	4	4.6	5	17
28	Wide scale traffic signal upgrades	4	4.6	5	18
5	Radial Route - Kesgrave Road	3	4.5	4	19
12	Improved Connectivity at existing stations	3	4.5	4	20
1	Radial Route - Norwich Road - former P&R	3	4.4	3	21
2	Radial Route - Henley Road	3	4.4	3	22
3	Radial Route - Westerfield Road	3	4.4	3	23
4	Radial Route - Tuddenham Road	3	4.4	3	24
14	Non Strategic Northern relief road	3	4.4	3	25
17	A12 / A1214 Main Road / Kesgrave improvements	3	4.4	3	26
13	Non Strategic Eastern relief road	2	4.3	2	27
16	A14 Junction 53 capacity improvements	2	4.3	2	28
26	Smart Parking	2	4.3	2	29
27	Integrated Smart Public Transport	2	4.3	2	30
29	Improved Public Transport RTPI	2	4.3	2	31
32	Do Nothing	0	1.5	-20	32

The initial findings suggest that, with the exception of *Do-Nothing*, all options offer some positive benefit to the local transport network. However, it is clear that the more strategic highway options achieve the highest score, with the greatest overall benefit.

On the basis of such positive scores, all options were taken forward for inclusion in the EAST, including the *Do-Nothing* that is used as a baseline metric.

8.5.3 EARLY ASSESSMENT SIFTING TOOL

Following the initial scoring against the scheme objectives, options were then evaluated in more detail using the DfT EAST approach, in order to better understand how options perform and compare. The EAST is a decision support tool developed to quickly summarise and present evidence on options in a clear and consistent format. The EAST assessment continued to make use of the information gathered in the Initial Appraisal (**Section 8.5.1**) and associated scoring system and evaluation criteria.

The tool has been designed to be consistent with the DfT's Transport Business Case principles, based around the best practice, five case model approach. The five cases and the elements within them that EAST considers are summarised in **Table 46** (with the elements focussed on as part of the INR Options Assessment highlighted):

Table 46 Five case model approach

Strategic Case: ▪ Scale of impact ▪ Fit with wider transport and government objectives ▪ Fit with other objectives ▪ Degree of consensus over outcomes **Economic Case:** ▪ Economic growth ▪ Carbon emissions ▪ Socio- distributional impacts and the regions ▪ Local environment ▪ Well-being ▪ Expected VfM category	**Financial Case:** ▪ Affordability ▪ Capital cost ▪ Revenue cost ▪ Overall cost risk **Commercial Case:** ▪ Flexibility of option ▪ Level of income generated (if any) **Managerial Case:** ▪ Implementation timetable ▪ Public acceptability ▪ Practical feasibility ▪ Quality of supporting evidence

The EAST aims to identify, at a high level, the nature and extent of all the economic, environmental and social impacts of the packages. As part of the Economic Case, the EAST guidance includes a decision tree in order to provide a guide to the issues that need to be considered when forming a view about the likely impact of each package of options on the economy, carbon emissions, socio-distribution impacts and the region's local environment and well-being.

The *Transport Appraisal Process* WebTAG Unit states that the:

"[The] tool does not make an overall recommendation as to whether an option should be progressed, instead, it is for the analyst to identify their own criteria or thresholds for determining which options 'pass' or 'fail' this stage of the process"

EAST has been designed as a flexible decision support tool allowing the analyst to identify their own assessment criteria based on appropriate relevant criteria to ensure options are all assessed on the same common basis. Adapting, or tailoring the EAST is therefore an acceptable and intrinsic approach consistent with the guidance. With this in mind, the approach adopted involved ranking the score, from highest to lowest, for each package of options in terms of the following categories:

- Scale of Impact
- Practical Feasibility
- Affordability
- Public Acceptability

The ranking was undertaken using a 1-7 point scoring system (as used within the Initial Appraisal, see **Table 42**) and is typical of the DfT WebTAG approach. As the EAST process is intended to provide a comparison between options, a 7-point scale allows for finer differentiation between similar options which have subtle but measurable differences that would otherwise receive the same score when using a 5-point scale. The application of a 7-point scale is also aligned with the typical scoring methodology used within the Appraisal Summary Table for Environmental Impact Assessment.

8.5.4 SUMMARY OF EAST FINDINGS

Table 47 EAST results summary table

Option		Radial Route - Norwich Road - former P&R	Radial Route - Henley Road	Radial Route - Westerfield Road	Radial Route - Tuddenham Road	Radial Route - Kesgrave Road	LRT Orbital	Bus Rapid Transit Orbit	Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations	Non Strategic Eastern relief road	Non Strategic Northern relief road	Non Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12,A1214, Main Road, Kesgrave Bypass improvements	Outer Highway Route - Single Carraigeway	Outer Highway Route - Dual Carraigeway	Mid Highway Route - Single Carraigeway	Mid Highway Route - Dual Carraigeway	Inner Highway Route - Single Carraigeway	Inner Highway Route - Dual Carraigeway	New River Orwell Bridge Crossing	Tunnel of River Orwell	Smart Parking	Integrated Smart Public Transport	Wide scale traffic signal upgrades	Improved Public Transport RTPI	Car Parking levy	Congestion charging in Ipswich centre	Do Nothing
Fit with wider transport and Government objectives		5	5	5	5	5	6	6	6	6	6	6	6	5	5	5	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2
Degree of consensus over outcomes	What consultation has taken place?	4	4	4	4	4	3	3	4	4	4	4	4	3	3	3	5	5	6	6	6	6	6	6	2	2	2	2	2	2	1	1	2
Key Uncertainties		4	4	4	4	4	3	3	3	4	4	4	5	4	4	4	3	4	3	3	3	3	3	3	1	1	3	3	3	3	1	1	4
ECONOMIC																																	
Economic Growth		4	4	4	4	4	5	5	5	5	5	5	5	4	4	4	4	4	6	7	7	7	7	7	5	5	4	4	4	4	5	5	1
Carbon Emissions		4	4	4	4	4	6	6	5	5	5	5	5	3	3	3	4	4	4	4	4	4	4	4	3	3	4	5	5	5	5	5	1
Socio-distributional impacts and the regions		4	4	4	4	4	5	5	4	5	5	4	5	4	4	5	4	4	5	5	5	5	5	5	4	4	4	4	4	4	3	3	1
Local Environment	Air Quality (AQMAs)	4	3	3	3	3	6	6	5	6	5	5	4	4	4	5	4	4	4	4	5	6	5	5	3	3	5	5	5	5	4	4	2
	Noise	3	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	4	4	5	5	5	5	3	3	4	4	4	5	4	4	2
	Natural environment, heritage and landscape	4	2	2	2	2	2	2	6	3	3	4	3	2	2	2	4	3	2	2	3	3	2	2	2	2	4	4	4	4	4	4	3
	Streetscape and urban environment	4	2	2	2	2	3	3	4	4	4	3	3	5	5	5	4	4	5	5	5	5	5	5	4	4	4	4	4	4	5	5	2
Well Being	Physical activity, injury/deaths, enabling people to enjoy range of services etc., crime, terrorism, severance	4	4	4	4	4	5	5	5	5	5	4	5	5	5	5	4	4	4	4	7	7	7	7	5	4	5	5	5	5	3	3	1
	Value for Money - expected BCR	5	5	5	5	5	5	5	4	5	5	3	5	5	5	6	5	5	5	5	6	6	6	6	1	1	4	4	4	4	5	6	1
MANAGERIAL																																	
Implementation timetable		6	6	6	6	6	3	3	4	3	3	2	4	3	3	3	5	5	6	6	6	6	6	6	2	2	4	4	5	5	3	3	4
Public acceptability		4	4	4	4	4	5	4	5	5	5	4	5	3	3	3	5	5	5	5	5	5	5	5	5	3	5	5	5	5	2	1	2
Practical feasibility		5	5	5	5	5	4	4	3	3	3	2	5	4	4	4	5	5	5	5	5	5	5	5	3	2	5	5	5	5	3	3	2
Quality of evidence	From modelling and evidence from similar options elsew	5	5	5	5	5	4	4	4	4	4	5	4	3	3	3	5	5	5	5	5	5	5	5	3	2	4	4	4	4	2	2	4
Key Risks		4	4	4	4	4	3	3	3	3	3	3	4	3	3	3	4	4	3	3	3	3	3	3	2	1	4	4	4	4	2	1	4
FINANCIAL																																	
Affordability		6	6	6	6	6	3	3	4	3	3	3	4	3	3	3	5	5	3	3	3	3	3	3	1	1	5	5	5	5	5	5	2
Capital Cost		5	5	5	5	5	1	2	4	3	3	2	4	3	3	3	4	4	3	3	3	3	3	3	2	1	6	6	4	5	3	3	4
Revenue cost		4	4	4	4	4	6	6	5	5	5	2	5	5	5	5	5	5	5	5	5	5	5	5	1	1	4	4	4	4	6	7	2
Overall cost risk		5	5	5	5	5	2	3	3	3	3	2	4	3	3	3	3	3	2	2	4	4	5	5	1	1	5	5	5	5	3	2	4
COMMERCIAL																																	
Flexibility of Option		2	2	2	2	2	5	5	3	4	4	4	4	3	3	3	3	3	4	3	4	3	4	3	3	3	5	5	5	5	3	3	1
Funding source		4	4	4	4	4	3	3	5	5	5	3	5	4	4	4	5	5	5	5	5	5	6	5	2	2	5	5	5	5	5	5	1
Income generated		4	4	4	4	4	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6	4	4	6	7	1
	Overall Average	4.28	4.13	4.13	4.13	4.13	4.13	4.16	4.30	4.22	4.18	3.72	4.40	3.70	3.71	3.89	4.28	4.25	4.43	4.49	4.84	4.90	4.88	4.87	2.99	2.73	4.36	4.47	4.37	4.43	3.76	3.76	2.17

9 SUMMARY & CONCLUSION

9.1 SUMMARY

The objectives of the scheme meet those set up by the Government to develop and improve the local road network and SRN.

It was demonstrated within this OAR that the Local Plans and the East Anglia LEP expect significant growth, both in terms of housing and employment. The documents recognise the importance of improving the integrated transport network and to tackle congestion in order to and deliver the required residential and employment developments needed to meet growth targets.

This report has provided the evidence on existing issues of capacity on the highway network, and gaps in public transport infrastructure and the cycle network provision. It has also identified a growing proportion of vehicle ownership, especially in rural areas, which encourages people to travel by car, increasing the constraint on network capacity.

This document has highlighted that the current local and strategic highway network suffers from frequent and severe delays, generating pollution, reducing safety of road users and constraining the local and regional economic market. Congestion on the A14 also has an impact on strategic areas, such as the Port of Felixstowe.

The study has demonstrated that the local area in and around Ipswich has experienced significant and steady growth; with local economic benefit derived from a greater working age population. The area also provides a significant retail offer and improved educational facilities, with popular high schools and a now a University.

This report has provided a high-level study of the environmental constraints which has helped identify 3 indicative corridors for the potential delivery of a northern relief road but must now be considered further in the next stage of option development.

Importantly, this report has demonstrated that the local area is expected to continue to grow further in the future, and action is needed to avoid the adverse impact this will likely have on the local and strategic highway network, potentially limiting housing and employment growth.

9.1.1 EAST OUTPUT

All of the options generally scored well in response to the scheme objectives, with the strategic highway options scoring highest. The non-highways options in general scored lower, indicating that individually they would be less likely to achieve the specific objectives unless part of a wider package. However, these latter options scored well in several key aspects of the DfT EAST, in terms of offering a low cost, sustainable, and low risk solution. The non-highway link options could be used as supplementary measures in association with the shortlisted highways options.

In the context of the combined overall scoring, the strategic highway options retained the highest-ranking position due to the strategic benefits to the wider area, and ability to benefit both the local and SRN, particularly in mitigating the effects of Orwell Bridge closures (**Table 48**).

Table 48 Option EAST Scoring and Ranking

ID	OPTION DESCRIPTION	EAST Av. Score	RANK
21	Mid Highway Route - Dual carriageway	**4.90**	1
22	Inner Highway Route - Single carriageway	**4.88**	2
23	Inner Highway Route - Dual carriageway	**4.87**	3
20	Mid Highway Route - Single carriageway	**4.84**	4
19	Outer Highway Route - Dual carriageway	**4.49**	5
27	Integrated Smart Public Transport	**4.47**	6
29	Improved Public Transport RTPI	**4.43**	7
18	Outer Highway Route - Single carriageway	**4.43**	8
12	Improved Connectivity at existing stations	**4.40**	9
28	Wide scale traffic signal upgrades	**4.37**	10
26	Smart Parking	**4.36**	11
8	Increased Frequency of service	**4.30**	12
1	Radial Route - Norwich Road - former P&R	**4.28**	13
16	A14 Junction 53 capacity improvements	**4.28**	14
17	A12, A1214, Main Road, Kesgrave Bypass improvements	**4.25**	15
9	New rail station at Gt Blakenham	**4.22**	16
10	New rail station at Martlesham	**4.18**	17
7	Bus Rapid Transit Orbit	**4.16**	18
5	Radial Route - Kesgrave Road	**4.13**	19
2	Radial Route - Henley Road	**4.13**	20
3	Radial Route - Westerfield Road	**4.13**	21
4	Radial Route - Tuddenham Road	**4.13**	22
6	LRT Orbital	**4.13**	23
15	Non-Strategic Northern fringe relief road	**3.89**	24
30	Car Parking levy	**3.76**	25
31	Congestion charging in Ipswich centre	**3.76**	26
11	Capacity improvements on Felixstowe branch line	**3.72**	27
14	Non-Strategic Northern relief road	**3.71**	28
13	Non-Strategic Eastern relief road	**3.70**	29
24	New River Orwell Bridge Crossing	**2.99**	30
25	Tunnel of River Orwell	**2.73**	31
32	Do Nothing	**2.17**	32

Comparing the five highest ranking options assessed against both Objectives and EAST (excluding Objectives scoring), produce similar results as set out in **Table 49** and **Table 50.**

Table 49 Objective Score Ranking

23	Inner Highway Route - Dual Carriageway	1
21	Mid Highway Route - Dual Carriageway	2
22	Inner Highway Route - Single Carriageway	3
20	Mid Highway Route - Single Carriageway	4
19	Outer Highway Route - Dual Carriageway	5

Table 50 EAST Score Ranking

21	Mid Highway Route - Dual Carriageway	1
22	Inner Highway Route - Single Carriageway	2
23	Inner Highway Route - Dual Carriageway	3
20	Mid Highway Route - Single Carriageway	4
19	Outer Highway Route - Dual Carriageway	5

Both scoring systems give the highest ranking to strategic highway options – with some minor variation in the ordering, with EAST ranking Inner Single slightly higher than the Inner Dual. This is predominately due to the lower capital cost and greater flexibility of the option in terms of commercial delivery; however, the Dual option offered greater benefits against Objectives in terms capacity, reliance to mitigate Orwell Bridge congestion, and ability to facilitate growth in the wider area and Suffolk Energy Coast.

The four highest ranked options were also the only options that demonstrated a positive benefit for all the project Objectives, demonstrating overall consistency against all approaches to scoring, whereas lower cost interventions that scored well against the EAST criteria, score less well against the project objectives; for example, Smart Parking is ranked 11 against EAST, but 29 against Objectives, showing positive benefit in only two of the eight objectives.

9.2 CONCLUSIONS

Failure to address the challenges identified in this report and invest in the transport network; in order to better facilitate east-west movements within the study area, is likely to have a constraining impact on the local economic growth. In addition, investment would have the opportunity to alleviate the strategic highway network, in particular the A14, which could influence the regional and national economy.

Congestion along the existing highway network is expected to intensify, leading to increased journey times for commuters and businesses. Consequently, these negative effects would lead to reduction of labour attraction and reduced population growth.

It appears necessary to compete, on a regional scale, with other centres such as Cambridge, Norwich or Colchester to continue to attract further businesses to provide adequate transport links to suppliers or customers.

Firms within the ‘knowledge economy’ also benefit greatly from economic agglomeration, relying on recruiting workers with highly specific skill sets to work within localised clusters of economic activity.

A worsened integrated transport network would potentially undermine the effective density of Ipswich, and potentially limit the expansion, reducing general productivity or attractiveness of its recently awarded University.

Conversely, improved transport linkages will potentially increase the level of availability of quality workers, both locally and commuting into Ipswich, which would benefit local firms and potentially stimulate a greater economic interaction.

Improved transport links in the north of Ipswich are also an important prerequisite to achieving the ambitions set out by the New Anglia LEP. The LEP identifies the importance of a transport connectivity around Ipswich with the ambitions of delivering expected new jobs and dwellings to support local growths.

In summary, interventions in the study area and in the indicative corridor alignments identified could deliver the following benefits:

- Improve strategic and local east west links across Ipswich reducing travelling time
- Tackle current and forecasted congestion on the network both by potentially alleviating local traffic congestion in Ipswich but also by encouraging strategic traffic away from routing through the centre of Ipswich
- Addressing environmental impact due to congestion
- Improving safety along the highway network
- Promote further local investment and create opportunities for growth
- Facilitate housing and employment developments promoted within the local plans
- Improve reliability of the strategic road network and access to strategic economical areas such as the Port of Felixstowe
- Encourage use of more sustainable methods of transport within the urban area, such as improving cycle or bus corridors
- Seek to increase rail usage to and from the Ipswich areas, increasing use of secondary railway stations encouraging businesses and commuters to get on-board

Transport improvements at a strategic level would benefit the different development opportunities highlighted in the local plans. The Strategic Orbital Highway options offer benefits to all road users, private cars, commercial vehicles, and public transport. The orbital routes allow connectivity to radial routes, increasing the opportunities to diversify flow across all routes and reduce stress points within the network, particularly at the primary connections to north Ipswich, A14 Junction 53, and A12 Kesgrave / Martlesham junctions, reducing congestion and improving connectivity to the Suffolk Energy Coast and wider prospective growth areas.

This also creates opportunities to connect with complimentary measures, such as enhanced public transport bus links on the radial routes, improving the viability of these routes in terms of increased patronage, and reduced journey times. Additionally, the introduction of a strategic highway route that has links to Westerfield Train Station, improves greatly the accessibility to rail services from outlying districts and may help reduce town centre vehicle trips that rail patrons would otherwise take to access the Ipswich train station.

9.3 RECOMMENDATION FOR NEXT STEPS

Appendix A of the DfT's WebTAG sets out the method for further appraisal of the options taken forward from the EAST assessment. The aim of the further appraisal is to collect sufficient evidence to distinguish the relative costs, benefits and impacts of the options under consideration as set out below:

- Strategic fit
- Value for money: Impact on Economy; Impact on Environment; Impact on Society; Public Accounts; Distributional Impacts; Indicative Benefit Cost Ratio
- Financial case
- Delivery case
- Commercial case

It is recommended that to progress further, this study should build on the findings of this OAR to assess the financial, delivery and commercial case for the strategic highway options. More refined route options should be identified within the geographical study area, through closer consideration of environmental constraints, additional focus on potential junction connections to the A14 and A12 and consideration of the intersection with main and secondary roads.

The updated County-wide transport model should be reviewed and tested against the emerging INR options in terms of delay and congestion benefits, in order to assess the impact of each option on the strategic and local road network, as well as likely demand for its use.

Further environmental studies should be carried along preferred routing with specialist surveys and analysis.

Finally, further work should be undertaken as part of the Ipswich Transport Strategy work to consider a package of supplementary sustainable transport improvements within the geographical study area, that complement the northern route option.

