

A47/A12 Corridor Feasibility Study

Stage 1: Review of Evidence
and Identification of
Problems along the Corridor

A Report by AECOM for the Highways Agency

February 2015

EXECUTIVE SUMMARY

Following the 2013 Spending Review, the Government announced its plans for the biggest ever upgrade of the strategic national roads network. The HM Treasury document, Investing in Britain's Future (July 2013) set out details of the programmes of infrastructure investment, which included the tripling of annual investment on Highways Agency major roads enhancements from today's levels to over £3bn by 2020/21.

As part of that investment programme, the Government announced that it will identify and fund solutions, initially through feasibility studies to look at problems and identify potential solutions to tackle

some of the most notorious and long-standing road hot spots in the country. The A47/A12 corridor was announced as being one of the six Feasibility studies.

In order to manage the study the governance and management arrangements were established. The study was undertaken by the Project Board which was made up of representatives from the Department for Transport and the Highways Agency. Throughout the study the Project Team engaged with Stakeholders given the range of stakeholder interest in the study.

The study considers the A47, from its junction with the A1 to the north west of Peterborough through to Great

Yarmouth; and the northern section of the A12 from Great Yarmouth to Lowestoft including Bascule Bridge.

The purpose of the study was to inform investment planning for the strategic road network, it predominantly focuses on road based solutions but in arriving at those the analysis considered all travel demand and various modes of transport along the corridor.

The study was carried out in three stages and is guided by DfT's Transport Analysis Guidance (WebTAG). This report constitutes Stage 1 of the three stage process and specifically accords with Steps 1 to 4a/b set out in WebTAG.

CURRENT SITUATION

The Stage 1 report reviews existing evidence to identify any problems along the corridor. It utilises a wealth of information from the Highways Agency and various stakeholders.

The standards and level of service on the A47 vary considerably over its length with part of the network which are single and dual carriageways. It is understood that the widely held opinion by local authorities and the business community, is that the corridor in its current form is a significant constraint to growth.

The A47 Acle Straight, between Acle and Great Yarmouth runs across low lying marsh land. It has a perceived poor safety record and is notoriously difficult to maintain and manage due to congestion and very long diversion routes particularly at peak holiday periods. The A12 in Lowestoft and Great Yarmouth is generally urban in nature, a mixture of single and dual carriageway sections. The A12 between the two towns is dual carriageway with at-grade junctions.

FUTURE SITUATION

The area is expected to continue to grow with over 50,000 new jobs and 100,000 new homes planned for the area over the next 15 years.

There are growth hotspots at several locations along the corridor, including Peterborough, Kings Lynn, Norwich and Great Yarmouth and Lowestoft. There are several major proposed housing developments close to the A47, including at Rackheath and Wisbech, Norwich and on the fringes of Great Yarmouth and Lowestoft.

Growth is forecast to result in increased traffic levels on sections of the route and therefore add to congestion and other problems. At the same time, proposed developments could be constrained by the capacity limitations on the highway network to accommodate additional trips.

NEED FOR INTERVENTION

There are a wide range of traffic issues along this route due to the varying nature of the corridor in terms of local environment, travel patterns and requirements. The main issues for the route relate to capacity; some of the links and junctions are currently over capacity and/or will be over capacity. The limited capacity impacts on the route reliability and creates journey time delays. It also can cause traffic to divert onto the nearby highway network and generate further issues. There are safety issues in certain locations where there are currently high collision and incident rates which could be addressed.

A summary of the challenges was considered within study which identified 32 challenges along the route with the majority being capacity issues along the full extent. Other challenges raised relate to asset condition, network operation, safety and social and environmental issues and also the lack of realistic alternatives to support planned growth, hence the need for interventions to address such problems.

REFINING THE OBJECTIVES AND GEOGRAPHIC AREA OF INTEREST

The transport challenges and their relationship with the wider economic, social and environmental challenges have been explored in this report. The objectives have been derived from the evidence gathered and the Stakeholder Consultation and are split between strategic and operational objectives to assist prioritisation.

The data analysis and identification of current problems and future issues informed the definition of a set of intervention objectives that were subsequently used in generating and assessing options to improve the route. These objectives were to:

■ Support economic growth:

- Facilitate growth in employment at key centres and locations along the A47/A12 corridor

- Facilitate growth in housing at key development hotspots along the corridor

■ Improve capacity, resilience and safety:

- Reduce delay and queues that occur during the peak hours and seasonal times of the year
- Improve the resilience of the route, such that the number of incidents and the effects of incidents is reduced
- Reduce the number of collision on the A47/A12 at key hotspots on the corridor

■ Environmental concerns:

- Minimise unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring.

The challenges were then verified and refined geographically by reviewing them against the proposed growth areas along the corridor. This established those areas in the vicinity of Peterborough, Norwich and Great Yarmouth as being the highest priority. In addition through the evidence gathering and validation process of the challenges, an exercise establishing link stresses along the corridor, together with junction modelling to assist with verifying where a problem is either a current or future challenge. Further refinement of the challenge also considered whether an emerging scheme or intervention could be realistically delivered within the timescale of 2021. At this stage anecdotal evidence was also included as part of the considerations.

1 INTRODUCTION AND PURPOSE

INTRODUCTION

This is the first of three reports. This report aims to identify the current and potential future issues that relate to the A47/A12 Corridor. This report will gather evidence of the existing situation on the corridor and the issues that currently exist. This report will also document the future pressures associated with the predicted growth along the corridor. The study will conclude with establishing whether there is a need for considering an intervention and also prioritise the list of challenges.

CONTEXT

The Department for Transport (DfT) commissioned the A47/A12 study to look at ways of improving the A47 and A12 trunk roads between the A1 and Great Yarmouth and the A12 between Great Yarmouth and Lowestoft. AECOM is working on behalf of the

Highways Agency (HA) for the DfT to identify the problems and propose solutions.

This was one of six studies announced at the 2013 Spending Review to tackle long-standing road hotspots in different parts of the country.

The Spending Review committed Government to an historic shift in the UK's approach to roads, underpinned by the biggest programme of investment since the 1970s. By 2020-21 the Government plans to treble investment in major new road enhancements from today's levels, marking the start of a radical new programme of renewal of the strategic road network. This is alongside an investment of £10 billion for repairs to ensure sustainability of the HA network.

Significantly, this investment is being underpinned by reforms to the way the HA manages the road network to lock-in investment and secure collaboration with the construction industry to deliver this step change in investment. The Government will

invest over £28 billion in enhancements and maintenance of national and local roads.

STUDY AIMS AND OBJECTIVES

The aim of the A47/A12 Corridor Feasibility Study was to identify and assess future options for investment in solutions along the A47/A12 corridor that are deliverable, affordable and offer value for money.

The specific objectives of the study were to:

- To identify and assess the case for deliverability and timing of specific infrastructure investments that address existing problems on the A47/ A12 corridor;
- To understand the balance of benefits and impacts from potential individual investment proposals and any additional benefits or impacts from the perspective of the whole corridor; and
- To evidence where possible, the wider economic benefits of transport investment in the corridor.

STAKEHOLDER ENGAGEMENT

Stakeholder engagement has been a key feature of the study process, building upon earlier stakeholder engagement, notably in relation to the Highways Agency (HA) Route Strategy evidence reports. In particular, the study team established a Stakeholder Reference Group which met at each stage of the study.

In addition there were bilateral meetings with individual members of the Stakeholder Reference Group to obtain information. For example, meetings were arranged with Norfolk County Council and Suffolk County Council to discuss the challenges

along their part of the A47 and A12 corridor. There were also telephone and email discussions with Peterborough City Council and Fenland District Council.

The discussions covered one key theme: 'what are the issues and challenges for the corridor. In addition to these we also asked what information was available that substantiates that there is currently an issue and whether any solutions/options have been identified to date that would inform this study.

This study aims to pull together the numerous national and local studies that

have already been carried out on this stretch of road to help inform investment decisions.

Given the wide range of stakeholder interest in the A47/A12 study, and the need to keep the project board a manageable size, a Reference Group was established for the study.

The main role of the Reference Group was to ensure stakeholders' views were captured and considered during the study process, particularly at key points in the study's work and at times of the development of key outputs.

STUDY SCOPE AND APPROACH

The scope and approach of the study was outlined in the Scope Document which was developed by the Department for Transport with Stakeholders¹. As its purpose was to inform investment planning for the strategic road network, the study focused on road-based solutions but informed by analysis of travel demand in general and the availability of different transport modes.

The study did not consider specific issues or proposals in relation to other parts of the motorway or trunk road network in the vicinity of the corridor, as these were considered as part of the preparation of HA's Route Strategies.

The study was undertaken in three stages and guided by the DfT's Transport Analysis Guidance (WebTAG).

This report constitutes the first of three reports. **Table 1.1** provides a summary for each stage of the process and the related WebTAG steps that the report follows.

Table 1.1 Study stage process

Stage	Task
1	Step 1 – Understanding the current situation
	Step 2 – Understanding the future situation
	Step 3 – Establishing the need for intervention
	Step 4a – Identifying the objectives
	Step 4b – Define the geographic area of impact to be addressed by the intervention
2	Step 5 – Generating options
	Step 6 – Initial sifting of options
	Step 7 – Development and assessment of potential options
3	Step 8 – Produce an option assessment report
	Step 9 – Clarify modelling and appraisal methodology for further appraisal (Stage 2 of WebTAG)

¹ Scoping Document: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/345566/a47-feasibility-study-scope.pdf

REPORT PURPOSE AND CONTENT

This report will detail the current and future situation and establish the need for a possible intervention and focus the geographical area of interest. The following structure for this report has been applied:

- **Chapter 2:** Background and Historical Work – provide a summary of the background information used as evidence to substantiate the issue located along the corridor
- **Chapter 3:** Understanding the Current Situation – provide an understanding of the current performance of the route and an overview of the travel demands and the provision of transport that uses the corridor
- **Chapter 4:** Understanding the Future Situation – sets out the evidence of planned development and future growth aspirations as well as predictions of the resultant traffic growth and the issues related to network performance
- **Chapter 5:** Establishing the Need for Intervention – this chapter draws on the current issues and future growth aspirations along the corridor and how these will impact the network which then establishes the need for an intervention
- **Chapter 6:** Refining Objectives – sets out objectives defined specifically for the corridor in the context of the problems identified in this stage of the study
- **Chapter 7:** Refining the Geographical Area of Interest – this summarise where interventions will be investigated as part of the next stage of the study based solely on the evidence collected at this stage of the study
- **Chapter 8:** Summary and Conclusions