Appendix A

EAST ASSESSMENT

Option		1		2		3		4		5		6		7	
		Radial Route - Norwich Road - former P&R		Radial Route - Henley Road		Radial Route - Westerfield Road		Radial Route - Tuddenham Road		Radial Route - Kesgrave Road		LRT Orbital		Bus Rapid Transit Orbit	
Description		Improvements to radial bus and cycle route priority between Ipswich Town Centre and A14 on Norwich Road. Services 87/88/88A/89/89A/113/114 currently use this route		Improvements to radial bus and cycle route priority north from Ipswich Town Centre on Henley Road. Service 116 currently uses this route		Improvements to radial bus and cycle route north from Ipswich Town Centre on Westerfield Road. Services 116/118/119 currently use this route.		Improvements to radial bus and cycle route north from Ipswich Town Centre on Tuddenham Road. Services 70 & 70a currently use this route.		Improvements to radial bus and cycle route between Ipswich Town Centre and A12 on Kesgrave Road. Services 63/64/65/65B currently use this route		Orbital Light Rail route to north Ipswich linking Gt Blakenham (main line rail) to Matlesham, with new transport hub at Gt Blakenham.		Orbital Bus Rapid Transit route to north Ipswich linking Gt Blakenham (main line rail) to Matlesham with new transport hub at Gt Blakenham.	
		Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description
STRATEGIC															
Fit with wider transport and Government objectives	Fit with EU legislation, complement EU proposals, qualify for EU funding, or contravene EU rules? Any other policies/proposals addressing the same issues? Do proposals conflict with or enhance other pre-existing proposals? Any negative impact on other modes of transport? Makes better use of existing infrastructure or 'does more with less'? Impact on other Govt policies besides transport? Fit with other network/regional/local/modal objectives not covered above?	5	Good fit with Government Objectives and seeks to make best use of existing infrastructure. However, might not fully address growth policies	5	Good fit with Government Objectives and seeks to make best use of existing infrastructure. However, might not fully address growth policies	5	Good fit with Government Objectives and seeks to make best use of existing infrastructure. However, might not fully address growth policies	5	Good fit with Government Objectives and seeks to make best use of existing infrastructure. However, might not fully address growth policies	5	Good fit with Government Objectives and seeks to make best use of existing infrastructure. However, might not fully address growth policies	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package
Degree of consensus over outcomes	What consultation has taken place?	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a radial route scheme	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a radial route scheme	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a radial route scheme	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a radial route scheme	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a radial route scheme	3	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding an LRT Orbital scheme	3	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding a Bus Rapid Transit Oribtal scheme
Key Uncertainties		4	Level of public support (can often be challenging on radial routes balancing all road users and resident views)	4	Level of public support (can often be challenging on radial routes balancing all road users and resident views)	4	Level of public support (can often be challenging on radial routes balancing all road users and resident views)	4	Level of public support (can often be challenging on radial routes balancing all road users and resident views)	4	Level of public support (can often be challenging on radial routes balancing all road users and resident views)	3	Route alignment, level of public support and whether can meet growth aspirations	3	Route alignment, level of public support and whether can meet growth aspirations
ECONOMIC															
Economic Growth		4	Slight improvements to journey time will have negilible effect on economic growth unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effect on economic growth unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effect on economic growth unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effect on economic growth unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effect on economic growth unless delivered as part of a package of measures	5	Improves connectivity around the north of Ipswich. Promotes non-car travel for certain fixed journeys. Would only really allow growth around the route	5	Improves connectivity around the north of Ipswich. Promotes non-car travel for certain fixed journeys. Would only really allow growth around the route
Carbon Emissions		4	Slight improvements to journey time will have negilible impact on carbon emissions unless delivered as part of a package of measures, including increased frequence of service.	4	Slight improvements to journey time will have negilible impact on carbon emissions unless delivered as part of a package of measures, including increased frequence of service.	4	Slight improvements to journey time will have negilible impact on carbon emissions unless delivered as part of a package of measures, including increased frequence of service.	4	Slight improvements to journey time will have negilible impact on carbon emissions unless delivered as part of a package of measures, including increased frequence of service.	4	Slight improvements to journey time will have negilible impact on carbon emissions unless delivered as part of a package of measures, including increased frequence of service.	6	Increased attractiveness of LRT could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	6	Increased attractiveness of BRT could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions
Socio-distributional impacts and the regions		4	Slight improvements to journey time will have negilible effects on social and Distributional Impact, limited oportunities to promote regeneration of north west Ipswich unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effects on social and Distributional Impact, limited oportunities to promote regeneration of north west Ipswich unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effects on social and Distributional Impact, limited oportunities to promote regeneration of north west Ipswich unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effects on social and Distributional Impact, limited oportunities to promote regeneration of north west Ipswich unless delivered as part of a package of measures	4	Slight improvements to journey time will have negilible effects on social and Distributional Impact, limited oportunities to promote regeneration of north west Ipswich unless delivered as part of a package of measures	5	Good Social and Distributional Impact, encourages growth by promoting accessibility	5	Good Social and Distributional Impact, encourages growth by promoting accessibility and social inclusion
Local Environment	Air Quality (AQMAs)	4	Slight improvements to journey time will have negilible impact o air quality unless delivered as part of a package of measures, including increased frequence of service.	3	Slight improvements to journey time may not off-set loss of vegetation resulting in negative impact on Air Quality unless delivered as part of a package of measures, including increased frequence of service.	3	Slight improvements to journey time may not off-set loss of vegetation resulting in negative impact on Air Quality unless delivered as part of a package of measures, including increased frequence of service.	3	Slight improvements to journey time may not off-set loss of vegetation resulting in negative impact on Air Quality unless delivered as part of a package of measures, including increased frequence of service.	3	Slight improvements to journey time may not off-set loss of vegetation resulting in negative impact on Air Quality unless delivered as part of a package of measures, including increased frequence of service.	6	Reduces car travel and promotes access by sustainable modes	6	Reduces car travel and promotes access by sustainable modes
	Noise	3	Loss of road space and Right Turn junction may lead to increased traffic queuing	4	Unlikely to increase significantly	4	Unlikely to increase significantly	4	Unlikely to increase significantly	4	Unlikely to increase significantly	4	Unlikely to increase significantly	4	Unlikely to increase significantly. BRT expected to encourage mode shift and reduce vehicle trips
	Natural environment, heritage and landscape	4	Neutral within context of corridor changes	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	2	Significant negative impacts along the route will require mitigation	2	Significant negative impacts along the route will require mitigation
	Streetscape and urban environment	4	Use of existing road space - neutral impact	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	2	loss of verges and tree avenues resulting in negative impact	3	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	3	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape
Well Being	Physical activity, injury/deaths, enabling people to enjoy range of services etc., crime, terrorism, severance,	4	Negilible effect	4	Negilible effect	4	Negilible effect	4	Negilible effect	4	Negilible effect	5	Improves access to a range of goods, services, people and places by reducing journey times and increasing access	5	Improves access to a range of goods, services, people and places by reducing journey times and increasing access
Value for Money - expected BCR		5	Medium	5	Medium	5	Medium	5	Medium	5	Medium	5	Medium	5	Medium
MANAGERIAL															
Implementation timetable		6	Shorter Term	6	Shorter Term	6	Shorter Term	6	Shorter Term	6	Shorter Term	3	Medium - Longer Term	3	Medium Term
Public acceptability		4	Localised public acceptability concerns only	4	Localised public acceptability concerns only	4	Localised public acceptability concerns only	4	Localised public acceptability concerns only	4	Localised public acceptability concerns only	5	While there may be localised access/alignment challenges close to the route LRT considered attractive	4	While there may be localised access/alignment challenges close to the route could be acceptable as part of new development
Practical feasibility		5	Established engineering approach	5	Established engineering approach	5	Established engineering approach	5	Established engineering approach	5	Established engineering approach	4	Established mode, but requires more specialist engineering but could be feasible	4	Established mode, but requires more specialist engineering but could be feasible
Quality of evidence	From modelling and evidence from similar options elsewhere	5	Established approach of corridor improvements	5	Established approach of corridor improvements	5	Established approach of corridor improvements	5	Established approach of corridor improvements	5	Established approach of corridor improvements	4	Limited evidence and concerns over patronage levels	4	Limited evidence and concerns over patronage levels
Key Risks		6	Local route risks (eg Utilities, Resident access, tree planting etc)	6	Local route risks (eg Utilities, Resident access, tree planting etc)	6	Local route risks (eg Utilities, Resident access, tree planting etc)	6	Local route risks (eg Utilities, Resident access, tree planting etc)	6	Local route risks (eg Utilities, Resident access, tree planting etc)	3	Cost, alignment (route constraints, eg Environment) and patronage levels	3	Alignment (route constraints, eg Environment) and patronage levels
FINANCIAL															
Affordability		6	Affordable in context of local funding	6	Affordable in context of local funding	6	Affordable in context of local funding	6	Affordable in context of local funding	6	Affordable in context of local funding	3	Major scheme and local funding	3	Could be major scheme or siginificant funding through growth
Capital Cost		5	Low	5	Low	5	Low	5	Low	5	Low	1	Very High	2	High
Revenue cost		4	Ongoing maintenance, with bus fare revenue to operators	4	Ongoing maintenance, with bus fare revenue to operators	4	Ongoing maintenance, with bus fare revenue to operators	4	Ongoing maintenance, with bus fare revenue to operators	4	Ongoing maintenance, with bus fare revenue to operators	6	Raises Revenue through fares, if commercial services limited revenue risk to SCC	6	Raises Revenue through fares, if commercial services limited revenue risk to SCC
Overall cost risk		5	Manageable within normal Local Authority governance and risk management	5	Manageable within normal Local Authority governance and risk management	5	Manageable within normal Local Authority governance and risk management	5	Manageable within normal Local Authority governance and risk management	5	Manageable within normal Local Authority governance and risk management	2	Will require additional governance and risk management	3	Will require additional governance and risk management
COMMERCIAL															
Flexibility of Option		2	Single fixed corridor but scope to alter proposals within route to meet objectives	2	Single fixed corridor but scope to alter proposals within route to meet objectives	2	Single fixed corridor but scope to alter proposals within route to meet objectives	2	Single fixed corridor but scope to alter proposals within route to meet objectives	2	Single fixed corridor but scope to alter proposals within route to meet objectives	5	Likely fixed route but scope to alter to address local constraints and deliver growth	5	Flexible system that can address local constraints and deliver growth and deliver wider services
Funding source		4	DfT/Local Govt/S106	4	DfT/Local Govt/S106	4	DfT/Local Govt/S106	4	DfT/Local Govt/S106	4	DfT/Local Govt/S106	3	DfT/Local Govt/S106	3	DfT/Local Govt/S106
Income generated		4	No	4	No	4	No	4	No	4	No	5	Yes ticket revenue	5	Yes ticket revenue

Option		8		9		10		11		12		13		14		15	
		Increased Frequency of service		New rail station at Gt Blakenham		New rail station at Martlesham		Capacity improvements on Felixstowe branch line		Improved Connectivity at existing stations		Non Strategic Partial relief road (Eastern)		Non Strategic Partial relief road (North)		Non Strategic Northern fringe relief road	
Description		Reliant upon train operating company, but additional economic growth could stimulate increased frequency of service		Provision of new 'Parkway' style station to take trips off A14 strategic road network and link to northern Ipswich		Provision of new 'Parkway' style station to take trips off A12 strtrategic road network and radial routes		additional twin tracking or passing loops to allow increased frequency of train service*. Some works already underway as part of existing route improvements by Network Rail to increase freight capacity. Additional works not in Network Rail forecast investments		Expansion of existing Westerfield Station - provision of additional car and cycle parking to create a Rural Hub Parkway station for improved connectivity with Ipswich Centre, East Suffolk, and strategic main line railway with onward links to London, Cambridge and Norwich		Partial relief road to the NE quarter of Ipswich 4 - Tuddenham Road roundabout - Four lane approaches for bypass approaches; three lanes for Tuddenham Road arms 5 - Northern Bypass / Kesgrave Bypass roundabout		Partial relief road to Northern quarter of Ipswich 1 - A14 Junction 53 - Grade separated, involving additional bridge over the A14 for realigned northbound A14 slips - Realigned southbound off-slip with segregated left turn onto		Relief road to northern fringe of Ipswich 1 - A14 Junction 53 - Grade separated, involving additional bridge over the A14 for realigned northbound A14 slips - Realigned southbound off-slip with segregated left turn onto	
		Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description
STRATEGIC																	
Fit with wider transport and Government objectives	Fit with EU legislation, complement EU proposals, qualify for EU funding, or contravene EU rules? Any other policies/proposals addressing the same issues? Do proposals conflict with or enhance other pre-existing proposals? Any negative impact on other modes of transport? Makes better use of existing infrastructure or 'does more with less'? Impact on other Govt policies besides transport? Fit with other network/regional/local/modal objectives not covered above?	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package as primarily related to freight capacity	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	5	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	5	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	5	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package
Degree of consensus over outcomes	What consultation has taken place?	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding increased bus service frequency	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding providing a new rail station at Great Blakenham	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding providing a new rail station at Martlesham	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding capacity improvements on Felixstowe branch line	4	Some consultation has taken place with the Local Authority, with a low level of discussion surrounding improved Connectivity at existing stations	3	Local Authority and Local Plan discussions only	3	Local Authority and Local Plan discussions only	3	Local Authority and Local Plan discussions only
Key Uncertainties		3	Operator commitment and whether commercially viable	4	Level of Network Rail support	4	Level of Network Rail support	4	Work underway that reduces uncertainties. Not clear how could support housing growth	5	Level of Network Rail support	4	Not a clear understanding of links between growth and scheme. Route choice not clear	4	Not a clear understanding of links between growth and scheme. Route choice not clear	4	Not a clear understanding of links between growth and scheme. Route choice not clear
ECONOMIC																	
Economic Growth		5	Improves non-car travel and could facilitate improved connectivity and attractivenss of rail that could promote growth	5	Improves non-car travel and could facilitate improved connectivity and attractivenss of rail that could promote growth, but only for one particular point on the network so growth would be localised	5	Improves non-car travel and could facilitate improved connectivity and attractivenss of rail that could promote growth, but only for one particular point on the network so growth would be localised	5	Promotes economic growth from the more effective movement of freight. Could have additional passenger benefits that facilites growth in locations connected by the route	5	Improves non-car travel and could facilitate improved connectivity and attractivenss of rail that could promote growth	4	Localised promotion of growth through partially addressing a challenging aspect of the network	4	Localised promotion of growth through partially addressing a challenging aspect of the network	4	Localised promotion of growth through partially addressing a challenging aspect of the network
Carbon Emissions		5	Increased attractiveness of train services could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	5	Increased access to train services could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	5	Increased access to train services could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	5	Could have a significant positive impact due to reduction in HGV freight traffic	5	Increased access to train services could cause mode shift and reduce total number of vehicular journeys across a wider area, hence reduce carbon emissions	3	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	3	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	3	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.
Socio-distributional impacts and the regions		4	Good Social and Distributional Impact, encourages growth by promoting accessibility	5	Good Social and Distributional Impact, encourages growth by promoting accessibility	5	Good Social and Distributional Impact, encourages growth by promoting accessibility	4	Good Distributional Impact, encourages growth by promoting freight benefits	5	Good Social and Distributional Impact, encourages growth by promoting accessibility	4	Some positive but localised economic and regeneration, but does not effect Regions	4	Some positive but localised economic and regeneration, but does not effect Regions	5	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.
Local Environment	Air Quality (AQMAs)	6	Reduces car travel and promotes access by sustainable modes	6	Reduces car travel and promotes access by sustainable modes	6	Reduces car travel and promotes access by sustainable modes	5	Reduces freight traffic by HGV on roads and improves rail capacity	4	Increased rail use but greater car access to stations	4	Neutral impact	4	Neutral impact	5	Will reduce congestion by providing alternative routes
	Noise	3	Increase in noise adjacent to route from increased train paths	3	Increase in noise local to station	3	Increase in noise local to station	3	Some increase in noise due to increased rail traffic	3	Increase in noise local to station	3	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	3	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	3	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels
	Natural environment, heritage and landscape	6	Established routes so likely to be beneficial if reduces impact from car travel	3	Significant localised impact around station requiring mitigation	3	Significant localised impact around station requiring mitigation	4	Neutral based on existing route	3	Significant localised impact around station requiring mitigation	2	Significant negative impacts along the route will require mitigation	2	Significant negative impacts along the route will require mitigation	2	Significant negative impacts along the route will require mitigation
	Streetscape and urban environment	4	No impact	4	Impact around station but opportunities for streetscape and urban design	4	Impact around station but opportunities for streetscape and urban design	5	Limited impact from existing route	4	Impact around station but opportunities for streetscape and urban design	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape
Well Being	Physical activity, injury/deaths, enabling people to enjoy range of services etc., crime, terrorism, severance,	5	Improves access to a range of goods, services, people and places by increasing access	5	Improves access to a range of goods, services, people and places by increasing access	5	Improves access to a range of goods, services, people and places by increasing access	4	Limited impact on well being. Improves access to rail and transportation of goods	5	Improves access to a range of goods, services, people and places by increasing access	5	Improves access to a range of goods, services, people and places by reducing journey times and increasing access	5	Improves access to a range of goods, services, people and places by reducing journey times and increasing access	5	Improves access to a range of goods, services, people and places by reducing journey times and increasing access
Value for Money - expected BCR		4	Medium	5	Medium	5	Medium	5	Medium	5	Medium	5	Medium	5	Medium	6	High
MANAGERIAL																	
Implementation timetable		5	Medium Term	4	Short - Medium	4	Short - Medium	3	Short (current) - Medium (further works)	4	Short - Medium	3	Medium	3	Medium	3	Medium
Public acceptability		5	Likely to be attractive to travelling public as makes best use of existing routes	5	Provides improved accessibility to rail that likely to be attractive to public	5	Provides improved accessibility to rail that likely to be attractive to public	4	While attractive there may be some concern over freight impacts	5	Likely to be acceptable to improve access to rail stations	3	Localised public acceptability concerns and potential wider concerns over impacts	3	Localised public acceptability concerns and potential wider concerns over impacts	3	Localised public acceptability concerns and potential wider concerns over impacts
Practical feasibility		5	Only subject to line capacity	4	Site selection, buy-in from TOC and NR. Timetabling, Provision of rail and road infrastructure	4	Site selection, buy-in from TOC and NR. Timetabling, Provision of rail and road infrastructure	4	Buy-in from TOC and NR. Timetabling, Provision of rail infrastructure	5	Established engineering approach	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints
Quality of evidence	From modelling and evidence from similar options elsewhere	4	Wider evidence but limited within region	4	Limited evidence at this stage although need for increased rail access	4	Limited evidence at this stage although need for increased rail access	6	Strong based on growth in freight and need for additional capacity through existing studies	4	Wider evidence that people will travel longer distances for rail access	3	Evidence of the need to address growth but no detailed modelling	3	Evidence of the need to address growth but no detailed modelling	3	Evidence of the need to address growth but no detailed modelling
Key Risks		5	Train operations and capacity	4	Engineering and capacity withn operating regime	4	Engineering and capacity withn operating regime	4	Engineering cost risk, but esablished and known	4	Local route risks (eg Utilities)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)
FINANCIAL																	
Affordability		4	Subject to timetabling and TOC. Fare revenue generation	3	Affordable in context of local funding (eg Growth)	3	Affordable in context of local funding (eg Growth)	3	Major scheme requiring Gov't funding	4	Affordable in context of local funding	3	Major scheme and local funding	3	Major scheme and local funding	3	Major scheme and local funding
Capital Cost		4		2	High	2	High	1	Very High	5	Low	3	High	3	High	3	High
Revenue cost		5		5	Neutral (operational and maintenance with fare revenue)	5	Neutral (operational and maintenance with fare revenue)	2	Maintenance cost and FOC and TOC revenue	4	Neutral (operational and maintenance with fare revenue)	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance
Overall cost risk		5	Need to manage operational risk.	4	Will need a joined up approach to delivery to manage cost risk	4	Will need a joined up approach to delivery to manage cost risk	3	Current scheme underway will have risk management in place. Other works will still have a higher cost risk.	5	Manageable within normal Local Authority governance and risk management	3	Will require additional governance and risk management	3	Will require additional governance and risk management	3	Will require additional governance and risk management
COMMERCIAL																	
Flexibility of Option		3	Subject to timetabling and TOC	4	Some flexibility over location to meet growth and passenger requirements	4	Some flexibility over location to meet growth and passenger requirements	4	Limited flexibility given route exists	5	Flexibility over level of service provided	3	Route alignment yet to be determined	3	Route alignment yet to be determined	3	Route alignment yet to be determined
Funding source		5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	3	DfT/Local Govt/S106	5	DfT/Local Govt/S106	4	DfT/Local Govt/S106	4	DfT/Local Govt/S106	4	DfT/Local Govt/S106
Income generated		5	Yes ticket revenue	5	Yes ticket revenue	5	Yes ticket revenue	5	Yes ticket revenue	5	Yes ticket revenue	4	No	4	No	4	No