2 BACKGROUND AND HISTORICAL WORK

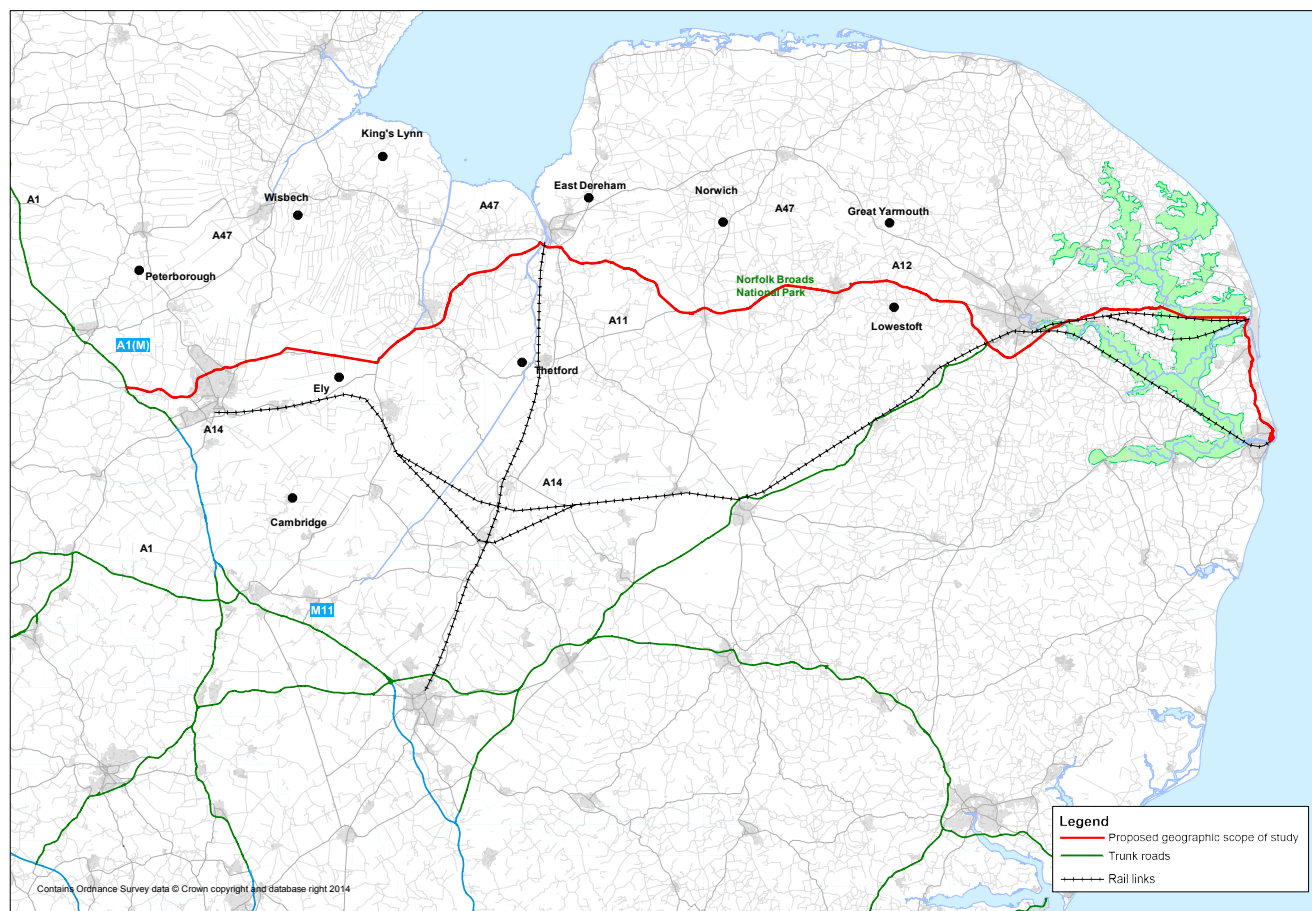
INTRODUCTION

This chapter describes the corridor that the study considers and the sources of evidence used and previous analysis that was completed.

THE STUDY CORRIDOR

The study covered the A47, from its junction with the A1 to the North West of Peterborough through to Great Yarmouth; and the northern section of the A12 from Great Yarmouth south to Lowestoft including the Bascule Bridge. This is illustrated in **Figure 2.1**.

Figure 2.1 Study Corridor – Geographical Scope



The study corridor forms a major east-west route through East Anglia connecting key population and economic areas such as at Peterborough, Kings Lynn and Norwich. The majority of the corridor runs through rural areas with low population densities while most of the population concentrated within larger urban areas of Peterborough, Wisbech, Kings Lynn, Dereham, Great Yarmouth and Lowestoft as well as smaller towns including Wisbech, and Swaffham.

The A47 varies considerably in standard over its length between single and dual carriageway standard, with at-grade and grade separated junctions. It is single carriageway between the A1 and the commencement of the Ailsworth Bypass (north of Peterborough) with at-grade junctions and accesses.

The study corridor intercepts with key strategic routes including the A1, A10 and A11. These strategic roads provide links the other urban centres including Cambridge, Ely and London.

Sections of the A47 experience significant seasonal variations in traffic volumes associated with tourism in the broads and coast of Norfolk.

The Norwich to Peterborough Multi-Modal Study (2002) highlighted Norwich being the area whose economic potential should be maximised building on its existing sectoral strengths and the opportunity afforded by Norwich Airport. Peterborough's continued establishment as a major regional employment centre is supported with the expansion of the Hampton Township and the need to move away from car based travel.

The East of England experienced rapid population growth between 1970 and 1990, when its population increased by over 20%, some three times the national average. There was an economic boom during the 1980s and although growth has slowed in the subsequent period.