Option		16 A14 Junction 53 capacity improvements		17 A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvements		18 Outer Highway Route - Single Carriageway		19 Outer Highway Route - Dual Carriageway		20 Mid Highway Route - Single Carriageway		21 Mid Highway Route - Dual Carriageway		22 Inner Highway Route - Single Carriageway		23 Inner Highway Route - Dual Carriageway	
Description		- Grade separated, involving additional bridge over the A14 for realigned northbound A14 slips - Realigned southbound off-slip with segregated left turn onto Northern Bypass - Roundabout formed by southbound off-slip / northbound		- Kesgrave Bypass / Park & Ride approach upgrade to four lane approach - Segregated left turn from roundabout to bypass - Circulatory on roundabout at A1214 approach / circulatory signals increased to four lanes		Single Carriageway outer highway route connecting A14 with A12 with key intermediate junctions		Dual Carriageway outer highway route connecting A14 with A12 with key intermediate junctions		Single Carriageway middle highway route connecting A14 with A12 with key intermediate junctions		Dual Carriageway middle highway route connecting A14 with A12 with key intermediate junctions		Single Carriageway inner highway route connecting A14 with A12 with key intermediate junctions		Dual Carriageway inner highway route connecting A14 with A12 with key intermediate junctions	
		Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description
STRATEGIC																	
Fit with wider transport and Government objectives	Fit with EU legislation, complement EU proposals, qualify for EU funding, or contravene EU rules? Any other policies/proposals addressing the same issues? Do proposals conflict with or enhance other pre-existing proposals? Any negative impact on other modes of transport? Makes better use of existing infrastructure or 'does more with less'? Impact on other Govt policies besides transport? Fit with other network/regional/local/modal objectives not covered above?	6	Good fit with Government Objectives (eg RIS) and could complement other transport measures. Could only facilitate significant growth as part of a wider package	5	Good fit with Government Objectives (eg RIS) and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience	6	Good fit with Government Objectives to deliver housing growth. Could also address Highways England policies for SRN resilience
Degree of consensus over outcomes	What consultation has taken place?	5	Some consultation has taken place with the Local Authority, with a high level of agreement	5	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement	6	Some consultation has taken place with the Local Authority, with a high level of agreement
Key Uncertainties		3	Would need further discussions with Highways England. Significant utility constraints.	4	Would need further discussions with Highway Authority	3	Route choice needs further development	3	Route choice needs further development	3	Route choice needs further development	3	Route choice needs further development	3	Route choice needs further development	3	Route choice needs further development
ECONOMIC																	
Economic Growth		4	Localised promotion of growth through addressing a pinch point on the network. Unlikely to have significant benefits to wider area.	4	Localised promotion of growth through addressing a pinch point on the network. Unlikely to have significant benefits to wider area.	6	Improves connectivity for east west journeys that bypass Ipswich. Smaller scale improvement to local connectivity in and around Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development	7	Improves connectivity for east west journeys that bypass Ipswich. Smaller scale improvement to local connectivity in and around Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development	6	Improves connectivity for east west journeys that bypass Ipswich and local connectivity in and around Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development	7	Improves connectivity for east west journeys that bypass Ipswich and local connectivity in and around Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development	6	Improves local connectivity in and around Ipswich. Smaller scale improvement to east west journeys that bypass Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development	7	Improves local connectivity in and around Ipswich. Smaller scale improvement to east west journeys that bypass Ipswich. Reduces journey times and costs. Results in a more reliable SRN and likely to stimulate wider economic growth and development
Carbon Emissions		4	Will reduce carbon emissions but will make car travel more attractive	4	Will reduce carbon emissions but will make car travel more attractive	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Decreased journey lengths and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.
Socio-distributional impacts and the regions		4	Very localised effects	4	Very localised effects	5	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	5	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	6	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	6	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	6	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	6	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.
Local Environment	Air Quality (AQMAs)	4	Will reduce congestion by providing alternative routes - but very localised benefits. Neutral impact on study area	4	Will reduce congestion by providing alternative routes	4	Will reduce congestion by providing alternative routes	4	Will reduce congestion by providing alternative routes	5	Will reduce congestion by providing alternative routes	6	Will reduce congestion by providing alternative routes	5	Will reduce congestion by providing alternative routes	5	Will reduce congestion by providing alternative routes
	Noise	3	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	3	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	4	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	4	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	5	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	5	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	5	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels	5	Will reduce noise on key congestion routes, but re-assignment of traffic will increase noise through areas with lower levels
	Natural environment, heritage and landscape	4	Localised impact only	3	Localised impact. Loss of woodland	2	Significant negative impacts along the route will require mitigation	2	Significant negative impacts along the route will require mitigation	3	Significant negative impacts along the route will require mitigation, but opportunities to route along existing strategic utility corridors to minimise impacts on sensitive environments	3	Significant negative impacts along the route will require mitigation, but opportunities to route along existing strategic utility corridors to minimise impacts on sensitive environments	2	Significant negative impacts along the route will require mitigation	2	Significant negative impacts along the route will require mitigation
	Streetscape and urban environment	4	Limited scope for streetscape and urban realm improvements	4	Limited scope for streetscape and urban realm improvements	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape	5	Likely impact on existing environment but opportunities through scheme to deliver improved streetscape
Well Being	Physical activity, injury/deaths, enabling people to enjoy range of services etc., crime, terrorism, severance,	4	Very localised intervention with limited impact on Well Being	4	Very localised intervention with limited impact on Well Being	4	Decreased severence in north of Ipswich, unlikely to affect level of physical activity or number of injuries, deaths or crime. Improves access to a range of goods, people, services and places.	4	Decreased severence in north of Ipswich, unlikely to affect level of physical activity or number of injuries, deaths or crime. Improves access to a range of goods, people, services and places.	7	Decreased severence in north of Ipswich, and improved connectivity for NMU increasing levels of physical activity. Improves access to a range of goods, people, services and places.	7	Decreased severence in north of Ipswich, and imoroved connectivity for NMU increasing levels of physical activity. Improves access to a range of goods, people, services and places.	7	Decreased severence in north of Ipswich, and imoroved connectivity for NMU closer to large populations increasing levels of physical activity. Improves access to a range of goods, people, services and places.	7	Decreased severence in north of Ipswich, and imoroved connectivity for NMU closer to large populations increasing levels of physical activity. Improves access to a range of goods, people, services and places.
Value for Money - expected BCR		5	Medium	5	Medium	5	Medium	5	Medium	6	High	6	High	6	High	6	High
MANAGERIAL																	
Implementation timetable		5	Medium	5	Medium	6	Medium	6	Medium	6	Medium	6	Medium	6	Medium	6	Medium
Public acceptability		5	Localised public acceptability concerns and potential wider concerns over impacts	5	Localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts	4	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts
Practical feasibility		5	Feasible subject to addressing typical constraints	5	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints	4	Feasible subject to addressing typical constraints
Quality of evidence	From modelling and evidence from similar options elsewhere	5	Modelling evidence that a need to address key network congestion	5	Modelling evidence that a need to address key network congestion	5	Initial modelling evidence indicates need to address strategic traffic and deliver growth	5	Initial modelling evidence indicates need to address strategic traffic and deliver growth	5	Initial modelling evidence indicates need to address strategic traffic and deliver growth	5	Initial modelling evidence indicates need to address strategic traffic and deliver growth	5	Feasible subject to addressing typical constraints	5	Initial modelling evidence indicates need to address strategic traffic and deliver growth
Key Risks		4	Cost, alignment (route constraints, eg Environment)	4	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)	3	Cost, alignment (route constraints, eg Environment)
FINANCIAL																	
Affordability		5	Fit with Highways England RIS	5	Fit with Highways England RIS	3	Major scheme and local funding	3	Major scheme and local funding	3	Major scheme and local funding	3	Major scheme and local funding	3	Major scheme and local funding	3	Major scheme and local funding
Capital Cost		4	Medium	4	Medium	3	High	3	High	3	High	3	High	3	High	3	High
Revenue cost		5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance	5	Ongoing maintenance
Overall cost risk		3	Will require additional governance and risk management	3	Will require additional governance and risk management	2	Will require additional governance and risk management	2	Will require additional governance and risk management	3	Will require additional governance and risk management	3	Will require additional governance and risk management	3	Will require additional governance and risk management	3	Will require additional governance and risk management
COMMERCIAL																	
Flexibility of Option		3	Limited flexibility as junction exists	3	Limited flexibility as junctions exist	3	Route options within a broad corridor	3	Route options within a broad corridor	3	Route options within a broad corridor	3	Route options within a broad corridor	3	Route options within a broad corridor	3	Route options within a broad corridor
Funding source		5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	6	DfT/Local Govt/S106	5	DfT/Local Govt/S106
Income generated		4	No	4	No	4	No	4	No	4	No	4	No	4	No	4	No

Option		24		25		26		27		28		29		30		31		32	
		New River Orwell Bridge Crossing		Tunnel of River Orwell		Smart Parking		Integrated Smart Public Transport		Wide scale traffic signal upgrades		Improved Public Transport RTPI		Car Parking levy		Congestion charging in Ipswich centre		Do Nothing	
Description		Construction of a new A14/A12 bridge crossing of the River Orwell adjacent to the existing bridge		Construction of a new A14/A12 tunnel crossing of the River Orwell adjacent to the existing bridge		Parking that directs users to free parking spaces to avoid hunting trips		Integrated ticketing systems between operators and public transport modes		Upgrade to UTC signal control network		Information management on service and journey times		Car Parking levy in Ipswich centre on employment premises		Congestion charge cordon around town centre core		No mitigation to accommodate forecast traffic grwoth.	
		Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description	Score	Description
STRATEGIC																			
Fit with wider transport and Government objectives	Fit with EU legislation, complement EU proposals, qualify for EU funding, or contravene EU rules? Any other policies/proposals addressing the same issues? Do proposals conflict with or enhance other pre-existing proposals? Any negative impact on other modes of transport? Makes better use of existing infrastructure or 'does more with less'? Impact on other Govt policies besides transport? Fit with other network/regional/local/modal objectives not covered above?	6	Main fit is with Highways England policies for SRN resilience and RIS. Less good fit with wider transport policies or measures	6	Main fit is with Highways England policies for SRN resilience and RIS. Less good fit with wider transport policies or measures	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Good fit with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Fits with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	6	Fits with Government Objectives and could complement other transport measures. Could only facilitate significant growth as part of a wider package	2	Will not meet objectives
Degree of consensus over outcomes	What consultation has taken place?	2	Possible concern that won't address the wider issues around the bridge	2	Possible concern that won't address the wider issues around the bridge	2	Relates to Ipswich future strategy	2	Relates to Ipswich future strategy	2	Relates to Ipswich future strategy	2	Relates to Ipswich future strategy	1	No consensus on likely outcomes and uncertainties over political view	1	No consensus on likely outcomes and uncertainties over political view	2	Some consultation has taken place with the Local Authority, with a high level of agreement that an intervention is required
Key Uncertainties		1	Significant engineering challenges. Not clear on Highways England support for such a scheme	1	Significant engineering challenges. Not clear on Highways England support for such a scheme	2	Not clear how fits with wider strategy. Needs a coordinated approach to the Ipswich Transport Strategy	3	Not clear how fits with wider strategy. Needs a coordinated approach to the Ipswich Transport Strategy. Needs further clarification on operations and Bus Operator acceptance	3	Not clear how fits with wider strategy. Needs a coordinated approach to the Ipswich Transport Strategy	3	Not clear how fits with wider strategy. Needs a coordinated approach to the Ipswich Transport Strategy	1	Level of support and impact on economic strategy for jobs	1	Level of support and impact on economic strategy for jobs	4	Not applicable
ECONOMIC																			
Economic Growth		5	Improves conectivity between west and east, particularly if new bridge provides more resilience during poor weather events. Thus, improves reliability for users and provides a wider benefit, encouraging the delivery of housing.	5	Improves conectivity between west and east, particularly if new bridge provides more resilience during poor weather events. Thus, improves reliability for users and provides a wider benefit, encouraging the delivery of housing.	4	Could promote economic growth when combined with a wider package of complementary measures	4	Could promote economic growth when combined with a wider package of complementary measures	4	Could promote economic growth when combined with a wider package of complementary measures	4	Could promote economic growth when combined with a wider package of complementary measures	5	Could promote economic growth when combined with a wider package of complementary measures. Such measures would be essential to ensure businesses continue to be viable and the area remains attractive for jobs and investment	5	Could promote economic growth when combined with a wider package of complementary measures. Such measures would be essential to ensure businesses continue to be viable and the area remains attractive for jobs and investment	1	Will constrain economic growth as congestion increases and accessibility across transport networks and all modes of travel reduces. This will create a barrier for journeys between homes and jobs which will result in reduced economic growth
Carbon Emissions		3	Decreased journey lengths when bridge would have previously been closed and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	3	Decreased journey lengths when bridge would have previously been closed and reduced congestion help to reduce carbon emissions. However, the more attractive route may increase number of trips. Significant construction work is required.	4	Reduced vehicle mileage will reduce carbon emmissions but could make car travel more attractive	5	Increased attractiveness of bus could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	5	Tackling congestion could reduce carbon emissions but could make car travel more attractive unless coordinated with all modes, eg bus and cycle	5	Increased attractiveness of bus could cause mode shift and reduce total number of vehicular journeys, hence reduce carbon emissions	5	If levy passed to employees it could reduce car travel if alternative modes available. This could reduce carbon emissions	5	When combined with a package of sustainable measures this could have a significant impact on reducing carbon emissions in the centre of Ipswich	1	Ongoing congestion will increase carbon emissions
Socio-distributional impacts and the regions		4	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	4	Balanced impact on SDIs, some positive and some negative. Will stimulate economic growth, regeneration and increase the region's strength.	4	Good Social and Distributional Impact within town centre; limited benefit to wider region	4	Good Social and Distributional Impact within town centre; limited benefit to wider region	4	Good Social and Distributional Impact within town centre; limited benefit to wider region	4	Good Social and Distributional Impact within town centre; limited benefit to wider region	3	While it could provide regional economic benefits there would be potential negative economic impacts across different social groups	3	While it could provide regional economic benefits there would be potential negative economic impacts across different social groups	1	Will not address future socio-economic and demographic changes from growth
Local Environment	Air Quality (AQMAs)	3	Will reduce as traffic re-assigns but may create issues around crossing as a focus point for traffic	3	Will reduce as traffic re-assigns but may create issues around crossing as a focus point for traffic	5	Likely to reduce hunting trips and congestion and associated air quality issues	5	Likely to reduce congestion and associated air quality issues	5	Likely to reduce congestion and associated air quality issues	5	Likely to reduce congestion and associated air quality issues	4	Likely to reduce congestion and associated air quality issues in town centre but trips could be reallocated to peripheral areas	4	Likely to reduce congestion and associated air quality issues in town centre but trips could be reallocated to peripheral areas	2	increased traffic and congestion will have a negative effect
	Noise	3	Will reduce as traffic re-assigns but may create issues around crossing as a focus point for traffic	3	Will reduce as traffic re-assigns but may create issues around crossing as a focus point for traffic	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	4	Could reduce traffic on certain routes but might not be significant enough to reduce noise levels	2	increased traffic and congestion will have a negative effect
	Natural environment, heritage and landscape	2	Significant environmental and visual impact	2	Significant environmental impact, but tunnel will mitigate for some impacts	4	Negilible Impact	4	Negilible Impact	4	Negilible Impact	4	Negilible Impact	4	Negilible Impact	4	Negilible Impact	3	Natural environment could be adversely effected by increased congestion
	Streetscape and urban environment	4	Limited impact	4	Limited impact	5	Opportunities to improve public realm through improved access within the town centre	4	Limited opportunities to improve public realm	4	Limited opportunities to improve public realm	4	Limited opportunities to improve public realm	5	Opportunities to improve public realm through improved access within the town centre	5	Opportunities to improve public realm through improved access within the town centre	2	increased traffic and congestion will have a negative effect
Well Being	Physical activity, injury/deaths, enabling people to enjoy range of services etc., crime, terrorism, severance,	5	Will reduec severance from River Orwell and will improve access to a range of services	4	Limited impact on well being	5	Will increase access for people to enjoy a range of services	5	Will increase access for people to enjoy a range of services	5	Will increase access for people to enjoy a range of services	5	Will increase access for people to enjoy a range of services	3	Could reduce accessibility unless introduced as part of a wider package	3	Could reduce accessibility unless introduced as part of a wider package	1	Well being may be adversely affected due to congestion and reduced access by all modes
Value for Money - expected BCR		1	Very Low	1	Very Low	4	Medium	4	Medium	4	Medium	4	Medium	5	Medium	6	High	1	N/a
MANAGERIAL																			
Implementation timetable		2	Longer	2	Longer	4	Short - Medium	4	Short - Medium	5	Short	5	Short	3	Medium - Longer	3	Medium - Longer	4	n/a
Public acceptability		5	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts and not providing an alternative route north of Ipswich	3	While support for addressing regional traffic congestion (lack of A14 resilence and town centre delays) there may be localised public acceptability concerns and potential wider concerns over impacts and not providing an alternative route north of Ipswich	5	Likely to be acceptable to public if improves access to town centre	5	Likely to be acceptable to public if improves access to town centre	5	Overall likely to be acceptable but there may be some localised concerns	5	Likely to be acceptable to public if improves access to town centre	2	Very likely to raise concerns from public	1	Very likely to cause significant concerns over acceptability to all social aspects	2	Do nothing is unlikely to be acceptable
Practical feasibility		3	Feasible subject to addressing significant design and construction challenges	2	Feasible subject to addressing significant design and construction challenges	5	Requires joined up technology	5	Requires joined up technology	5	Established engineering approach	5	Established systems across UK	5	Feasible process and able to be implemented	5	Feasibile and tested technology	2	Doing nothing is unlikely to be a practical solution due to increases in traffic congestion
Quality of evidence	From modelling and evidence from similar options elsewhere	3	Limited evidence to suggest option will address A14 challenges	2	Limited evidence to suggest option will address A14 challenges	4	Limited evidence at this stage	4	Limited evidence at this stage	4	Established modelling of town centre traffic congestion	4	Limited evidence at this stage	2	Evidence that provides a revenue workstream but less clear on mode shift	2	No specific evidence for Ipswich but established approach to managing congestion	4	n/a
Key Risks		2	Significant cost, alignment (route constraints, eg Environment)	1	Significant cost and engineering challenges, alignment (route constraints, eg Environment)	5	Technology and operations	5	Joint bus operations, technology and revenue	5	Network capacity, balancing conflict between modes	5	Joint bus operations, technology and revenue	2	Political and public acceptability	1	Political and public accessibility	4	n/a
FINANCIAL																			
Affordability		1	Nationally significant project funding	1	Nationally significant project funding	5	Affordable in context of local funding	5	Affordable in context of local funding	5	Affordable in context of local funding	5	Affordable in context of local funding	5	Would require a wider package of measures	5	Would require a wider package of measures	2	Significant economic impacts of do-nothing
Capital Cost		2	Very High	1	Very High	6	Low	6	Low	4	Medium	5	Low	3	Medium/High implimentation and administration costs	3	Medium/High implimentation and administration costs	4	None
Revenue cost		1	Significant ongoing maintenance costs	1	Significant ongoing maintenance costs	4	Revenue cost required for operations	4	Revenue cost required for operations	4	Ongoing Maintenance	4	Should increase patronage and related fare revenues	6	Generates revenue for transport investment	7	Generates revenue for transport investment	2	Inefficient transport networks could impact on revenue
Overall cost risk		1	High levels of additional cost risk requiring additional joined up governance	1	High levels of additional cost risk requiring additional joined up governance	5	Joined up local governance and risk management	5	Joined up local governance and risk management	5	Manageable within normal Local Authority governance and risk management	5	Manageable within normal Local Authority governance and risk management	3	Higher levels of additional cost risk requiring additional joined up governance	2	High levels of additional cost risk requiring additional joined up governance	4	Low
COMMERCIAL																			
Flexibility of Option		3	Limited crossing options given local constraints	3	Limited crossing options given local constraints	5	Flexibility of technology options	5	Flexibility within the constraints of operations and legislation	5	Flexibility over locations and scale of upgrades	5	Flexibility within the constraints of operations	3	Limited flexibility. Relates to levy area, scale of levy	3	Limited flexibility. Relates to congestion zone/area, timing and amount of charge	1	None
Funding source		2	DfT/Local Govt/S106	2	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	5	DfT/Local Govt/S106	1	N/A
Income generated		4	No	4	No	4	No	6	Yes ticket revenue	4	No	4	No	6	Yes	7	Yes	1	No