A47 PETERBOROUGH TO GREAT YARMOUTH

Between Peterborough and Norwich the A47 is predominantly single carriageway with at-grade roundabouts and priority junctions. There are, however, a number of dual carriageway sections. These are at Thorney (with at-grade junctions), Walton Highway to Tilney High End (grade separated and at-grade), King's Lynn

(grade separated and at-grade), Swaffham (grade separated) and Dereham (grade separated and at-grade) Between Dereham and Norwich this is predominantly single carriageway but with a dualled section between Dereham and Hockering.

From Easton the A47 passes to the south of Norwich where it is built to relatively modern dual carriageway standards, with a number of grade separated junctions. To the east of Norwich the route is a mixture of single and dual carriageway sections with a series of at grade junctions. A number sections along the corridor feature minor junctions, direct access to properties and direct access to adjacent fields.

No direct rail link exists between Peterborough and Great Yarmouth. Single rail line runs parallel with the corridor. Rail lines do serve all of the urban areas along the corridor.

The corridor travels near to Norwich International Airport. The next nearest airport is at Stansted which is south of Cambridge along the M11. The corridor also provides access to Gt Yarmouth and Lowestoft ports.

A12 (LOWESTOFT HARBOUR TO A47 GREAT YARMOUTH)

There are two opening bridges on the A12. The first one is Breydon Bridge and the second is the Bascule Bridge in Lowestoft. The A12 south of Great Yarmouth provides trunk road access to Lowestoft as well as performing a local function. The trunk road terminates at the southern end of the

Bascule Bridge in Lowestoft. The A12 passes through the urban areas of Lowestoft and Great Yarmouth where it is primarily single carriageway, but with a significant length of dual carriageway between Gapton Hall/ Pasteur and Middleton Road. Between these communities the A12 is dual carriageway standard with at-grade junctions. The study includes the Bascule Bridge which can be raised, temporarily closing the A12

to traffic, to allow entrance to the port of Lowestoft for larger sea going vessels.

The geographical scope of the study is shown in schematic form in **Figure 2.2** which shows the single and dualled sections of the study corridor. The schematic diagram illustrates some of the key junctions along the route and local planning authority boundaries.