Appendix B

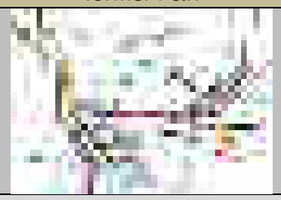
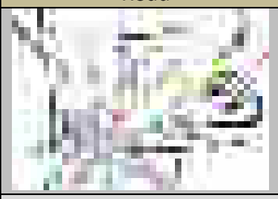
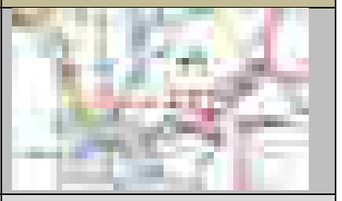
ENVIRONMENTAL ASSESSMENT

Environmental Option Appraisal for Ipswich Northern Route

Date: 26/03/2018

Version: Final Rev 1.0

Table 1 High level environmental assessment of the 6 bus options

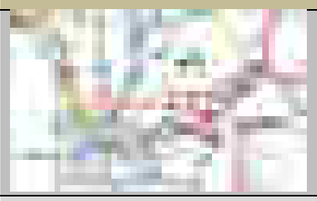
	Bus					
	Radial Route - Norwich Road - former P&R	Radial Route - Henley Road	Radial Route - Westerfield Road	Radial Route - Tuddenham Road	Radial Route - Kesgrave Road	Bus Rapid Transit Orbit
						
Agriculture, Forestry and vegetation Management	**<u>Existing Environment:</u>** The proposed option comprises improvements to existing road infrastructure and therefore is not expected to have any adverse effect on agriculture, forestry and vegetation. The Chestnuts is a park on Norwich Road, just north of the roundabout with Valley Road and Chevallier St. Broomhill Park is approx. 300m from the roundabout. The River Gipping is approx. 500m from the roundabout.	The proposed option comprises widening of existing road infrastructure with loss of verge hedging and tree planting, and therefore expected to have a moderate adverse effect on agriculture, forestry and vegetation. There is a wide expanse of Grade 3 agricultural land to the east of Henley road north of the junction with The Grove. There is a tributary from the River Gipping that crosses Henley road just south of the junction with Lower Road.	The proposed option comprises widening of existing road infrastructure with loss of verge hedging and tree planting, and therefore expected to have a moderate adverse effect on agriculture, forestry and vegetation. There is a wide expanse of Grade 2 and 3 agricultural land to the east and west of Westerfield road 100m north of the junction with Chelsworth Avenue. There is a tributary from the River Gipping that crosses Westerfield road just south of the junction with Lower Road/ Church Lane.	The proposed option comprises widening of existing road infrastructure with loss of verge hedging and tree planting, and therefore expected to have a moderate adverse effect on agriculture, forestry and vegetation. There is a wide expanse of Grade 2 and 3 agricultural land to the east and west of Tuddenham road north of where Tuddenham road crosses the railway line. There are a number of priority habitats east of Tuddenham St Martin.	The proposed option comprises widening of existing road infrastructure with loss of verge hedging and tree planting, and therefore expected to have a moderate adverse effect on agriculture, forestry and vegetation. There is an area of lowland healthland (Rushmere Golf Course) to the east of Ipswich Hospital. There is an extensive area of deciduous woodland west of Martlesham comprising Martlesham Plantation and Kesgrave wood. Sink Valley Site of Special Scientific Interest (SSSI) lies north and west of Kesgrave Wood. There is a tributary from the River Deben that crosses Hall road, west of the A12/ Main Road (A1214) roundabout. The River Deben and Suffolk Coast & Heaths Area of Outstanding Natural Beauty (AONB) are approx. I000m east of the A12/main road (A1214) roundabout.	The proposed option lies predominantly within an area of designated Grade 3 and 4 Agricultural land. A small proportion of the route lies on Coastal and floodplain grazing marsh (environmentally sensitive area). There are two SSSIs located south of Great Blakenham - Great Blakenham SSSI and Little Blakenham SSSI. There are a number of priority habitats north of the railway line (Ipswich – Woodbridge) between Tuddenham St Martin and Woodbridge. There are also a number of priority habitats north of Martleham. There is a tributary from the River Deben that crosses Hall road, west of the A12/ Main Road (A1214) roundabout. The River Deben and Suffolk Coast & Heaths AONB are approx. I000m east of the A12/main road (A1214) roundabout.
	No greenbelt, biosphere reserves, National Nature Reserves, or National Parks have been identified within the Study Area or within 10km of the Study Area.					
	<u>Construction:</u>					

	Bus					
	Radial Route - Norwich Road - former P&R	Radial Route - Henley Road	Radial Route - Westerfield Road	Radial Route - Tuddenham Road	Radial Route - Kesgrave Road	Bus Rapid Transit Orbit
	Land-take, change of land use (either temporary or permanent) along the proposed route. The design will be refined to avoid potential effects on designated sites. Specific mitigation measures will be developed to minimise these impacts. NB: Orbital Bus Rapid Transit Route - A potential direct adverse impact has been identified on a SSSI site. The design will be refined to avoid passing through the SSSI. **Operation:** Long term residual effects from the construction phase and reinstatement of the construction sites.					
Air Quality	**Existing Environment:** None of these options are located within an AQMA. The AQMAs located within the Study Area are presented below. The **Ipswich AQMA No. 1.** encompasses the land in and around the junction of Norwich Road, Chevallier Street /Valley Road/ Chevallier Street/Waterloo Road. The **Ipswich AQMA No. 2.** Is located at the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. **Ipswich AQMA No. 3.** Is an area following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, extending along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street. **Ipswich AQMA No. 3.** includes the Bramford Road/Yarmouth Road/Chevallier Street junction and part of Chevallier Street. **Woodbridge AQMA No. 1** includes the properties on the western side of the Throughfare and Melton Hill arm of the junction with Lime Kiln Quay Road.					
	Construction: Potential adverse impacts from dust and exhaust emissions on human and ecological receptors located within close proximity to the worksites. However, these can be minimised/avoided with the implementation of the CEMP. **Operation:** Increase in air emission along the new constructed route and at the junctions with A12 and A14.					
Buildings, Structures and Historic Associations	**Existing Environment:** There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected by Norwich Road. There are no scheduled monuments within the option footprint.	There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected Henley Road. There are no scheduled monuments within the option footprint.	There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected by Westerfield Road. There are no scheduled monuments within the option footprint.	There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected by Tuddenham Road. There are no scheduled monuments within the option footprint.	There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected by Kesgrave Road. There are 6no. scheduled monuments in the option footprint. 3no. in The Sinks Valley SSSI and 3no. in Ipswich Heath SSSI.	There are a number of listed buildings along the proposed BRT route corridor. There are 6no. scheduled monuments in the option footprint. 3no. in The Sinks Valley SSSI and 3no. in Ipswich Heath SSSI.
	The Study Area may encompass other below-ground features; however these are not fully known yet and cannot be assessed.					
	Construction: Potential temporary and permanent significant effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during construction. **Operation:** Potential permanent significant effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during operation.					
Contaminated Land	**Existing Environment:** There are a number of landfills located along the A14 and south east from Kesgrave. • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. • South from Ipswich: Ski Centre. There is no closed mining waste sites within this option corridor.					
	Construction: Potential for ground gas and excavated material contamination risk as a result of construction works (including excavation, road/river crossing works, etc.). Any made ground would be considered as a potential source of contamination. Given current land-use is largely agricultural, the potential for encountering contamination is limited. **Operation:** None.					

<table>
<tr><th></th><th colspan="6">Bus</th></tr>
<tr><th></th><th>Radial Route - Norwich Road - former P&R</th><th>Radial Route - Henley Road</th><th>Radial Route - Westerfield Road</th><th>Radial Route - Tuddenham Road</th><th>Radial Route - Kesgrave Road</th><th>Bus Rapid Transit Orbit</th></tr>
<tr><td rowspan="3">Ecology</td><td colspan="6"><u>Existing Environment:</u></td></tr>
<tr><td colspan="3">There are no SSSI or Special Protection Areas (SPA) within the option footprint.</td><td colspan="3" rowspan="2">There are 2no. SSSI within the footprint of the route options. There are no SPAwithin the options footprint. There are a number of deciduous woodland priority habitats –adjacent to Kesgrave Road. There are 4no. areas of ancient woodland – one south of Playford (Lux Wood) and one just west of Woodbridge near the B1079 (Blunt's Wood) one east of Martlesham (Lumber Wood), and one north of Playford in Culpho (Culpho Wood). There are no protected species but notable species within the option footprint include the Turtle Dove and Yellow Wagtail. Priority species for CS targeting include the Curlew and Lapwing.</td></tr>
<tr><td>There is a Local Nature Reserve (LNR) 200m to the East of the site – The Dales Open Space. There are a number of deciduous woodland priority habitats – the closest being 200m from the site. Within the option footprint there are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove.</td><td>There is a LNR 100m to the west of the site – The Dales Open Space. There are a number of deciduous woodland priority habitats – the closest being adjacent to Henley Road, just south of Thurleston Lane. This area also comprises a Woodpasture and Parkland BAP Priority Habitat. Within the option footprint there are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove.</td><td>There are a number of deciduous woodland priority habitats –adjacent to Westerfield Road. Within the option footprint there are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove.</td><td>There are a number of deciduous woodland priority habitats –adjacent to Tuddenham Road. Within the option footprint there are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove and Yellow Wagtail.</td></tr>
<tr><td colspan="6"><u>Construction:</u>
Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. Construction works could also result in removal of some low grade scrub vegetation, disturbance and minimal loss of habitat.
<u>Operation:</u>
Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. The ecological receptors have not been fully identified yet.</td></tr>
<tr><td rowspan="2">Landscape, Townscape and Visual</td><td colspan="6"><u>Existing Environment:</u>
The main land cover is hardstanding. The area directly adjacent to the proposed route is predominantly residential. Due to the nature of the improvement works there will be negligible impact to the permanent landscape, townscape and visual of the area.</td></tr>
<tr><td colspan="6"><u>Construction and Operation:</u>
Potential significant effects on landscape character (e.g. removal of vegetation and trees) and by the construction of permanent infrastructure (e.g. roads and junctions). There may be a requirement to install temporary compound/ parking/ storage facilities during construction on currently undeveloped land which may involve the removal of existing vegetation which will likely have a negative temporary visual impact on nearby sensitive receptors.
Potential significant effects on people who are particularly sensitive to changes in views and visual amenity. A number of sensitive receptors i.e. residential properties, farms, parks etc. along the proposed route will be impacted with regard to visual amenity.</td></tr>
<tr><td rowspan="2">Nuisance, Noise, Vibration and Light</td><td colspan="6"><u>Existing Environment:</u>
Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England. There are a number of residential and commercial receptors scattered along the proposed routes which could be exposed to noise, vibration and light nuisance during construction and operation.</td></tr>
<tr><td colspan="6"><u>Construction:</u>
Significant increase in noise and vibration in comparison to the baseline as a result of construction activities which would be conducted over a long period of time (including weekends and potentially outside of normal hours i.e. 7am to 7pm). There will be a requirement for site compounds, delivery of vehicles, materials and equipment
<u>Operation:</u>
Significant increase in noise and vibration in comparison to the baseline as a result of new traffic running through the proposed option.</td></tr>
<tr><td rowspan="2">Traffic Generation and Access</td><td colspan="5"><u>Existing Environment:</u>
The proposed options will generate construction work traffic via the residential areas either side of the route corridor. As a result there is likely to be a short term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.</td><td>The proposed option will generate construction work traffic via the residential areas of Gt Blakenham and Martlesham.</td></tr>
<tr><td colspan="6"><u>Construction:</u>
Potential short term increase in traffic on the local road network (including weekends) due to construction work traffic via the countryside roads and the main roads connecting with Ipswich (A12 and A14). There may be a requirement for closures and diversions of roads and other access (e.g. pedestrian access, Public Right of Way) during construction.</td></tr>
</table>

	Bus					
	Radial Route - Norwich Road - former P&R	Radial Route - Henley Road	Radial Route - Westerfield Road	Radial Route - Tuddenham Road	Radial Route - Kesgrave Road	Bus Rapid Transit Orbit
	Operation: Once operational, the new route will change the traffic on the regional and local road network. Some of the existing traffic flow may be diverted during the construction works. As a result some of the roads will experience a long term increase in traffic. Other sections of the roads in the network may experience a long term decrease in traffic. It will provide capacity to enable growth and improve the town's sustainable modes of transport.					
Water Resources, Pollution and Drainage	**Existing Environment:** There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The options lies predominantly within Flood Zone 1 – which indicates low probability of flooding. *NB: The Bus Rapid Transit Orbit route passes over tributaries of the River Fynn and River Gipping which have Flood Zone 3 status therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation.* These options lies within a Drinking Water Protected Area and a surface water and groundwater Nitrate Vulnerable Zone.					
	Construction: The improvement works and the new Orbital bus route may have permanent and/or temporary adverse effects on surface water quality. The construction works may also expose construction workers and/or infrastructure to flood risk as some areas of the route are located within area at risk of flooding (Flood zone 3). **Operation:** Potential adverse effects during operation on surface water quality (e.g. increased suspended sediment during heavy rainfall, accidental release of contaminants into surface waters, etc.). Subsequent adverse effects on soil quality and groundwater resources.					
Materials and Waste Management	**Existing Environment:** There are a number of landfills located along the A14 and south east from Kesgrave. The landfills identified within the Study Area include: • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. • South from Ipswich: Ski Centre.					
	Construction: Details are not yet available to understand the materials requirements. It is anticipated that potential waste and soil arisings will be produced during the construction phase. However, final conclusions cannot be drawn without access to further information. A Site Waste Management Plan will be prepared to mitigate any potential effects. **Operation:** None.					

Table 2 High level environmental assessment of the 6 rail options

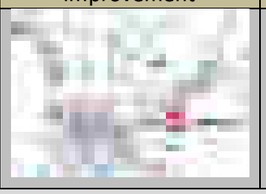
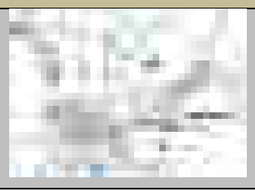
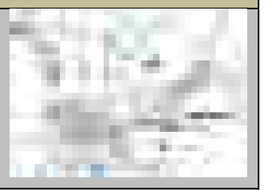
	Rail					
	LRT Orbital	Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations
						
Agriculture, Forestry and vegetation Management	**<u>Existing Environment:</u>** The proposed option lies predominantly within an area of designated Grade 3 and 4 agricultural land. A small proportion of the route lies on coastal and floodplain grazing marsh (environmentally sensitive area). There are two SSSIs located south of Great Blakenham - Great Blakenham SSSI and Little Blakenham SSSI. There are a number of priority habitats north of the railway line (Ipswich – Woodbridge) between Tuddenham St Martin and Woodbridge. There are a number of priority habitats north of Martleham.	The proposed improvements lie within Network Rail land. Directly to the south of Ipswich station is the residential streets of Ancaster Road, Gippeswyk Avenue, and Belstead Road. These are adjacent to the railway sidings. There is an area of dense woodland between the railway sidings and Ancaster Road. To the west of Ancaster Road is Gippeswyk Park. To the north of the station is the River Orwell. There are a number of priority habitats within the option footprint, including mudflats in the River Orwell to the north of the station, and deciduous woodland to the south of the station – adjacent to the sidings. The closest SSSI (Stoke Tunnel Cutting) is 2500m southeast of the proposed site.	The proposed option lies predominantly within industrial and residential land, with small pockets of woodland and grade 3 agricultural land. The River Gipping and A14 lie to the east of the proposed site. There are two SSSIs located south of Great Blakenham - Great Blakenham SSSI and Little Blakenham SSSI. There are a number of priority habitats within the option footprint.	The proposed option lies predominantly within industrial and grade 3 agricultural land. The River Flynn and River Lark lie to the northwest of the proposed new station site flowing south into Martlesham Creek and the River Deben which are located southeast and east respectively. The A12 lies to the east of the proposed site. Ferry Cliff Sutton SSSI is located SE of the proposed site. It is a Ramsar site and a Special Protected Area (SPA). There are a number of priority habitats within the option footprint.	The proposed improvements lie within Network Rail land. Directly to the south of Ipswich station is the residential streets of Ancaster Road, Gippeswyk Avenue, and Belstead Road – All adjacent to the railway sidings. There is an area of dense woodland between the railway sidings and Ancaster Road. To the west of Ancaster Road is Gippeswyk Park. To the north of the station is the River Orwell. There are a number of priority habitats within the option footprint, including mudflats in the River Orwell to the north of the station, and deciduous woodland to the south of the station – adjacent to the sidings. The closest SSSI (Stoke Tunnel Cutting) is 2500m southeast of the proposed site.	The proposed improvements lie within Network Rail land. North of the station along Westerfield road there are a number of residential properties to the west, and industrial units to the east. South of the station- along Westerfield Road there are a number of farms and the Railway Inn public house. The wider footprint is grade 3 agricultural land- predominantly arable and pasture. There are no SSSIs within the option footprint.
	No greenbelt, biosphere reserves, National Nature Reserves, or National Parks have been identified within the Study Area or within 10km of the Study Area.					
	<u>Construction:</u> Land-take (non- rail options), change of land use and potential loss of agricultural land (either temporary or permanent) along the proposed route. The design will be refined to avoid potential effects on designated sites. Specific mitigation measures will be developed to minimise these impacts. *NB: LRT Orbital route - A potential direct adverse impact has been identified on a SSSI site. The design will be refined to avoid passing through the SSSI.* **<u>Operation:</u>** Long term residual effects from the construction phase and reinstatement of the construction sites.					
Air Quality	**<u>Existing Environment:</u>** None of these options are located within an AQMA. The AQMAs located within the Study Area are presented below. The **Ipswich AQMA No. 1.** encompasses the land in and around the junction of Norwich Road, Chevallier Street /Valley Road/ Chevallier Street/Waterloo Road. The **Ipswich AQMA No. 2.** Is located at the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. **Ipswich AQMA No. 3.** Is an area following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, extending along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street.					

	Rail					
	LRT Orbital	Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations
	Ipswich AQMA No. 3. includes the Bramford Road/Yarmouth Road/Chevallier Street junction and part of Chevallier Street. **Woodbridge AQMA No. 1** includes the properties on the western side of the Throughfare and Melton Hill arm of the junction with Lime Kiln Quay Road.					
	Construction: Potential adverse impacts from dust and exhaust emissions on human and ecological receptors located within close proximity to the worksites. However, these can be minimised/avoided with the implementation of the CEMP. **Operation:** Increase in air emission along the new constructed route and at the junctions with A12 and A14.					
Buildings, Structures and Historic Associations	**Existing Environment:** There are a number of listed buildings along the proposed route corridor. There are 6no. scheduled monuments in the option footprint. 3no. in The Sinks Valley SSSI and 3no. in Ipswich Heath SSSI. The Study Area may encompass other below-ground features; however these are not fully known yet and cannot be assessed.					
	Construction: Potential temporary and permanent adverse effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during construction. **Operation:** Potential permanent adverse effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during operation.					
Contaminated Land	**Existing Environment:** There are a number of landfills located along the A14 and south east from Kesgrave. • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. • South from Ipswich: Ski Centre. There is no closed mining waste sites within this option corridor.					
	Construction: Potential for ground gas and excavated material contamination risk as a result of construction works (including excavation, road/river crossing works, etc.). Any made ground would be considered as a potential source of contamination. Given current land-use is largely agricultural, the potential for encountering contamination is limited. **Operation:** None.					
Ecology	**Existing Environment:** There are 2no. SSSI within the option footprint. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats – adjacent to Kesgrave Road. There are 4no. areas of ancient woodland – one south of Playford (Lux Wood) and one just west of Woodbridge near the B1079 (Blunt's Wood) and one east of Martlesham (Lumber Wood), and one north of Playford in Culpho (Culpho Wood). There are no protected species but notable species within the option footprint include the Turtle Dove and Yellow	There is a SSSI in the option vicinity – Stoke Tunnel Cutting, approx. 2600m SE from the site. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats. There are no protected species or notable species within the option footprint.	There are 2no. SSSI in the option vicinity. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats. There are no protected species but notable species within the option footprint include the Turtle Dove. Priority species for CS targeting include the Lapwing.	There are 2no. SSSI within the option footprint. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats –adjacent to Kesgrave Road. There are 4no. areas of ancient woodland – one south of Playford (Lux Wood) and one just west of Woodbridge near the B1079 (Blunt's Wood) and one east of Martlesham (Lumber Wood), and one north of Playford in Culpho (Culpho Wood). There are no protected species but notable species within the option footprint include	There is a SSSI in the option vicinity – Stoke Tunnel Cutting, approx. 2600m SE from the site. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats. There are no protected species or notable species within the option footprint.	There are no SSSIs and SPA within the option footprint. There are a number of deciduous woodland priority habitats. There are no protected species but notable species within the option footprint include the Turtle Dove and Lapwing, and Grey Partridge.

	Rail					
	LRT Orbital	Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations
	Wagtail. Priority species for CS targeting include the Curlew and Lapwing.			the Turtle Dove and Yellow Wagtail. Priority species for CS targeting include the Curlew and Lapwing.		
	Construction: Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. **Operation:** Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage, increased rail service frequency and increased human disturbance. The ecological receptors have not been fully identified yet.					
Landscape, Townscape and Visual	**Existing Environment:**					
	The main land cover is agricultural land – predominantly arable and pasture. The proposed LRT route comprises arable farmland, vegetation and woodland.	The main land cover is railway land.	The main land cover is industrial and residential land.	The main land cover is industrial and agricultural land – predominantly arable and pasture.	The main land cover is railway land.	The main land cover is NR railway land currently used as a NR compound. However, it is likely that this in addition to the adjacent agricultural land will be required for the station car park and cycle parking.
	Construction and Operation: Potential adverse effects on landscape character (e.g. removal of vegetation and trees) and by the construction of permanent infrastructure (e.g. roads and junctions). There may be a requirement to install temporary compound/ parking/ storage facilities during construction on currently undeveloped land which may involve the removal of existing vegetation which will likely have a negative temporary visual impact on nearby sensitive receptors. Potential adverse effects on people who are particularly sensitive to changes in views and visual amenity. A number of sensitive receptors i.e. residential properties, farms, parks etc. along the proposed route will be impacted with regard to visual amenity.					
Nuisance, Noise, Vibration and Light	**Existing environment:** Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England. There are a number of residential and commercial receptors scattered along the proposed routes which could be exposed to noise, vibration and light nuisance during construction and operation.					
	Construction: Significant increase in noise and vibration in comparison to the baseline as a result of construction activities which would be conducted over a long period of time (including weekends and potentially outside of normal hours i.e. 7am to 7pm). There will be a requirement for site compounds, delivery of vehicles, materials and equipment **Operation:** Significant increase in noise and vibration in comparison to the baseline as a result of new traffic running through the proposed option and/or increased of rail service frequency.					
Traffic Generation and Access	**Existing Environment:** The Study Area encompasses a road network which include major national roads (A12 and A14), regional roads and local roads. The current local and strategic highway network of Ipswich suffers from frequent and severe delays. The congestion on the A14 has also an impact on strategic areas.					
	The proposed option will generate construction work traffic via the residential areas of Gt Blakenham and Martlesham.	The proposed option may generate an increase in localised station user traffic via Burrell Road (B1075).	The proposed option will generate construction work traffic via the residential areas of Gt Blakenham. As a result there is likely to be an increase in traffic on the local road network (station road, Gipping Road, Bramford Road)	The proposed option will generate construction work traffic via the residential areas of Martlesham. As a result there is likely to be a medium term increase in traffic on the local road network (Top Street, Ipswich Road, Sandy lane)	The proposed option will generate construction work traffic via the residential areas of Martlesham. As a result there is likely to be an increase in traffic on the local road network (Ancaster road, Burrell Road, Belstead Road, Willoughby road)	The proposed option will generate construction work traffic via the residential areas of Martlesham. As a result there is likely to be an increase in traffic on the local road network (Westerfield Road)
	Construction: Potential short term increase in traffic on the local road network (including weekends) due to construction work traffic via the countryside roads and the main roads connecting with Ipswich (A12 and A14). There may be a requirement for closures and diversions of roads and other access (e.g. pedestrian access, Public Right of Way) during construction.					

	Rail					
	LRT Orbital	Increased Frequency of service	New rail station at Gt Blakenham	New rail station at Martlesham	Capacity improvements on Felixstowe branch line	Improved Connectivity at existing stations
	Operation: Once operational, the proposed option may reduce traffic on the road network through the increase of rail service frequency and/or capacity. The new parkway may change the configuration of the traffic on the local network nearby. As a result of the proposed options, some of the roads will experience a long term increase in traffic. Other sections of the roads in the network may experience a long term decrease in traffic. These options will contribute to improve the town's sustainable modes of transport.					
Water Resources, Pollution and Drainage	**Existing Environment:** There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The options lies predominantly within Flood Zone 1 – which indicates low probability of flooding.					
	The proposed route passes over tributaries of the River Fynn and River Gipping which have Flood Zone 3 status therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation.	The site is in close proximity to the River Orwell (north of site) which has Flood Zone 3 status, therefore the option may be affected by seasonal or annual water level variation. To the north of the station is an area benefiting from flood defences.	The proposed option site is in close proximity to the River Gipping (to the east) which has Flood Zone 3 status, therefore the option footprint may be affected by seasonal or annual water level variation.	The proposed option site is in close proximity to the River Fynn (to the south and east) which has Flood Zone 3 status, therefore the option footprint may be affected by seasonal or annual water level variation.	The proposed option site is in close proximity to the River Orwell (north of site) which has Flood Zone 3 status, therefore the option footprint may be affected by seasonal or annual water level variation. To the north of the station is an area benefiting from flood defences.	The proposed option site is in close proximity to the River Gipping tributary (NW of site) and River Fynn (NE of site) which have Flood Zone 3 status, therefore the option footprint may be affected by seasonal or annual water level variation.
	These options lies within a Drinking Water Protected Area and a surface water and groundwater Nitrate Vulnerable zone.					
	Construction: The construction works is expected to have permanent and temporary adverse effects on surface water quality. The construction works may also expose construction workers and/or infrastructure to flood risk as some areas of the route are located within area at risk of flooding (Flood zone 3). **Operation:** Potential adverse effects during operation on surface water quality (e.g. increased suspended sediment during heavy rainfall, accidental release of contaminants into surface waters, etc.). Subsequent adverse effects on soil quality and groundwater resources.					
Materials and Waste Management	**Existing Environment:** There are a number of landfills located along the A14 and south east from Kesgrave. The nearest sites to the proposed options are: • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. South from Ipswich: Ski Centre.					
	Construction: Details are not yet available to understand the materials requirements. It is anticipated that potential waste and soil arisings will be produced during the construction phase. However, final conclusions cannot be drawn without access to further information. A Site Waste Management Plan will be prepared to mitigate any potential effects. **Operation:** None.					

Table 3 High level environmental assessment of the 7 road options

	Road						
	Non-Strategic Eastern relief road	Non-Strategic Northern relief road	Non-Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvement	New River Orwell Bridge Crossing	Tunnel of River Orwell
							
Agriculture, Forestry and vegetation Management	**Existing Environment:** The proposed option lies predominantly within an area of designated Grade 3 and 4 Agricultural land. There are a number of priority habitats along the eastern part of the proposed route between Tuddenham St Martin and Martlesham. There is an area of lowland healthland (Rushmere Golf Course) to the east of Ipswich Hospital. There is an extensive area of deciduous woodland west of Martlesham comprising Martlesham Plantation and Kesgrave wood. Sink Valley SSSI lies north and west of Kesgrave Wood.	The proposed option lies predominantly within an area of designated Grade 3 Agricultural land. There are a number of priority habitats within the proposed route corridor – around Tuddenham St Martin.	The proposed option lies predominantly within an area of designated Grade 3 and 4 Agricultural land. There are a number of priority habitats along the proposed route corridor from Rushmere St Andrew to Martlesham. There is an extensive area of deciduous woodland west of Martlesham comprising Martlesham Plantation and Kesgrave wood. Sink Valley SSSI lies north and west of Kesgrave Wood. There is a tributary from the River Deben that crosses Hall road, west of the A12/ Main Road roundabout. The river Deben and Suffolk Coast & Heaths AONB are approx. I000m east of the A12/main road roundabout.	The proposed option comprises improvements to the existing junction 53 and therefore is not expected to have any adverse impacts on agriculture, forestry and vegetation. The closest priority habitats are north of the Bramford bridge, to the east of Fraser road.	The proposed option comprises improvements to the existing A12/A1214 roundabout and therefore is not expected to have any adverse impacts on agriculture, forestry and vegetation. There are a number of priority habitats on adjacent to the roundabout. There is an extensive area of deciduous woodland west of the roundabout comprising Martlesham Plantation and Kesgrave wood. Sink Valley SSSI lies north and west of Kesgrave Wood. To the south of the roundabout is another extensive area of deciduous woodland – also the Martlesham Plantation.	The proposed option lies predominantly within an area of designated Grade 3 Agricultural land. There are a number of priority habitats within the proposed river bridge crossing footprint. The Stour and Orwell Estuaries have Special Protected area (SPA) and Ramsar status. The Orwell Estuary is a SSSI. There are 2no. LNRs east of the Orwell bridge crossing – Orwell Country Park in Bridge Wood, south of the A14 and Pipers Vale, north of the A14.	The proposed option lies predominantly within an area of designated Grade 3 Agricultural land. There are a number of priority habitats within the proposed river tunnel crossing footprint. The Stour and Orwell Estuaries have Special Protected area (SPA) and Ramsar status. The Orwell Estuary is a SSSI. There are 2no. LNRs east of the Orwell bridge crossing – Orwell Country Park in Bridge Wood, south of the A14 and Pipers Vale, north of the A14.
	No greenbelt, biosphere reserves, National Nature Reserves, or National Parks have been identified within the Study Area or within 10km of the Study Area.						
	Construction: Land-take, change of land use and potential loss of agricultural land (either temporary or permanent) along the proposed route. The design will be refined to avoid potential effects on designated sites. Specific mitigation measures will be developed to minimise these impacts. *NB: Relief road to northen fringe of Ipswich - A potential direct adverse impact has been identified on a SSSI site. The design will be refined to avoid passing through the SSSI.* **Operation:** Long term residual effects from the construction phase and reinstatement of the construction sites.						
Air Quality	**Existing environment:** These options are not located within an AQMA. The AQMAs located within the study area are presented below.						

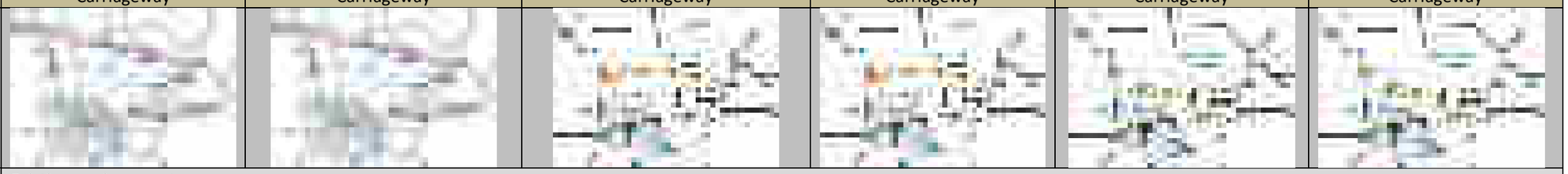
<table>
<tr><th></th><th colspan="7">Road</th></tr>
<tr><th></th><th>Non-Strategic Eastern relief road</th><th>Non-Strategic Northern relief road</th><th>Non-Strategic Northern fringe relief road</th><th>A14 Junction 53 capacity improvements</th><th>A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvement</th><th>New River Orwell Bridge Crossing</th><th>Tunnel of River Orwell</th></tr>
<tr><td></td><td colspan="7">The Ipswich AQMA No. 1. encompasses the land in and around the junction of Norwich Road, Chevallier Street /Valley Road/ Chevallier Street/Waterloo Road.
The Ipswich AQMA No. 2. Is located at the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street.
Ipswich AQMA No. 3. is an area following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, extending along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street.
Ipswich AQMA No. 3. includes the Bramford Road/Yarmouth Road/Chevallier Street junction and part of Chevallier Street.
Woodbridge AQMA No. 1 includes the properties on the western side of the Throughfare and Melton Hill arm of the junction with Lime Kiln Quay Road.</td></tr>
<tr><td></td><td colspan="7"><u>Construction:</u>
Potential adverse impacts from dust and exhaust emissions on human and ecological receptors located within close proximity to the worksites. However, these can be minimised/avoided with the implementation of the CEMP.
<u>Operation:</u>
Increase in air emission along the new constructed route and at the junctions with A12 and A14.</td></tr>
<tr><td>Buildings, Structures and Historic Associations</td><td colspan="7"><u>Existing Environment:</u></td></tr>
<tr><td></td><td>There are a number of listed buildings along the proposed relief road corridor.
There are 6no. scheduled monuments in the option footprint. 3no. in The Sinks Valley SSSI and 3no. in Ipswich Heath SSSI.</td><td>There are a number of listed buildings along the proposed relief road corridor. There are no scheduled monuments within the option footprint.</td><td>There are a number of listed buildings along the proposed relief road corridor. There are 6no. scheduled monuments within the route footprint; 3no. in the Site of Combretovium NE of Baylham, and 3no. within the Martlesham Plantation, south of the A1214.
This option will potentially cross overhead lines, pressure gas mains and East Anglia ONE Route.</td><td>There are a number of listed buildings along the existing route corridor. The setting of these listed structures would probably already be affected by Norwich Road. There are no scheduled monuments within the option footprint.</td><td>There are a number of listed buildings along the proposed relief road corridor. There are 6no. scheduled monuments within the route footprint; 3no. in the Site of Combretovium NE of Baylham, and 3no. within the Martlesham Plantation, south of the A1214.</td><td colspan="2">There are a number of listed buildings within the proposed road crossing footprint. There are no scheduled monuments within the option footprint.</td></tr>
<tr><td></td><td colspan="7">The Study Area may encompass other below-ground features; however these are not fully known yet and cannot be assessed.</td></tr>
<tr><td></td><td colspan="7"><u>Construction:</u>
Potential temporary and permanent adverse effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during construction.
<u>Operation:</u>
Potential permanent adverse effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during operation.</td></tr>
<tr><td>Contaminated Land</td><td colspan="7"><u>Existing Environment:</u>
There are a number of landfills located along the A14 and south east from Kesgrave.
NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill.
East from Ipswich: Foxhall landfill and Waldringfield Quarry.
South from Ipswich: Ski Centre.
There is no closed mining waste sites within this option corridor.</td></tr>
<tr><td></td><td colspan="7"><u>Construction:</u>
Potential for ground gas and excavated material contamination risk as a result of construction works (including excavation, road/river crossing works, etc.). Any made ground would be considered as a potential source of contamination. Given current land-use is largely agricultural, the potential for encountering contamination is limited.
<u>Operation:</u>
None</td></tr>
<tr><td>Ecology</td><td colspan="7"><u>Existing environment:</u></td></tr>
</table>

	Road						
	Non-Strategic Eastern relief road	Non-Strategic Northern relief road	Non-Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvement	New River Orwell Bridge Crossing	Tunnel of River Orwell
	There are 2no. SSSI within the footprint of the route option. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats – adjacent to Kesgrave Road. There are 4no. areas of ancient woodland – one south of Playford (Lux Wood) and one just west of Woodbridge near the B1079 (Blunt's Wood) one east of Martlesham (Lumber Wood), and one north of Playford in Culpho (Culpho Wood). There are no protected species but notable species within the option footprint include the Turtle Dove and Yellow Wagtail. Priority species for CS targeting include the Curlew and Lapwing.	There are no SSSI or SPA within the option footprint. There is a LNR 1500m to the SE of the site – The Dales Open Space. There are a number of deciduous woodland priority habitats. Within the option footprint here are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove.	There are 2no. SSSI within the option footprint. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats –adjacent to Kesgrave Road. There are 4no. areas of ancient woodland – one south of Playford (Lux Wood) and one just west of Woodbridge near the B1079 (Blunt's Wood) and one east of Martlesham (Lumber Wood), and one north of Playford in Culpho (Culpho Wood). There are no protected species but notable species within the option footprint include the Turtle Dove and Yellow Wagtail. Priority species for CS targeting include the Curlew and Lapwing.	There are no SSSI or SPA within the option footprint. There is a LNR 1500m to the SE of the site – The Dales Open Space. There are a number of deciduous woodland priority habitats – the closest being 200m from the site. Within the option footprint here are no parcels of ancient woodland or any protected species. Notable species within the option footprint include the Turtle Dove.	There are 2no. SSSI within the option footprint. There are no SPA within the option footprint. There are a number of deciduous woodland priority habitats – adjacent to Kesgrave Road. There are no parcels of ancient woodland within the junction footprint. There are no protected species but notable species within the option footprint include the Turtle Dove and Yellow Wagtail. Priority species for CS targeting include the Curlew and Lapwing.	The Stour and Orwell Estuaries have Special Protected area (SPA) and Ramsar status. The Orwell Estuary is a SSSI. There are 2no. LNRs east of the Orwell bridge crossing – Orwell Country Park in Bridge Wood, south of the A14 and Pipers Vale, north of the A14. There are a number of deciduous woodland priority habitats along the A14 Orwell Bridge approaches. There are no protected species but notable species within the option footprint include the Turtle Dove, Corn Bunting, and Redshank. Priority species for CS targeting include the Redshank and Lapwing. The River Orwell in the option area is designated as an Important bird area.	The Stour and Orwell Estuaries have SPA and Ramsar status. The Orwell Estuary is a SSSI. There are 2no. LNRs east of the Orwell bridge crossing – Orwell Country Park in Bridge Wood, south of the A14 and Pipers Vale, north of the A14. There are a number of deciduous woodland priority habitats along the A14 Orwell Bridge approaches. There are no protected species but notable species within the option footprint include the Turtle Dove, Corn Bunting, and Redshank. Priority species for CS targeting include the Redshank and Lapwing. The River Orwell in the option area is designated as an Important bird area.
	Construction: Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. **Operation:** Potential adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. The ecological receptors have not been fully identified yet.						
Landscape, Townscape and Visual	**Existing environment:** The main land cover is existing hardstanding and parcels of agricultural land. The area directly adjacent to the proposed route is predominantly agricultural, and the River Orwell. Due to the nature of the tunnel works there will be negligible impact to the permanent landscape, townscape and visual amenity of the area. There will be a requirement to install temporary compound/ parking/ storage facilities during construction on currently undeveloped land which may involve the removal of existing vegetation, which will likely have a negative temporary visual impact on nearby residential receptors.						
	Construction and Operation: Potential effects on landscape character (e.g. removal of vegetation and trees) and by the construction of permanent infrastructure (e.g. roads and junctions). Potential adverse effects on people who are particularly sensitive to changes in views and visual amenity. A number of sensitive receptors i.e. residential properties, farms, parks etc. along the proposed route will be impacted with regard to visual amenity.						
	Existing environment:						