Figure 2.2 A47/A12 Feasibility Study Corridor

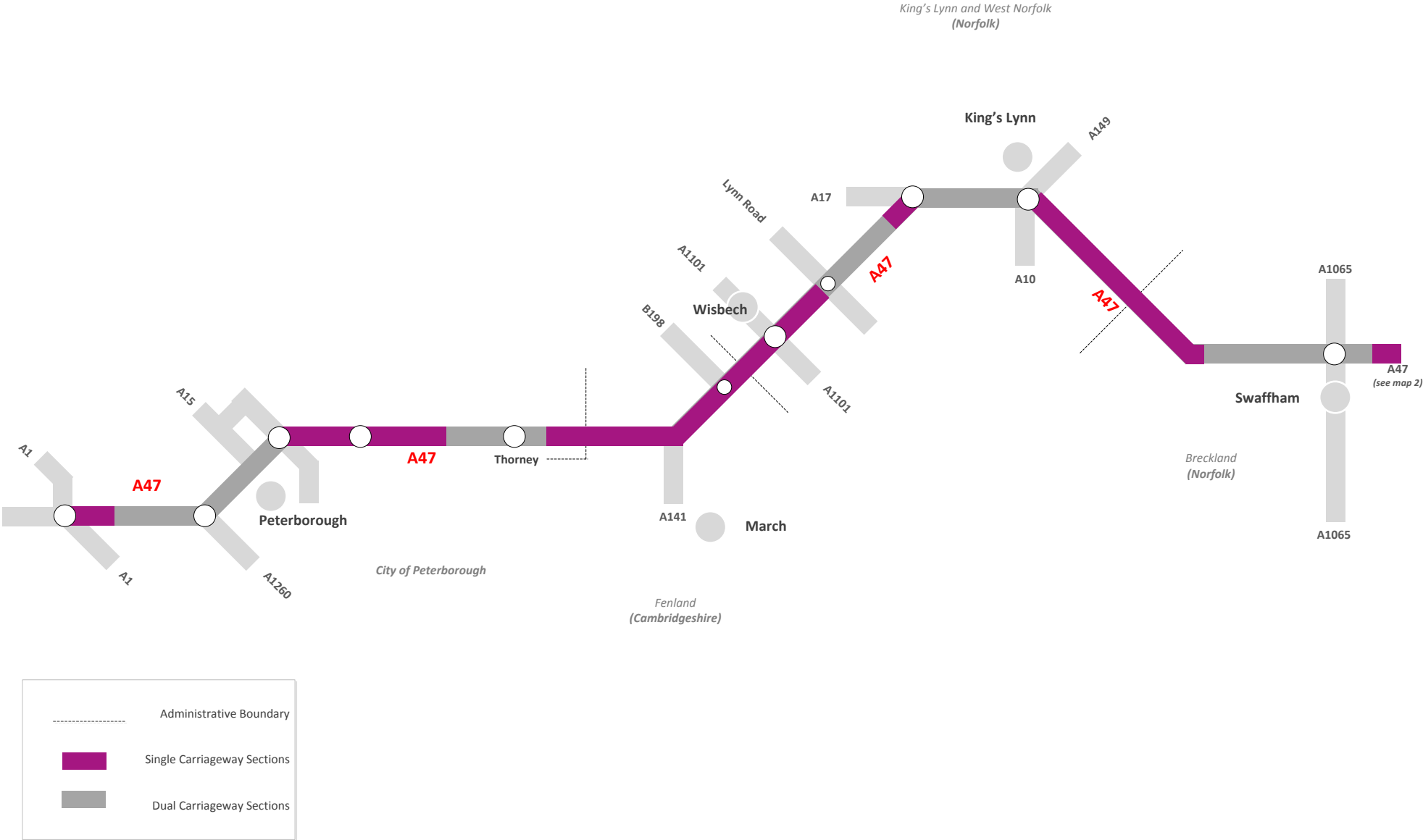
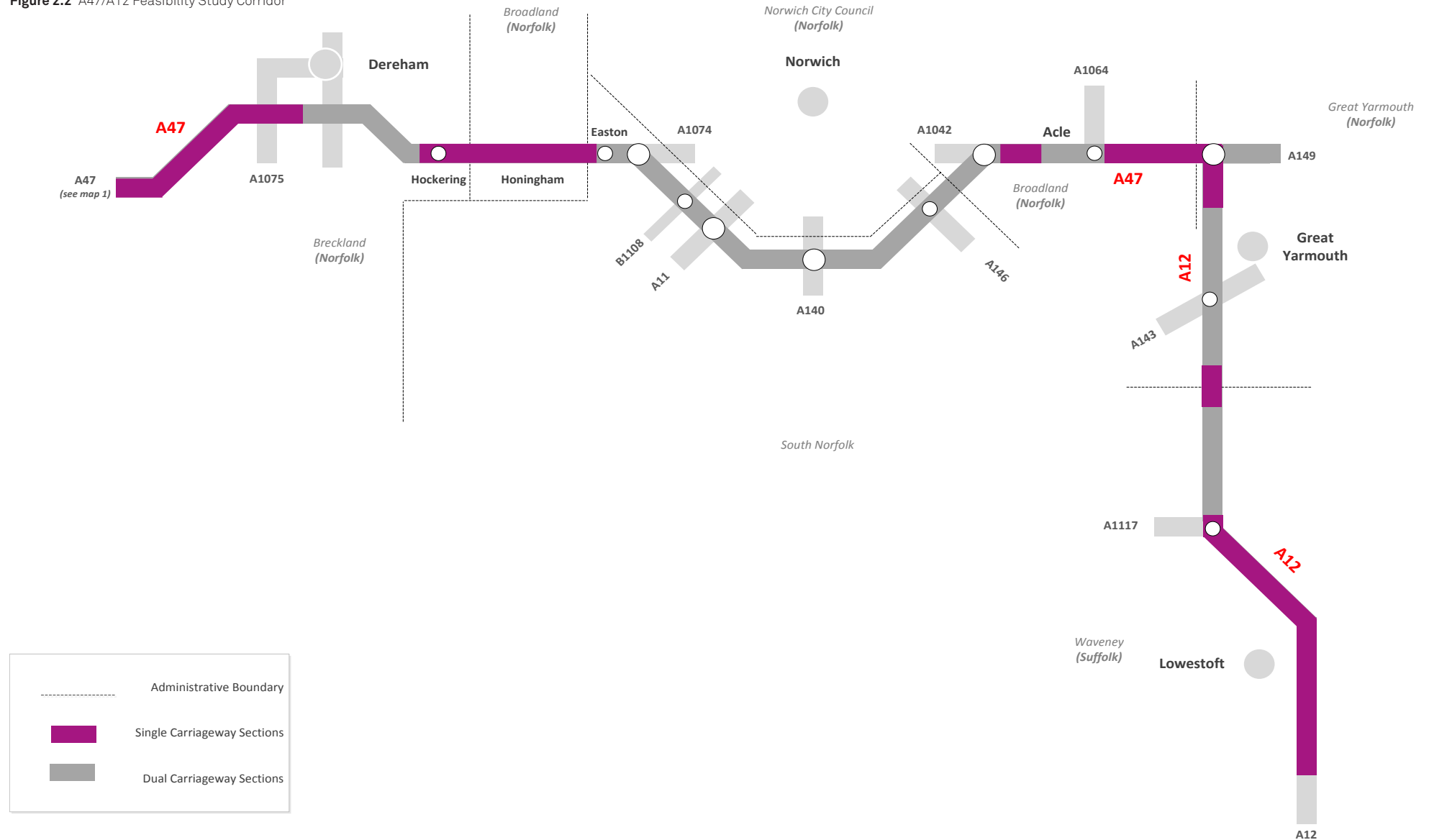


Figure 2.2 A47/A12 Feasibility Study Corridor



SOURCES OF INFORMATION AND PREVIOUS ANALYSIS

Additional information has been gathered and used to identify challenges along the corridor and to inform the study. These are:

NORWICH TO GREAT YARMOUTH ROADS BASED STUDY (2001)

The study was undertaken by Oscar Faber on behalf of the former Government Office to review the most serious and pressing problems that could be targeted through a targeted programme of improvements. The identification of opportunities for shift of passenger and freight traffic away from the road corridor and the potential of infrastructure and public transport improvements was also considered as part of the study on how they would help resolve problems.

Specific aims of this study was to address solutions to congestion and safety problems on the single carriageway sections of the route and the associated poor access and unreliable journey times to the ports of Great Yarmouth and Lowestoft.

The short and longer term recommendations for the route made in the 2001 study are described below.