	Road						
	Non-Strategic Eastern relief road	Non-Strategic Northern relief road	Non-Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvement	New River Orwell Bridge Crossing	Tunnel of River Orwell
Nuisance, Noise, Vibration and Light	Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England. There are a number of residential and commercial receptors scattered along the proposed routes which could be exposed to noise, vibration and light nuisance during construction and operation.						
	Construction: Potential significant increase in noise and vibration in comparison to the baseline as a result of construction activities which would be conducted over a long period of time (including weekends and potentially outside of normal hours i.e. 7am to 7pm). **Operation:** Potential significant increase in noise and vibration in comparison to the baseline as a result of new traffic running through the proposed option.						
Traffic Generation and Access	**Existing Environment:** The proposed option will generate construction work traffic via the residential areas of Martlesham and Kesgrave. As a result there is likely to be a medium term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.	The proposed option will generate construction work traffic via the residential areas of Westbourne, Whitton and Castle Hill. As a result there is likely to be a medium term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.	The proposed option will generate construction work traffic via the residential areas of Westbourne, Whitton and Castle Hill, Kesgrave and Martlesham. As a result there is likely to be a medium term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.	The proposed junction improvements will generate construction work traffic via the commercial units along Bury Road, and residential areas of Whitton, Castle Hill and Westbourne. As a result there is likely to be a short term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.	The proposed junction improvements will generate construction work traffic along Main Road (A1214) and the A12. Any associated diversions will increase the traffic flows to the A12/B1438, Bealings Road, Hall Road, A12/Foxhall Road roundabout and Dobbs Lane. The residential areas of Martlesham Heath and Martlesham are likely to be effected. As a result there is likely to be a short term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site.	The proposed road crossing option will generate construction work traffic via the Orwell bridge, adding to the already congested A14, and put additional pressure on junctions 56 and 57. As a result there is likely to be a medium term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site. It is likely that the A14 Orwell Bridge crossing will require Traffic management to manage the traffic flows during construction.	The proposed road crossing option will generate construction work traffic via the Orwell bridge, adding to the already congested A14, and put additional pressure on junctions 56 and 57. As a result there is likely to be a medium term increase in traffic on the local road network, with construction vehicles travelling to and from the construction site. It is likely that the A14 Orwell Bridge crossing will require Traffic management to manage the traffic flows during construction.
	Construction: Potential short term increase in traffic on the local road network (including weekends) due to construction work traffic via the countryside roads and the main roads connecting with Ipswich (A12 and A14). There may be a requirement for closures and diversions of roads and other access (e.g. pedestrian access, Public Right of Way) during construction. **Operation:** Once operational, the new route will change the traffic on the regional and local road network. Some of the existing traffic flow will be diverted to the new route. As a result some of the roads will experience a long term increase in traffic. Other sections of the roads in the network may experience a long term decrease in traffic. It will provide capacity to enable growth and improve the town's sustainable modes of transport. The additional bridge or tunnel across the River Orwell will reduce congestion and improve traffic flows when there is an issue with the existing bridge crossing.						
Water Resources, Pollution and Drainage	**Existing Environment:** There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The option lies predominantly within	There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The option lies predominantly within	There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The option lies predominantly within Flood Zone 1 – which	There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The option lies within	There are 3no. rivers within the Study Area – The River Gipping in the West (near A14), River Fynn and River Lark in the east. The option lies	This option passes over the River Orwell. There is a high priority flood risk management priority to the west of the Orwell bridge. The	This option passes under the River Orwell. There is a high priority flood risk management priority to the west of the Orwell bridge. The

	Road						
	Non-Strategic Eastern relief road	Non-Strategic Northern relief road	Non-Strategic Northern fringe relief road	A14 Junction 53 capacity improvements	A12 / A1214 Main Road / Kesgrave Bypass signalised roundabout improvement	New River Orwell Bridge Crossing	Tunnel of River Orwell
	Flood Zone 1 – which indicates low probability of flooding. However, the proposed route passes over a tributary of the River Fynn which has a Flood Zone 3 status therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation. There is a tributary from the River Deben that crosses Hall road, west of the A12/ Main Road (A1214) roundabout. The river Deben and Suffolk Coast & Heaths AONB are approx. I000m east of the A12/main road (A1214) roundabout.	Flood Zone 1 – which indicates low probability of flooding. However, the proposed route passes close to a tributary of the River Gipping which have Flood Zone 3 status and therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation.	indicates low probability of flooding. However, the proposed route passes over tributaries of the River Fynn and River Gipping which have Flood Zone 3 status and therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation.	Flood Zone 1 – which indicates low probability of flooding. The River Gipping, and its flood plains, located immediately to the west of Junction 53 lies in Flood Zone 3 and therefore the route corridor in this area and immediate surroundings may be affected by seasonal or annual water level variation.	within Flood Zone 1 – which indicates low probability of flooding.	option lies predominantly within Flood Zone 1 – which indicates low probability of flooding. However, the area directly west of the A14 Orwell Bridge (extending along the Strand – B1456) lies within a Flood Zone 3. To the NNE of the Orwell Bridge is an area benefiting from flood defences. The option area also has medium priority sediments and phosphate issues.	option lies predominantly within Flood Zone 1 – which indicates low probability of flooding. However, the area directly west of the A14 Orwell Bridge (extending along the Strand – B1456) lies within a Flood Zone 3. To the NNE of the Orwell Bridge is an area benefiting from flood defences. The option area also has medium priority sediments and phosphate issues. This area also has medium priority sediments and phosphate issues.
	These options lie within a Drinking Water Protected Area and a surface water and groundwater Nitrate Vulnerable Zone. These options are situated within a highly productive aquifer.						
	Construction: The construction of the new roads and associated infrastructure will have permanent and temporary adverse effects on surface water quality. The construction works may also expose construction workers and/or infrastructure to flood risk as some areas of the route are located within area at risk of flooding (Flood zone 3). **Operation:** Potential adverse effects during operation on surface water quality (e.g. increased suspended sediment during heavy rainfall, accidental release of contaminants into surface waters, etc.). Subsequent adverse effects on soil quality and groundwater resources.						
Materials and Waste Management	**Existing Environment:** There are a number of landfills located along the A14 and south east from Kesgrave. The nearest sites to the proposed options are: • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. South from Ipswich: Ski Centre.						
	Construction: Details are not yet available to understand the materials requirements. It is anticipated that potential waste and soil arisings will be produced during the construction phase. However, final conclusions cannot be drawn without access to further information. A Site Waste Management Plan will be prepared to mitigate any potential effects. **Operation:** None.						

Table 4 High level environmental assessment of the 6 highway route options

<table>
<tr><th></th><th colspan="6">Highway Route Options</th></tr>
<tr><td></td><td>Outer Highway Route - Single Carriageway</td><td>Outer Highway Route - Dual Carriageway</td><td>Mid Highway Route - Single Carriageway</td><td>Mid Highway Route - Dual Carriageway</td><td>Inner Highway Route - Single Carriageway</td><td>Inner Highway Route - Dual Carriageway</td></tr>
<tr><td></td><td colspan="6">  </td></tr>
<tr><td>Agriculture, Forestry and vegetation Management</td><td colspan="6"><u>Existing environment:</u>
The vast majority of the proposed routes are dominated by Grade 3 agricultural land (good to moderate quality). There is a small pocket of Grade 4 agricultural land (poor quality) within the Study Area adjacent to junction A14/A140. The Outer Highway Route also crosses areas characterised by Grade 2 agricultural land (very good). There are small pockets of Grade 4 agricultural land (poor quality) near Claydon (adjacent to junction A14/B1113) and to the west and to the north of Martlesham.

Designated sites have been identified within close proximity to the proposed route (see the Ecology section). Two designated sites have been identified 500m away from the Mid Highway Route option and the Inner Highway Route appears to be crossing the Sinks Valley Kesgrave SSSI.</td></tr>
<tr><td></td><td colspan="4"><u>Construction:</u>
Land-take, change of land use and potential loss of agricultural land (either temporary or permanent) along the proposed route. The design will be refined to avoid potential effects on designated sites. Specific mitigation measures will be developed to minimise these impacts.
<u>Operation:</u>
Long term residual effects from the construction phase and reinstatement of the construction sites.</td><td colspan="2"><u>Construction:</u>
Land-take, change of land use and potential loss of agricultural land (either temporary or permanent) along the proposed route. A potential direct adverse impact has been identified on a SSSI site. The design will be refined to avoid passing through the SSSI. Specific mitigation measures will be developed to minimise these impacts.
<u>Operation:</u>
Long term residual effects from the construction phase and reinstatement of the land impacted by the construction activities. Potential long term impact on designated site.</td></tr>
<tr><td>Air Quality</td><td colspan="6"><u>Existing environment:</u>
These options are not located within an AQMA. The closest AQMA to these options is Woodbridge AQMA No. 1, which is located more than 1.3km from the junction A12/A1152 (Outer Highway Route) and junction A12/B1079 (the Middle Highway Route). Woodbridge AQMA No. 1 includes the properties on the western side of the Throughfare and Melton Hill arm at the junction with Lime Kiln Quay Road.

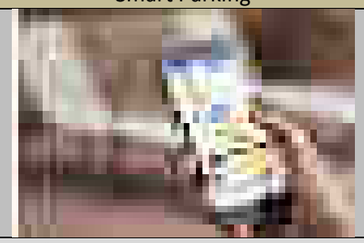
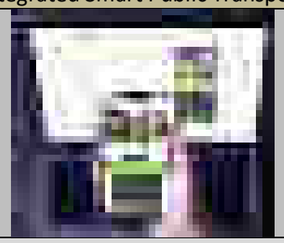
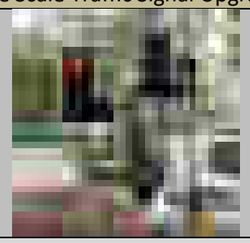
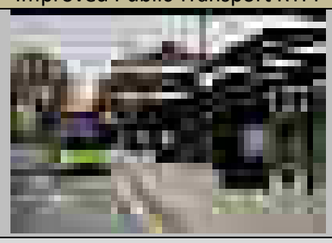
There are four AQMAs identified in Ipswich and these are located more than 6km away from the Outer Highway Route, 2.5km away from the Middle Highway Route and 3km away from the Inner Highway Route.</td></tr>
<tr><td></td><td colspan="6"><u>Construction:</u>
Potential adverse impacts from dust and exhaust emissions on human and ecological receptors located within close proximity to the worksites. However, these can be minimised/avoided with the implementation of the CEMP.
<u>Operation:</u>
Increase in air emission along the new constructed route and at the junctions with A12 and A14.</td></tr>
<tr><td>Buildings, Structures and Historic Associations</td><td colspan="6"><u>Existing environment:</u>
There are a number of listed buildings along the proposed corridors. These are as follows:
Outer Highway Route: These are mostly located along existing roads.
Middle Highway Route: Two listed buildings are likely to be directly impacted by the new junction proposed on B1079 Grundisburgh Road which connects with the A12.
Inner Highway Route: The Kesgrave Hall listed building is located within the option corridor, close to the A12/A1214 junction.
The corridors are also located within close proximity (<1km) to a number of scheduled monuments. These are as follows :</td></tr>
</table>

	Highway Route Options					
	Outer Highway Route - Single Carriageway	Outer Highway Route - Dual Carriageway	Mid Highway Route - Single Carriageway	Mid Highway Route - Dual Carriageway	Inner Highway Route - Single Carriageway	Inner Highway Route - Dual Carriageway
	• **Outer Highway Route**: 5no. scheduled monuments which include Baylham Roman site; a moated site of Old Berghersh House north of Witnesham; a moated site and ponds at Thistleton Hall and a settlement site around St Botolph's Church near Clopton; and a moated site at The Old Rectory near Hasketon. • **Middle Highway Route:** 3no. scheduled monuments which include a moated site of Old Berghersh House north of Witnesham, a moated site at Abbey Farm and a moated site at The Old Rectory near Hasketon. • **Inner Highway Route:** 7no. scheduled monuments which include Playford Hall moated site, Bowl barrow on Playford Heath (3 sites) and 3 sites west of the A12 near the A12/A1214 junction. There are no world heritage sites and registered battlefields within the Study Area. The Outer Highway Route is very likely to cross Shrubland Hall located south of Coddenham along the A14 which is included in the Register of Parks and Gardens of Special Historic Interest in England. The corridors are also located within close proximity to a number of overhead line and below ground facilities/structures: • **Outer Highway Route**: This option will cross overhead lines north east of Grundisburgh. • **Middle Highway Route and Inner Highway Route:** These options will cross overhead lines, high pressure gas mains and East Anglia ONE Route at different locations. The Study Area may encompass other below-ground features; however these are not fully known yet and cannot be assessed.					
	Construction: Potential temporary and permanent significant effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during construction. **Operation:** Potential permanent significant effects on heritage assets and visual amenity of historic buildings/assets during construction. Specific permits are likely to be required during operation.					
Contaminated Land	**Existing environment:** The nearest historic landfills to the proposed routes are: • **Outer Highway Route**: Gallows Hill and Coddenham Landfill (>800m). • **Middle Highway Route:** Lodge Lane historic landfill (at the new proposed junction on B1113 Bamford Rd) and Rise Hall historical landfill. • **Inner Highway Route:** This route is likely to cross former historical landfill in Kesgrave (Sinks Pit and Hall's Pit). There are historical landfills potentially located within close proximity to this option, including Church Lane and Tuddenham Road Landfills. There is no closed mining waste sites within this option corridor					
	Construction: Potential for ground gas and excavated material contamination risk as a result of construction works (including excavation, road/river crossing works, etc.). Any made ground would be considered as a potential source of contamination. Given current land-use is largely agricultural, the potential for encountering contamination is limited. **Operation:** None					
Ecology	**Existing environment:** The proposed route is located within or near a number of designated sites (<2km). These are as follows: • **Outer Highway Route**: Rede Wood LNR; Riverside House Meadow SSSI (within 800m); Sandy Lane Pit – Barham SSSI (>1km); Deben Estuary Ramsar / SPA / SSSI (>1km); Creeting St Mary Pits SSSI. • **Middle Highway Route:** Rede Wood LNR and Riverside House Meadow are <500m from the proposed route. The following sites are located between 500m-2km from the route: Deben Estuary Ramsar / SPA/ SSSI (>800m from Junctions B and C); Sandy Lane Pit – Barham SSSI (>1.6km); Great Blakenham Pit SSSI (within 600m); Little Blakenham Pit SSSI (>1.2km). • **Inner Highway Route:** Route crosses Sinks Valley Kesgrave SSSI is <500m from the proposed route. The following sites are located between 500m-2km from the route: ede Wood LNR; Ipswich Heath (>1km); Deben Estuary Ramsar / SPA / SSSI (> 1km). These options are not located within or near National Nature Reserves, National Parks, Special Areas of Conservation (SACs) or Biosphere Reserves. The Outer Highway Route crosses parks and gardens located along the A14 and these extend from the A140/A14 junction to Hall Farm cottages. Both the Outer Highway Route and the Middle Highway Route cross priority habitats which are located in the floodplain grazing marsh along the River Lark. The Inner Highway Route crosses woodlands which are located to the north west of the A12/A1214 roundabout at Martlesham. This area comprises Martlesham Plantation and Kesgrave Wood. The option is likely to cross habitats of interest that may support protected species (e.g. presence of priority habitat near A14/A140 junction and a deciduous woodland has been identified near the A12/A1214 junction). Several sites are scattered throughout the countryside.					

	Highway Route Options					
	Outer Highway Route - Single Carriageway	Outer Highway Route - Dual Carriageway	Mid Highway Route - Single Carriageway	Mid Highway Route - Dual Carriageway	Inner Highway Route - Single Carriageway	Inner Highway Route - Dual Carriageway
	Construction: Potential significant adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. **Operation:** Potential significant adverse effects on ecological receptors through increased disturbance such as lighting, noise, change in hydrology and disturbance resulting from the new land-take, vehicular usage and increased human disturbance. The ecological receptors have not been fully identified yet.					
Landscape, Townscape and Visual	**Existing environment:** The option corridors and surroundings are mainly characterised by an agricultural landscape with arable farmland, vegetation and woodlands. The south east part of the study area (where the Inner Highway Route is located) is mainly characterised by a marginal agricultural landscape with secondary woodland and forestry plantations. Overall, there are also small built up areas scattered across the study area, which also comprises a number of public rights of ways. The Study Area forms part of 3 National Character Areas including South Suffolk and North Essex Clayland, South Norfolk and High Suffolk Claylands, and Suffolk Coast and Heaths. The option is also not located within an AONB. The nearest AONB is Suffolk Coast and Heaths and is located as follows from the proposed routes: • **Outer Highway Route:** >1.4km from the junction A12/A1152. • **Middle Highway Route:** the proposed construction works at junction A12/B1438 are located 300m from the boundary of Suffolk Coast and Heaths AONB. • **Inner Highway Route:** >1.5km from the junction A12/A1214).					
	Construction and Operation: Potential significant effects on landscape character (e.g. removal of vegetation and trees) and by the construction of permanent infrastructure (e.g. roads and junctions). Potential significant effects on people who are particularly sensitive to changes in views and visual amenity. A number of sensitive receptors i.e. residential properties, farms, parks etc. along the proposed route will be impacted with regard to visual amenity.					
Nuisance, Noise, Vibration and Light	**Existing environment:** Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England. The proposed options runs close to villages and towns which have higher density of population, including Claydon, Ipswich, Grundisburgh, Woodbridge and Martlesham. There are a number of residential and commercial receptors scattered along the proposed routes which could be exposed to noise, vibration and light nuisance during construction and operation.					
	Construction: Significant increase in noise and vibration in comparison to the baseline as a result of construction activities which would be conducted over a long period of time (including weekends and potentially outside of normal hours i.e. 7AM to 7PM). **Operation:** Significant increase in noise and vibration in comparison to the baseline as a result of new traffic running through the proposed option.					
Traffic Generation and Access	**Existing environment:** The Study Area encompasses a road network which include major national roads (A12 and A14), regional roads and local roads. The current local and strategic highway network of Ipswich suffers from frequent and severe delays. The congestion on the A14 has also an impact on strategic areas such as the Port of Felixstowe, with particular issues related to the Orwell Bridge Crossing.					
	Construction: Potential short term increase in traffic on the local road network (including weekends) due to construction work traffic via the countryside roads and the main roads connecting with Ipswich (A12 and A14). There may be a requirement for closures and diversions of roads and other access (e.g. pedestrian access, Public Right of Way) during construction. **Operation:** Once operational, the new route will change the traffic on the regional and local road network. Some of the existing traffic flow will be diverted to the new route. As a result some of the roads will experience a long term increase in traffic. Other sections of the roads in the network may experience a long term decrease in traffic.					