The Short Term (by 2005) recommendations were:

- new incident detection and driver information systems on A47 corridor,
- local junction improvements and new speed limit and enforcement on Acle Straight.

The Longer-Term Highway Improvements (by 2016) were:

- improvements to junctions on western approaches to Great Yarmouth;
- dualling of section from Blofield to North Burlingham, to complete the dual carriageway from Norwich to Acle;
- widening, in the long term, to modern single two-lane carriageway standard, of Acle Straight.

NORWICH TO PETERBOROUGH MULTI MODAL STUDY (2003)

The study was undertaken by the former Government Office to address the transport problems on the Norwich to Peterborough Corridor including the economic regeneration of East Anglia. The report developed a set of recommendations for implementation over a short, medium and longer term programme up to 2031.

The analysis carried out by the study provided a framework for considering future transport investment decisions in the study area.

The 2003 study concluded that full dualling of the A47 from Norwich to Peterborough could not be justified on the then current and projected traffic volumes. The study recommended a phased programme of improvements to sections of the route for delivery over the short (to 2016), medium (to 2026) and longer term (post-2026). The short term measures were:

- upgrading the A47 to dual-2 lane standard between the A1 and Sutton (west of Peterborough);

- upgrading the A47 to dual-2 lane standard between North Tuddenham and Easton (west of Norwich);
- introduction of improved management measures on the A47 Peterborough Parkway to include improved signing and localised improvements to selected junctions;
- support for continued implementation of the Highways Agency's vulnerable road users crossing improvements to reduce severance of the A47 at key locations;
- consider the case for small scale bypasses to the villages of Middleton and East Winch.

A12 LOWESTOFT STUDY LAKE LOTHING THIRD RIVER CROSSING STUDY (2014)

During 2014 Suffolk County Council appointed consultants to provide a comparative assessment of 3 indicative locations for a new crossing of Lake Lothing shown in the Lowestoft Transport and Infrastructure prospectus 2013-2025.

The study included a consultation exercise to engage stakeholders and the public to obtain their views on a road crossing.

At their Cabinet meeting on 27 January 2015 the County Council agreed to forward the conclusions of the work to government for consideration when drawing up their programme of improvements for the A47/A12.

HIGHWAYS AGENCY, AREA 6 QUARTERLY SAFETY REPORT (Q4 2014), SKANSKA, JANUARY 2014

This report provided analysis of collision and casualty numbers recorded within the 12 month study period.

HIGHWAYS AGENCY, ROUTE STRATEGY EVIDENCE REPORT: EAST OF ENGLAND, APRIL 2014

This report investigated the East of England routes' capability, condition and constraints whilst identifying local growth aspirations. The report reports on the priority list of challenges and opportunities, identifying where capacity could be improved at junctions and safety concerns. The report also highlights the impact of housing and employment developments around eastern England's large and medium-sized urban centres that require improved infrastructure.

GREATER CAMBRIDGE GREATER PETERBOROUGH ENTERPRISE PARTNERSHIP, STRATEGIC ECONOMIC PLAN, JULY 2014

The Greater Cambridge Greater Peterborough Enterprise Partnership's Local Transport Board have worked together with partners to develop delivery plan to improve the transport infrastructure and support housing and economic growth. The plan looks at the issues related to the SRN within their region, local sustainable projects and identifies the requirement for larger investments.

NEW ANGLIA LEP STRATEGIC ECONOMIC PLAN, MARCH 2014

New Anglia LEP's Strategic Economic Plan set out to address the regions' shortfalls and growth opportunities. The plan demonstrated the housing and employment commitments and potential growth locations with reference to specific improvements on the strategic road network in order to achieve this.

**PETERBOROUGH CITY COUNCIL,
A47 ALLIANCE, A47 PETERBOROUGH
AND CAMBRIDGESHIRE, CASE FOR
IMPROVEMENT EVIDENCE AND WIDER
ECONOMIC BENEFITS, JANUARY 2014**

This study evidence base for A47 between A1 and Wisbech including an assessment of the wider economic benefits that could be delivered through making changes and improvements to the road. This study also identified the single carriageway sections of the A47 that performs poorly in terms of network performance, journey times and road safety.

**PETERBOROUGH CITY COUNCIL,
PETERBOROUGH LONG TERM
TRANSPORT PLAN AND INTEGRATED
DEVELOPMENT PLAN, 2011**

A 15 year transport plan assessing the key transport issues in the area. The council have a large focus on promoting green sustainable transport alternatives which falls in line with the local Sustainable Community Strategy.

**A47 ALLIANCE, ROUTE
STRATEGY, JANUARY 2014**

The A47 Alliance presented its case to Government for improvements along the A47/A12 corridors and need of investment. The work showed some of the major underperforming sections of the A47. It set out priority investments in the short, medium and long term in order to resolve the problems in this corridor.

**NORFOLK COUNTY COUNCIL, A47
WIDER ECONOMIC BENEFITS, MOTT
MACDONALD, AUGUST 2012**

This study considered the A47 corridor primarily within Norfolk and calculated the monetised benefits of potential improvement schemes and the benefits to the local economy. It also considers the longer term objective of Norfolk County Council (NCC) of full dualling of the A47 throughout its length.

**NORFOLK COUNTY COUNCIL, A11/
A47 THICKTHORN INTERCHANGE
IMPROVEMENT: CONCEPT
SCHEME OPTIONS REPORT, MOTT
MACDONALD APRIL 2013**

Following analysis of the Norwich Area Transport Strategy (NATS) model identified Thickthorn Interchange as one of the number of junctions that would see a significant increase in traffic demand. This study looked at viable options to accommodate the potential increase in traffic.