	Highway Route Options					
	Outer Highway Route - Single Carriageway	Outer Highway Route - Dual Carriageway	Mid Highway Route - Single Carriageway	Mid Highway Route - Dual Carriageway	Inner Highway Route - Single Carriageway	Inner Highway Route - Dual Carriageway
Water Resources, Pollution and Drainage	**Existing environment:** The Study Area forms part of the River Gipping catchment area (flowing into the Orwell Estuary) and the River Deben catchment area. The farming landscape also encompasses small watercourses, ditches and areas with natural drainage. The routes potentially crosses a number of rivers and watercourses. These are as follows: • **Outer Highway Route:** the River Fynn and one of its tributary north of Witnesham, a watercourse east of Swilland, the River Lark and its associated tributaries. • **Middle Highway Route:** a small watercourse south of Henley, the River Fynn, the River Lark and its associated tributaries. • **Inner Highway Route:** a small watercourses south of Akenham and would remain south of the River Fynn and the railway line. The route would cross a tributary of the River Flynn prior to junction A12/A1214. The option is mostly located within Flood zone 1 (low risk). The proposed roundabout west of A14 (the Middle Highway Route) is located within a Flood zone 3 (crossing with the River Gipping). The floodplains of the River Fynn and River Lark and associated tributaries are classified as a Flood zone 3 (higher risk). Fewer floodplain zones seems to be crossed by the Inner Highway Route compared to the Outer and Middle Highway Routes. The option will cross a drinking water protected area/safeguard zone which is located either side of the A14 between Beacon Hill and Ipswich. No protected groundwater zones are identified within the Study Area. The vast majority of the proposed route is located within a low spatial priority area in relation to surface water quality for woodland. There are small pockets along the route (west of Henley Road) which are classified as high spatial priority area.					
	Construction: The construction of the new roads and associated infrastructure will have significant permanent and temporary adverse effects on surface water quality. The construction works may also expose construction workers and/or infrastructure to flood risk as some areas of the route are located within area at risk of flooding (Flood zone 3). **Operation:** Potential adverse effects during operation on surface water quality (e.g. increased suspended sediment during heavy rainfall, accidental release of contaminants into surface waters, etc.). Subsequent adverse effects on soil quality and groundwater resources.					
Materials and Waste Management	**Existing environment:** There are a number of landfills located along the A14 and south east from Kesgrave. The nearest sites to the proposed options are: • NW from Ipswich: Sally Woods Lane Landfill, Creeting Hills, Barking Landfill, Gallows Hill Pit, Darmsden Hall Landfill Site, Old Sandy Lane Pit, Masons Landfill and Bramford Landfill. • East from Ipswich: Foxhall landfill and Waldringfield Quarry. • South from Ipswich: Ski Centre.					
	Construction: Details are not yet available to understand the materials requirements. It is anticipated that potential waste and soil arisings will be produced during the construction phase. However, final conclusions cannot be drawn without access to further information. A Site Waste Management Plan will be prepared to mitigate any potential effects. **Operation:** None.					

Table 5 High level environmental assessment of the 4 smart technology options

	Smart Technology			
	Smart Parking	Integrated Smart Public Transport	Wide Scale Traffic Signal Upgrades	Improved Public Transport RTPI
Brief Option Description				
Agriculture, Forestry and vegetation Management	**<u>Existing environment:</u>** Outside Ipswich, the vast majority of the land is characterised by Grade 3 and Grade 2 agricultural lands. Designated sites have been identified in Ipswich Town and within the wider Study Area (see Ecology Section). This option is likely to be developed with an urban area which is predominantly characterised by man-made ground.			
	<u>Construction:</u> Given the typical location of such type of facilities, it is unlikely that this option will have noticeable effects during construction on agriculture, forestry and vegetation with the implementation of mitigation measures. **<u>Operation:</u>** None.	**<u>Construction:</u>** Given the typical location of such type of facilities, it is unlikely that this option will have noticeable effects during construction on agriculture, forestry and vegetation with the implementation of mitigation measures. **<u>Operation:</u>** None.	**<u>Construction:</u>** None. **<u>Operation:</u>** None.	
Air Quality	**<u>Existing environment:</u>** There are four AQMAs identified in Ipswich and one AQMA in Woodbridge. The proposed options are likely to be located in urban centres where there are potential sensitive human receptors.			
	<u>Construction:</u> The construction activities would remain temporary and localised with short term effects on air quality. **<u>Operation:</u>** None.	**<u>Construction:</u>** The construction activities would remain temporary and localised with short term effects on air quality. **<u>Operation:</u>** This option is likely to improve traffic flows and subsequently, air quality in the long term through the reduction of air emission in urban centres.	**<u>Construction:</u>** The upgrade of existing infrastructure is not expected to have noticeable effects on air quality during construction. **<u>Operation:</u>** This option is likely to improve traffic flows and subsequently, air quality in the long term through the reduction of air emission in urban centres.	**<u>Construction:</u>** The RTPI-system installation and the potential upgrade of bus stops would involve very minor construction activities in urban centres. **<u>Operation:</u>** None.
Buildings, Structures and Historic Associations	**<u>Existing environment:</u>** There are a number of listed buildings and several scheduled monuments in the centre of Ipswich and within the wider Study Area. The Study Area may encompass below-ground features, however the location of the option and its potential effects on these features are not known yet.			
	<u>Construction:</u> It is anticipated that the setting of the protected buildings/structures would probably already be affected by the existing urban environment. **<u>Operation:</u>** Given the nature of activities, limited effects are expected on buildings and infrastructures with the implementation of appropriate mitigation measures.	**<u>Construction:</u>** It is anticipated that the setting of the protected buildings/structures would probably already be affected by the existing urban environment. **<u>Operation:</u>** Given the nature of activities, limited effects are expected on buildings and infrastructures with the implementation of appropriate mitigation measures.	**<u>Construction:</u>** This option does not involve any works. Therefore, no impacts are expected on buildings, structures and historic associations during construction. **<u>Operation:</u>** None.	**<u>Construction:</u>** This option will only involve very small upgrade of existing bus stops. Therefore, this option will not have any noticeable effects on historical assets. **<u>Operation:</u>** None.

	Smart Technology			
	Smart Parking	Integrated Smart Public Transport	Wide Scale Traffic Signal Upgrades	Improved Public Transport RTPI
Contaminated Land	**Construction:** This option is unlikely to have any noticeable effects on sensitive receptors, if any, as a result of the proposed scheme (e.g. excavation of contaminated material). If this issue were to occur, the risk would be managed through a Soil Management Plan. **Operation:** None.	**Construction:** This option is unlikely to have any noticeable effects on sensitive receptors, if any, as a result of the proposed scheme (e.g. excavation of contaminated material). If this issue were to occur, the risk would be managed through a Soil Management Plan. **Operation:** None.	**Construction:** None. **Operation:** None.	**Construction:** Given the very low magnitude of the proposed upgrade, it is unlikely that the proposed option will have noticeable effects on sensitive receptors in relation to contaminated land. **Operation:** None.
Ecology	**Existing environment:** There are Local Nature Reserves (LNRs) identified in Ipswich. A number of designated sites have been identified within the wider Study Area, including SSSIs, LNRs, SPAs and Ramsar sites.			
	Construction: Given the low magnitude of the proposed upgrade, no significant adverse effects are expected on ecological receptors during construction. **Operation:** None.	**Construction:** Given the low magnitude of the proposed upgrade, no significant adverse effects are expected on ecological receptors during construction. **Operation:** None.	**Construction:** Given the very low magnitude of the proposed upgrade, no adverse effects are expected on ecological receptors during construction. **Operation:** None.	**Construction:** Given the very low magnitude of the proposed upgrade, no adverse effects are expected on ecological receptors during construction. **Operation:** Nne.
Landscape, Townscape and Visual	**Existing environment:** These options are likely to be developed within an urbanised an area including Ipswich and its surroundings.			
	Construction: Potential temporary and localised effects to the current townscape of Ipswich or other areas. **Operation:** No significant changes are expected on the current townscape of Ipswich or other areas.	**Construction:** Potential temporary and localised effects to the current townscape of Ipswich or other areas. **Operation:** No significant changes are expected on the current townscape of Ipswich or other areas.	**Construction:** This option will not change the existing environment as it involves changing the existing traffic light system; hence no effects are predicted on landscape, townscape and visual. **Operation:** None.	**Construction:** The RTPI-system installation and the potential upgrade of bus stops are not expected to have any noticeable effects on landscape as it would fit within the existing urban environment. **Operation:** None.
Nuisance, Noise, Vibration and Light	**Existing environment:** Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England. The proposed options are likely to be developed within an urban area where there are human receptors.			
	Construction: A number of receptors could be exposed to noise, vibration and light nuisance during construction activities. The construction activities would remain temporary and localised with short term effects on noise, vibration and light. **Operation:** Given the nature of the proposed scheme, limited effects are anticipated on noise, vibration and light.	**Construction:** A number of receptors could be exposed to noise, vibration and light nuisance during construction activities. The construction activities would remain temporary and localised. It is likely that short term effects would occur on noise, vibration and light. **Operation:**	**Construction:** The upgrade of existing infrastructure is not expected to have any effects on noise, vibration and light during construction. **Operation:** This option is likely to improve traffic flow and this may reduce noise levels and vibration within urban centres.	**Construction:** The RTPI-system installation and the potential upgrade of bus stops is not expected to have any effects on noise, vibration and light during construction. **Operation:** None.

	Smart Technology			
	Smart Parking	Integrated Smart Public Transport	Wide Scale Traffic Signal Upgrades	Improved Public Transport RTPI
		Overall, this option is likely to improve traffic flow and this may reduce noise levels and vibration within urban centres.		
Traffic Generation and Access	**Existing environment:** The current local and strategic highway network of Ipswich suffers from frequent and severe delays. The congestion on the A14 has also an impact on strategic areas such as the Port of Felixstowe, with particular issues related to the Orwell Bridge Crossing.			
	Construction: Short term effects on traffic and access due to construction vehicles travelling to and from the construction site. However, these effects are expected to be short term and localised. **Operation:** Given the small scale of the proposed scheme, limited effects are anticipated on traffic and access.	**Construction:** Short term effects on traffic and access due to construction vehicles travelling to and from the construction site. However, these effects are expected to be short term and localised. **Operation:** This option is likely to contribute to the long term improvement of traffic flow within urban areas in Ipswich and neighbouring towns.	**Construction:** Temporary traffic signal may be used during construction while the work is carried out. **Operation:** This option is likely to contribute to the long term improvement of traffic flow within urban areas in Ipswich and neighbouring towns.	**Construction:** The RTPI-system installation and the potential upgrade of bus stops are not expected to have any direct effects on traffic. **Operation:** None.
Water Resources, Pollution and Drainage	**Existing environment:** The proposed options are likely to be developed within an urban area where there is a stormwater network. This network conveys run off water to waterways through pipe networks.			
	Construction and Operation: This option is unlikely to have significant effects on water resources with the implementation of appropriate mitigation measures e.g. detention or retention basins, and/or other best management practices for the control of discharge quantity and quality.	**Construction and Operation:** This option is unlikely to have significant effects on water resources with the implementation of appropriate mitigation measures e.g. detention or retention basins, and/or other best management practices for the control of discharge quantity and quality.	**Construction:** This option will not have any adverse effects on water resources. **Operation:** None.	**Construction:** This option will not have any adverse effects on water resources. **Operation:** None.
Materials and Waste Management	**Existing environment:** There are a number of landfills located in Ipswich and within its surroundings (e.g. along the A14 and south east from Kesgrave).			
	Construction: This option is expected to generate small volume of waste and arisings during construction. **Operation:** None.	**Construction:** This option is expected to generate very small volume of waste and arisings during construction. **Operation:** None.	**Construction:** This option is expected to generate very small volumes of waste during construction. This option does not involve earth works; hence no arisings are anticipated to be generated during construction. **Operation:** None.	**Construction:** The RTPI-system installation and the potential upgrade of bus stops are expected to generate very small volumes of waste during construction. **Operation:** None.

Table 6 High level environmental assessment of the 3 'other' options

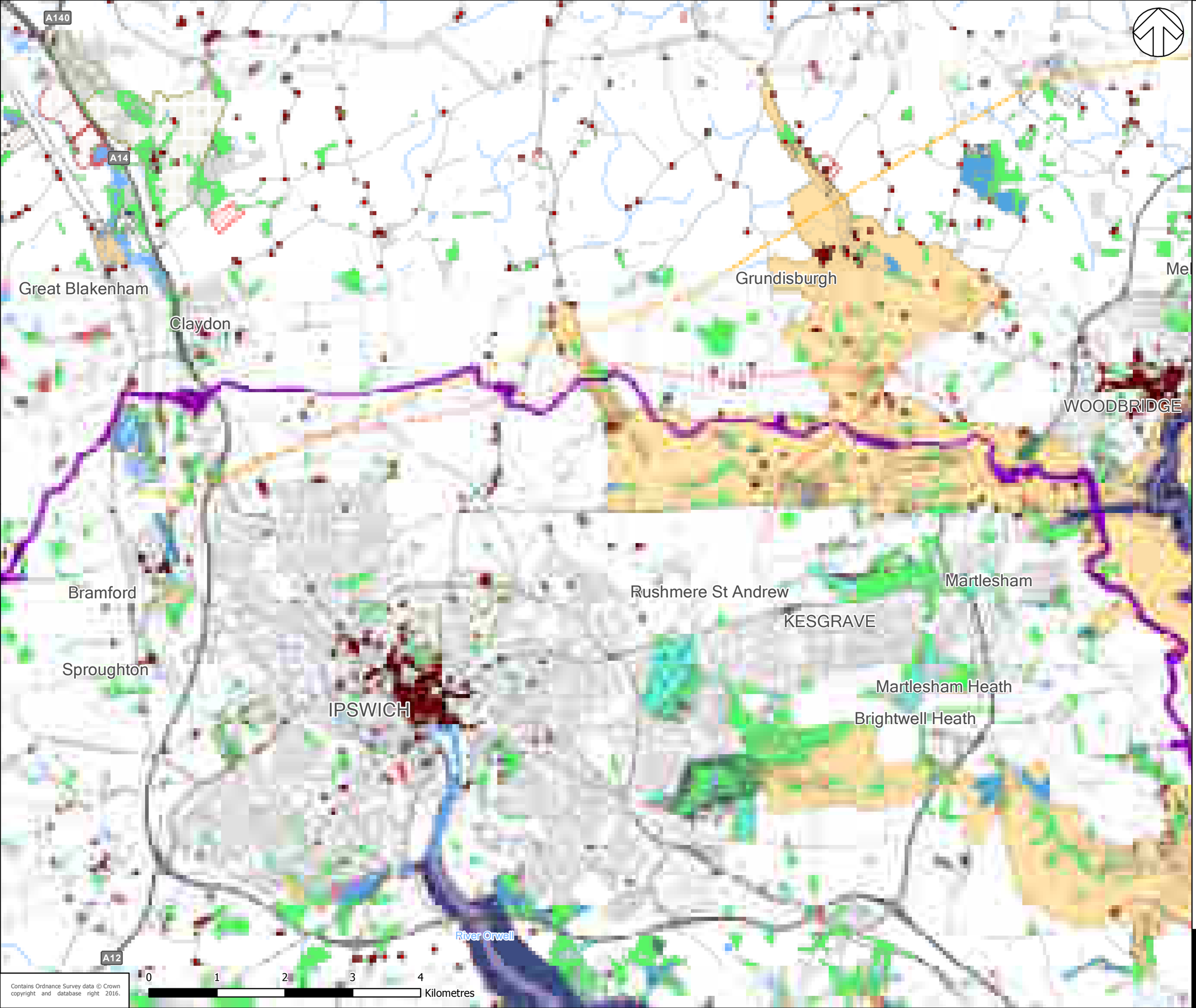
	Other		
	Car Parking Levy	Congestion Charging in Ipswich Centre	Do Nothing
Agriculture, Forestry and vegetation Management	**Existing Environment:** There is limited green space within the Ipswich Town Centre boundary. Christchurch Park is located to the north of the town.		
	Construction:		

	Other		
	Car Parking Levy	Congestion Charging in Ipswich Centre	Do Nothing
	None. **Operation:** None.		
Air Quality	**Existing Environment:** There are 4no. AQMAs in Ipswich Town centre: The **Ipswich AQMA No. 1.** encompasses the land in and around the junction of Norwich Road, Chevallier Street /Valley Road/ Chevallier Street/Waterloo Road. The **Ipswich AQMA No. 2.** Is located at the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. **Ipswich AQMA No. 3.** is an area following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, extending along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street. Ipswich AQMA No. 3. includes the Bramford Road/Yarmouth Road/Chevallier Street junction and part of Chevallier Street.		
	Construction: None. **Operation:** The parking Levy and congestion charge will discourage people from driving into the town centre, hence reducing the number of cars entering the centre, which in turn will alleviate the degree of congestion on the road network. The 'Do Nothing' option will permit the increase in traffic and congestion on the town centre roads		
Buildings, Structures and Historic Associations	**Existing Environment:** There are a significant number of listed buildings, and several scheduled monuments within Ipswich Town Centre. The Study Area may encompass other below-ground features; however these are not fully known yet and cannot be assessed.		
	Construction: None. **Operation:** The parking Levy and congestion charge will discourage people from driving into the town centre, hence reducing the number of cars entering the centre, which in turn will alleviate the degree of congestion on the road and reduce the need for parking. The 'Do Nothing' option will permit the increase in traffic and congestion on the town centre roads. Which, in turn will put added pressure on parking and access.		
Contaminated Land	**Existing Environment:** The level of land contamination in Ipswich Town Centre is unknown at present and requires further investigation.		
	Construction: None. **Operation:** None.		
Ecology	**Existing Environment:** There are no SSSI, SPAs, SACs, or LNRs within Ipswich Town Centre. There is one deciduous woodland priority habitats within the Town Centre – Christchurch Park, off Crown Street. Within the option footprint here are no parcels of ancient woodland or any protected or notable species.		
	Construction: None. **Operation:** The 'Do Nothing' option will affect the ecology due to pollution, noise, vibration, congestion and disturbance associated with increased traffic in the Town Centre.		
Landscape, Townscape and Visual	**Existing Environment:** Ipswich Town Centre has a predominantly urban landscape. Set on the River Orwell it has a rich maritime history. Christchurch Park also sits within the town centre boundary.		
	Construction: None. **Operation:** The parking Levy and congestion charge will discourage people from driving into the town centre, hence reducing the number of cars entering the centre, which in turn will alleviate the degree of congestion on the road and reduce the need for parking. The 'Do Nothing' option will permit the increase in traffic and congestion on the town centre roads. Which, in turn will put added pressure on parking and access.		
Nuisance, Noise, Vibration and Light	**Existing Environment:** There are a significant number of retail, leisure, educational and business units within the Town Centre that could be exposed to noise, vibration and light nuisance.		