TRAFFIC MODELS

Strategic models and junction models for the A47/A12 corridor have been reviewed in order to build an understanding of predicted traffic growth on the network during the study period. Details of these models and their current validity are given in **Table 2.1**.

Table 2.1 Strategic Traffic Models

Model	Geographical Scope	Model Base Year	Status
East of England Regional Model (EERM)	A47 and A12 routes	2006	Strategic SATURN model Age of base year data exceeds desirable time limit. The 2006 re-validation was based on additional RSI surveys in parts of Norfolk and Suffolk.
Peterborough Transport Model (PTM)	A47 (A1 to Thorney)	2003/ 2006	Strategic SATURN model Age of base year data exceeds desirable time limit.
Wisbech Area Transport Study (WATS) model	A47 (A141 Guyhirn to B198 Lynn Road junction NE of Wisbech)	2008	Strategic SATURN model Base data is reaching time limit.
King's Lynn Transport Model (KLTM)	A47 (A17 to A149)	2007	Strategic SATURN model Base data is reaching time limit.
Norwich Area Transportation Strategy (NATS)	A47 from Dereham to Acle	2006/ 2012	Strategic SATURN model 2006 Base data is reaching time limit. Status of 2012 recalibration unclear.
Great Yarmouth Area Transport Strategy (GYATS)	Short section of A47 approaching Great Yarmouth A12 from A47 to Gorleston Golf Club on south edge of Great Yarmouth	2003	Strategic SATURN model Age of base year data exceeds desirable time limit.
Lowestoft	A12 – From B1375 north of Lowestoft to B1437 junction south of Lowestoft.	2001	Strategic SATURN model Age of base year data exceeds desirable time limit.

All models above could be considered to be too old and not compliant with WebTAG. The study team also considered that use of the East of England Regional Model (EERM) to inform the decision making process would not be adequate due to the age of base year data exceeding the desirable

time limit and the accuracy of the model is restricted and therefore has not been used.

3 UNDERSTANDING THE CURRENT SITUATION

INTRODUCTION

This chapter summarises the current performance of the route and provides an overview of the travel demands and the provision of transport that uses the corridor.

OVERVIEW OF ROUTE OPERATION AND CONDITION

This section summarises the work undertaken by the Highways Agency as part of the East of England Route Strategy in April 2014 documented the issues along the corridor. Input from stakeholder and road user groups linked to the route was used to inform the evidence in the Route Strategy.

The main concerns raised was the route's resilience identified as a key challenge, particularly in response to incidents which could cause traffic to find alternative routes via local roads which are not suited to carrying heavy traffic volumes. The single carriageway sections of the A47 between Norwich and King's Lynn, and on the Acle Straight through the Broads area are locations where this challenge is particularly acute.

Provision of reliable and useful information to motorists using the network was identified as a key challenge, and how

improved technology could be a useful device in the better management of traffic flows, particularly where traffic volumes are expected to increase in the future. The A12 was specifically identified in this respect.

This may be particularly pertinent in the Greater Norwich area where there is a significant amount of development expected to come forward, and the A47 will act as an important artery between new communities, for example around Wymondham, Easton and Rackheath and Norwich City and other employment centres.

In terms of asset conditions carrying out maintenance to the A12, some sections are particularly difficult to maintain due to the single carriageways and in addition there being very few suitable diversion routes on either the county or strategic road networks for either planned or unplanned maintenance.

A number of capacity challenges was also identified; some which already occur and some are anticipated in the future.

Key nodes around Norwich, including the A47/A1074 Longwater Interchange, the A47/A11 Thickthorn Interchange and the A47/A1042 Postwick Interchange all currently experience congestion and are therefore a priority challenge to address in the short to medium term. Improvement measures are under consideration at all of these junctions to improve the operation of the network and accessibility

to Norwich from surrounding existing areas as well as key growth proposals at Norwich Research Park, Broadland Gate, Hethel Engineering Centre and around Easton/Costessey and Rackheath.

Key nodes around King's Lynn, including the A47/A17 Pullover Junction and the A47/A10/A149 Hardwick Interchange and act as gateways to King's Lynn as well as facilitating the movement of longer distance traffic however they experience capacity issues. Key development proposals in King's Lynn, as well as in surrounding towns

including Wisbech, will be likely to generate additional traffic movements which could affect the capacity of the route. A challenge will be to deliver improvements to ensure the vitality of King's Lynn, towns such as Wisbech and the wider area, is not inhibited.