	Other		
	Car Parking Levy	Congestion Charging in Ipswich Centre	Do Nothing
	Ipswich is not one of the 23no. DEFRA Noise Action Plans designed to address the management of noise issues and effects in agglomerations in England.		
	Construction: None. **Operation:** The parking Levy and congestion charge will discourage people from driving into the town centre, hence reducing the number of cars entering the centre, which in turn will alleviate the degree of congestion on the road and reduce the need for parking. The 'Do Nothing' option will permit the increase in traffic and congestion on the town centre roads. Which, in turn will put added pressure on parking and access.		
Traffic Generation and Access	**Existing Environment:** Traffic flow is slow and roads congested on the Ipswich Town Centre road network, particularly during peak hours. Congested streets restrict accessibility.		
	Construction: None. **Operation:** The parking Levy and congestion charge will discourage people from driving into the town centre, hence reducing the number of cars entering the centre, which in turn will alleviate the degree of congestion on the road and reduce the need for parking. The 'Do Nothing' option will permit the increase in traffic and congestion on the town centre roads. Which, in turn will put added pressure on parking and access.		
Water Resources, Pollution and Drainage	**Existing Environment:** There are no rivers within the Town Centre Boundary. However, the River Orwell is situation directly to the south of the Town Centre, and the River Gipping to the West. The SSW part of the town is located within Flood Zone 3. This zone benefits from flood defences. There are a number of small water bodies within the town centre.		
	Construction: None. **Operation:** None.		
Materials and Waste Management	**Existing Environment:** There is no material or waste management required for this option.		
	Construction: None. **Operation:** None.		

Appendix C

CONSTRAINTS MAPPING



Key

- Listed Building
- Environmentally Sensitive Area
- Parks and Gardens
- Scheduled Monument
- Local Nature Reserve
- Site of Special Scientific Interest
- Special Protection Area
- Wetland of International Importance
- Coastal and floodplain grazing marsh
- Coastal saltmarsh
- Deciduous woodland
- Good quality semi-improved grassland
- Lowland calcareous grassland
- Lowland dry acid grassland
- Lowland fens
- Lowland heathland
- Lowland meadows
- Mudflats
- Reedbeds
- Traditional orchard
- No main habitat but additional habitats
- Overhead Lines
- High Pressure Gas Mains
- East Anglia ONE Route

WSP | PARSONS BRINCKERHOFF

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

Option Assessment Report

70023942-WSP-RPT-OAR-001

Document End

62-64 Hills Road
Cambridge
CB2 1LA

wsp.com

Page left blank

Suffolk County Council

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

OPTION ASSESSMENT REPORT ADDENDUM

70023942-WSP-RPT-OAR-002
JANUARY 2020

PUBLIC

Suffolk County Council

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

OPTION ASSESSMENT REPORT ADDENDUM

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70023942

OUR REF. NO. 70023942-WSP-RPT-OAR-002

DATE: JANUARY 2020

Suffolk County Council

IPSWICH NORTHERN ROUTE TRANSPORT STUDY

OPTION ASSESSMENT REPORT ADDENDUM

WSP

62-64 Hills Road
Cambridge
CB2 1LA

Phone: +44 1223 558 050

Fax: +44 1223 558 051

WSP.com

CONTENTS

TABLES

FIGURES

1 EXECUTIVE SUMMARY

1.1.1. This document forms an addendum to the Option Assessment Report, reference 70023942-WSP-RPT-OAR-001, in response to the evolution of project objectives that has occurred during the project.

1.1.2. WSP has been under commission to Kier on behalf of Suffolk County Council (SCC) since 2016 to carry out the Ipswich Northern Route Transport Study. This study considered a range of multi-modal transport opportunities, including road, rail, bus, cycle and other strategic interventions to facilitate and support the delivery of housing and employment growth in the north of Ipswich. Specifically, the aim of this study is to:

"Strategically review, short list and assess, the strategic viability of transport capacity improvements, in order to facilitate and support the delivery of housing and employment growth in north Ipswich and the wider Ipswich area."

This work was driven by a defined set of project objectives set out below, the findings of which led to the development of an Option Assessment Report (OAR). This addendum updates key elements of the OAR in response to the revised project objectives.

- Provide additional transport capacity to support planned and enable future residential and employment growth in the wider Ipswich area;
- Reduce congestion within Ipswich Town Centre, including along the A1214 corridor;
- Positive impact on the Strategic Road Network (SRN) including between the Copdock Roundabout – Junction 55, the Orwell Bridge, and Sevens Hills Roundabout – Junction 58, and improve the connection between the A14 and A12 for vehicles transiting to the north of Suffolk and Norfolk;
- Improve resilience of road network when the Orwell Bridge is shut;
- Improve Sustainable methods of transport within the east to west corridor to the north of Ipswich and links from the north of Ipswich to the Town Centre;
- Improve air quality and reduce noise on existing corridors;
- Enable economic growth for the wider Ipswich area by improving connectivity and accessibility; and
- Supporting economic growth and better connectivity to the Suffolk Energy Coast.

1.1.3. Following the development of the OAR, further work was undertaken to refine the objectives with a sharper focus on economic growth and resilience in the transport network, and to respond to changes in local housing and economic policies, and regional economic and housing growth aspirations for between 10,000-15,000 new homes in addition to existing Local Plan allocations. The objectives have been consolidated into a set of four primary objectives, each with a sub-set of supporting secondary objectives seeking to better assess the implications of the route on Ipswich and the local area that are now to be used for the project - see Figure 1-1 below:

Figure 1-1 - Revised Project Objectives

1.1.4. Within this addendum, the scheme options were re-scored against the updated objectives; the findings of this assessment reaffirmed the outcome of the initial study in that the strategic road schemes as scoring higher than all other options. For the purpose of this study, and in order to provide sufficient capacity resilience to meet future transport demand arising from strategic growth, dual carriageway options of the three primary routes are proposed to be taken forward to further appraisal:

- Inner Highway Route – Dual Carriageway;
- Middle Highway Route – Dual Carriageway;
- Outer Highway Route – Dual Carriageway.

1.1.5. The further appraisal process will collect the evidence needed to distinguish the relative costs, benefits, and impacts of the options for their strategic fit, value for money, financial, delivery and commercial case.

2 INTRODUCTION

INTRODUCTION

2.1.1. This document forms an addendum to the Option Assessment Report, reference 70023942-WSP-RPT-OAR-001, in response to the evolution of project objectives that has occurred during the project.

2.1.2. The OAR brief was to “Strategically review, short list and assess, the strategic viability of transport capacity improvements, in order to facilitate and support the delivery of housing and employment growth in north Ipswich and the wider Ipswich area”, that was informed by the project objectives.

2.1.3. The only material change that has been made following the development of the original OAR is a refinement of the scheme objectives, and this addendum seeks to re-assess the existing suite of options against the objectives, and identify any potential changes to ranking of the option shortlist that might influence the recommendation for which options to take forward for further assessment and stakeholder consultation.

SCHEME BACKGROUND

2.1.4. In order to meet the previously defined objectives, the study considered a range of transport measures involving radial and orbital routes, bus priority measures, relief roads, capacity improvements and new highways. This resulted in the production of a long list of 32 options, comprised of 31 transport interventions, and one ‘Do-Nothing’ scenario that assumes no intervention. The purpose of the ‘Do Nothing’ scenario was to act as a baseline against which relative benefits could be assessed, and provided a frame of reference for traffic modelling purposes to assess the impact on the local transport network without any scheme, allowing the extent of congestion and delay to be mapped out.

2.1.5. A detailed assessment based on methodology defined by the Department of Transport Early Assessment and Sifting Tool (EAST) concluded that a strategic road linking the A14 with A12 to the north of Ipswich provided the greatest benefits to the local transport network and economy. These routes were identified as:

- Inner Highway Route – Dual Carriageway;
- Middle Highway Route – Dual Carriageway;
- Outer Highway Route – Dual Carriageway.

A plan illustrating the route options is presented in Figure 2-1 below:

Figure 2-1 - Shortlisted Strategic Highway Options

2.1.6. Within the OAR the options were assessed against the original scheme objectives, strategic benefits, technical and environmental constraints. They were sifted by means of a two-stage process where an initial appraisal of each options' alignment with the scheme objectives was carried out, followed by a subsequent analysis of each option using the Department for Transport's Early Assessment and Sifting Tool.

3 SCHEME OBJECTIVES

3.1.1. Following development of the OAR, the scheme objectives underwent a further stage of review and evolution to reflect the consultations held with key stakeholders and contributors to the development of the business case.

3.1.2. The original objectives upon which the assessment was based were defined as:

- Provide additional transport capacity to support planned and enable future residential and employment growth in the wider Ipswich area;
- Reduce congestion within Ipswich Town Centre, including along the A1214 corridor;
- Positive impact on the Strategic Road Network (SRN) including between the Copdock Roundabout – Junction 55, the Orwell Bridge, and Sevens Hills Roundabout – Junction 58, and improve the connection between the A14 and A12 for vehicles transiting to the north of Suffolk and Norfolk;
- Improve resilience of road network when the Orwell Bridge is shut;
- Improve Sustainable methods of transport within the east to west corridor to the north of Ipswich and links from the north of Ipswich to the Town Centre;
- Improve air quality and reduce noise on existing corridors;
- Enable economic growth for the wider Ipswich area by improving connectivity and accessibility; and
- Supporting economic growth and better connectivity to the Suffolk Energy Coast.

3.1.3. The objectives now mirror these discussions and are set out below.

3.1.4. The original objectives have now been refined into four primary and 11 secondary objectives, which have taken into account a range of indicators, and have evolved through stakeholder engagement.

3.1.5. The new objectives which have been used to assess the options are shown in Table 3-1 below.

Table 3-1 – Scheme Objectives

Primary Objective	Secondary Objective
Improve business' and people's experience of using the A14 and provide additional route resilience	Positively impact on the A14; particularly for junctions with existing capacity issues, between Copdock, (J55), and Seven Hills, (J58)
	Improve connections for vehicles accessing the north of Suffolk and Norfolk from the A14 and A12
	Reduce congestion and increase resilience of the A14 including the Orwell Bridge
Support the existing local economy through improved connectivity, making Suffolk the best place to do business.	Enable economic growth in wider Ipswich area and Suffolk by improving connectivity and accessibility
	Supporting economic growth in Suffolk as set out in the Local Enterprise Partnership's Economic Strategy for Norfolk and Suffolk, including the Suffolk Energy Coast
	Supporting the delivery of the Economic Strategy for Norfolk and Suffolk and emerging Local Industrial Strategy for Norfolk and Suffolk
Provide additional travel options, helping to optimise existing road capacity in Ipswich, leading to environmental improvements	Less congestion in Ipswich and on the A1214
	Improved opportunities for sustainable trips along the route and in Ipswich, including walking and cycling
	Improve air quality and reduce noise on existing transport corridors
Directly support new homes and jobs growth to ensure the sustainable future success of Suffolk	Improve Transport capacity for planned residential and employment growth in the wider Ipswich area
	Enable the delivery of around 10,000 to 15,000 additional homes across Suffolk
	Optimise the environmental benefits of the project and support low carbon development

3.1.6. The new objectives above now make up the objective assessment part of the options assessment process, step 2 of the project, which now replaces the previous scheme objective assessment in the OAR.

3.1.7. It also shows how the policy derived from the New Anglia Local Enterprise Partnership (NALEP) has been considered and used to score the options of the study.

4 OPTION SIFTING

METHODOLOGY USED IN ASSESSMENT

4.1.1. The option sifting process used multi-criteria assessment to score scheme options. This included:

- analysis of current local and national policy;
- looking at the current transport conditions;
- proposing the need for intervention; and
- looking at any constraints that may hinder the process.

4.1.2. Options were then generated, which could then be assessed against the new objectives.

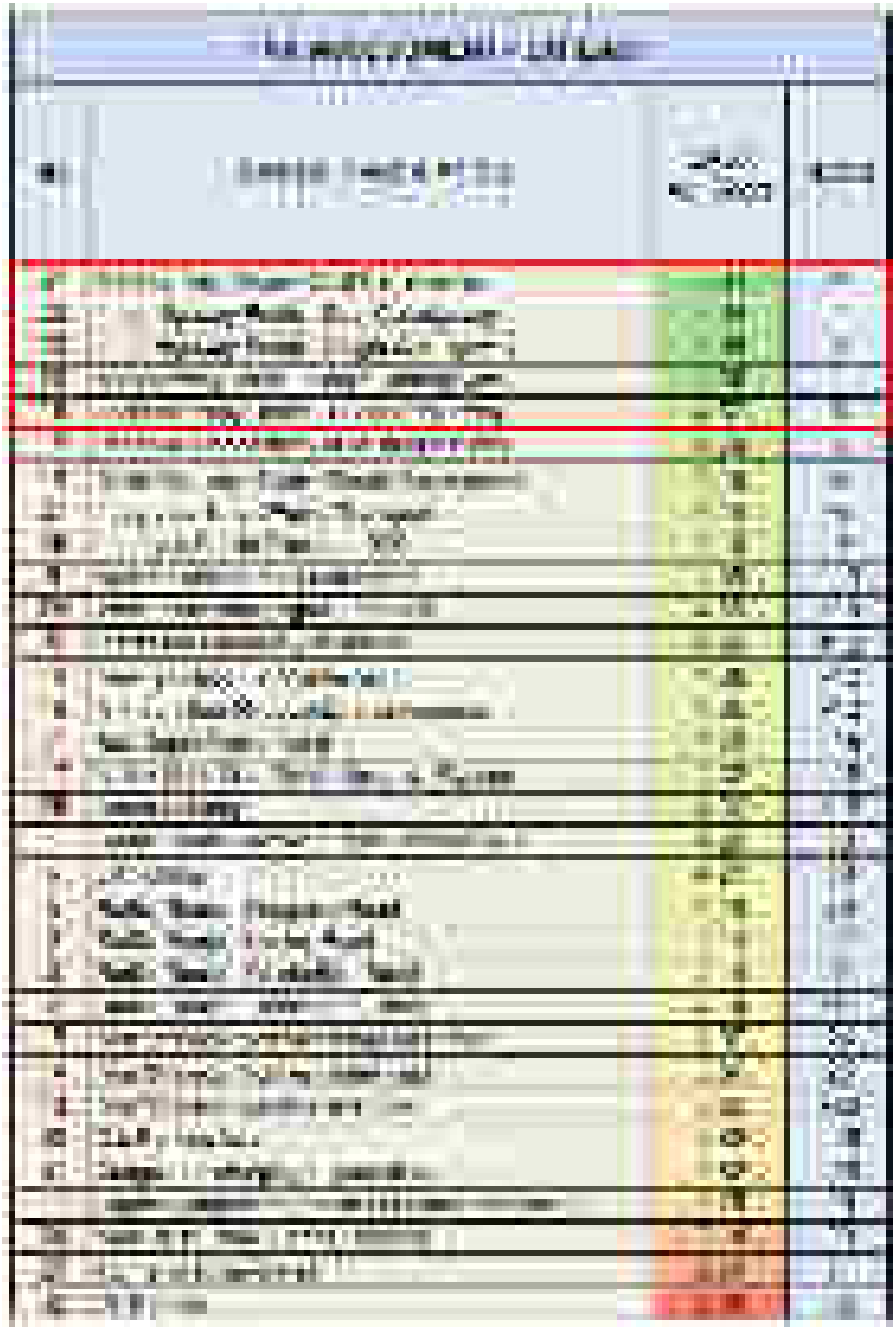
4.1.3. Within this addendum methodology, the scheme options were assessed against the new primary scheme objectives, within the Early Assessment and Sifting Tool (EAST) matrix (within the Strategic category). Each objective could be awarded between 0 and 7 points, with 7 points showing that the option is a strong fit for the objectives. An overall result was then calculated.

4.1.4. The objectives are scored under the 'Strategy' category of the EAST assessment. All 32 options were re-assessed against the new objectives in Table 3-1 and scored accordingly. The original scoring of the Economic, Managerial, Financial and Commercial categories was not re-visited as it was not affected by the change in objectives. The results from the re-scoring of the Strategic category were added to the original EAST scores for the other categories from the previous stage work to generate a revised scoring table.

The five options that scored the highest using the EAST Matrix were Options 19, 20, 21, 22, 23, (all road-based schemes) as they met all four of the new primary objectives. The dual carriageway options will be taken forward (as they represent a worst-case land take compared to single carriageway and can be scaled down at a later stage if required).

Table 4-1 below shows results from the EAST Matrix for each of the options.

Table 4-1 – EAST Results inclusive of New Objectives



5 COMPARISON OF RESULTS

COMPARISON OF OAR RESULTS

5.1.1. The previous results generated in the OAR with the original scheme objectives produced a top 5 ranking of the below options:

- Option 23 Inner Highway Route – Dual Carriageway
- Option 21 Mid Highway Route – Dual Carriageway
- Option 22 Inner Highway Route – Single Carriageway
- Option 19 Outer Highway Route – Dual Carriageway
- Option 20 Mid Highway Route – Single Carriageway

5.1.2. The top 5 ranked options following the assessment with the new primary objectives are:

- Option 21 Mid Highway Route – Dual Carriageway
- Option 23 Inner Highway Route – Dual Carriageway
- Option 22 Inner Highway Route – Single Carriageway
- Option 20 Mid Highway Route – Single Carriageway
- Option 19 Outer Highway Route – Dual Carriageway

5.1.3. The results generated through the new objectives show that the top 5 options have not changed, but rather their position has. Previously option 23 was the highest scoring option followed by option 21, now they however have equal scores and share the first place. These two options equally fit with the scheme objectives and EAST assessment criteria.

5.1.4. The order has changed slightly owing to the refinement of scheme objectives. With clarity of the objectives the results are more consistent and reliable, that instils greater confidence in the ranked top five options selected will be the most appropriate.

5.1.5. As the findings of the revised assessment are consistent with the previous outcome, with no material change to the top five ranked options, these options are considered to be the best fit with the objectives are therefore recommended to be taken forward for further assessment.

OPTION REFINEMENT/DEVELOPMENT

5.1.6. As road-based options north of Ipswich scored highest in the option selection, work was undertaken to develop the designs further. Three initial route alignments were developed for dual carriageway schemes as they represented the worst-case land take and there would be future opportunity to downgrade to single carriageway if appropriate.

5.1.7. The route alignments were developed to avoid sensitive environmental receptors and constraints (including private residences) to minimise detrimental impact on local communities and the natural environment. The routes were also designed to meet the appropriate design standards as set out in the Design Manual for Roads and Bridges. This produced an initial alignment for each of the three route options, however there is some scope to modify these alignments further as the scheme progresses.

5.1.8. In addition to the shortlisted routes, a series of junction arrangements were considered for the A14, A12 and A140. These are shown in Figure 5-1. These were designed with the aid of updated traffic modelling to ensure each option would suit the needs and objectives of the scheme.

Figure 5-1 - Junction Tie-in Configurations

5.1.9. The refined route options and tie-in junction configurations will form the basis of Public Consultation and will inform a Strategic Outline Business Case for the Ipswich Northern Route project.

6 CONCLUSION

6.1.1. This document forms an addendum to the Option Assessment Report, reference 70023942-WSP-RPT-OAR-001, in response to the evolution of project objectives that has occurred during the project.

6.1.2. The new objectives have evolved to better reflect the needs of the scheme and to provide the best solution to traffic congestion in Ipswich and improvements to the wider Suffolk transport network.

6.1.3. There has been no material change in the end results following the assessment with new scheme objectives and the top 5 options assessed in the original OAR report have been shown to have the best fit with the new objectives.

6.1.4. The top five objectives that will be taken forward for the SOBC are:

- Option 21 Mid Highway Route – Dual Carriageway
- Option 23 Inner Highway Route – Dual Carriageway
- Option 22 Inner Highway Route – Single Carriageway
- Option 20 Mid Highway Route – Single Carriageway
- Option 19 Outer Highway Route – Dual Carriageway

6.1.5. The list above shows that the same 5 options will be taken forward for further assessment in the Strategic Outline Business Case (SOBC), as they were in the OAR. The SOBC will further analyse the fit of the options with the objectives and outline the business, management and economic cases for the project.

6.1.6. Public consultation will be held between July 2019 and September 2019 to receive feedback on the proposed options, which can then be refined further as required to produce options that reflect the needs of the area and the people.

62-64 Hills Road
Cambridge
CB2 1LA

wsp.com