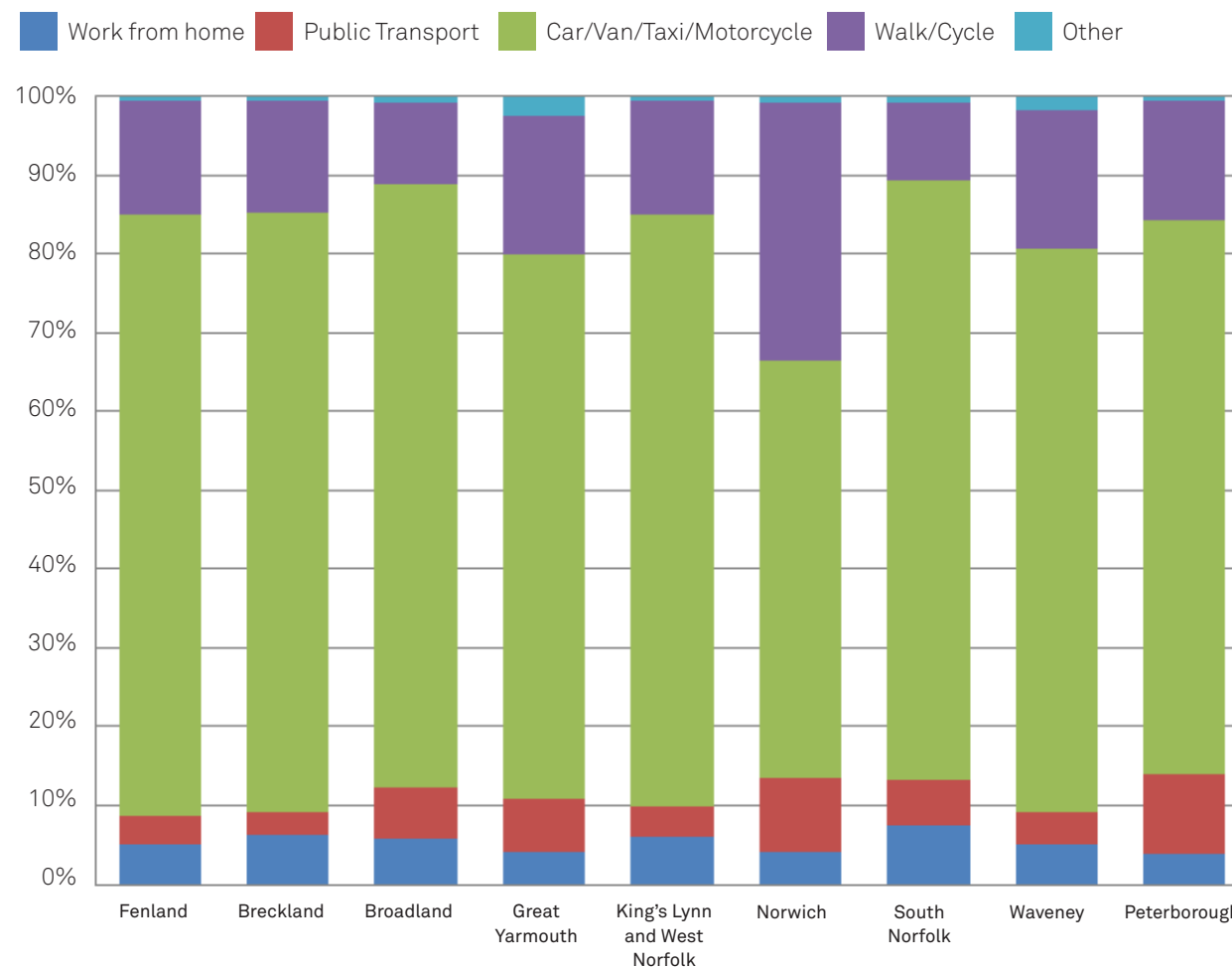
The A47 between the A1 and Sutton, west of Peterborough, and the section between North Tuddenham and Easton, west of Norwich, both experience peak period congestion. Growth in Peterborough and Norwich could potentially exacerbate this situation.

TRAVEL DEMAND

A Key source of information is for travel demand is provided by the 2011 Census Analysis – Method of Travel to Work in England and Wales released by the Office for National Statistics on 13 February 2013 (**Figure 3.1**). Data of the areas along the A47 / A12 have been analysed and the following conclusions have been derived:

- Driving to work was the most common mode of commuting (71 per cent of the working population). 86,722 people walked or cycled to work (16 per cent), while 33,209 people commuted to work by public transport (6 per cent);
- Broadland was the district with the highest proportion of people driving to work (77 per cent) while Norwich had the highest proportion of people walking or cycling to work (33 per cent);
- In all the districts, the percentage of people walking or cycling to work was higher than the percentage of people commuting by public transport; and
- Peterborough was the district with the largest population for economic activity (Centre for Cities) whereas Great Yarmouth had the lowest number of working people.

Figure 3.1 Travel demand by mode of transport by town



Source: 2011 Census – Office for National Statistics

Figure 3.2 provides the origin and destinations for the main towns along the study corridor by mode of transport. It was clear from this exercise that Kings Lynn is the mid-point for commuter trips if you choose to travel from either end of the A47.

Figure 3.2 Method of Travel to Work by Town – Origin and Destinations

PETERBOROUGH = ORIGIN				
	Mode of Transport	Car & Passenger	Bus	Train
DESTINATIONS	Huntingdonshire	3453 [94%]	11 [3%]	90 [2%]
	South Kesteven	2361 [95%]	111 [4%]	26 [1%]
	Fenland	1964 [95%]	86 [4%]	11 [1%]
	South Holland	1055 [96%]	41 [4%]	6 [1%]
	East Northamptonshire	1033 [95%]	49 [5%]	0 [0%]
	Cambridge	452 [84%]	36 [7%]	49 [9%]
	Corby	422 [95%]	21 [5%]	1 [0%]
	South Cambridgeshire	410 [96%]	10 [2%]	8 [2%]
	Rutland	394 [99%]	2 [1%]	1 [0%]
	King's Lynn and West Norfolk	191 [96%]	8 [4%]	1 [0%]
PETERBOROUGH = DESTINATION				
	Mode of Transport	Car & Passenger	Bus	Train
ORIGINS	South Kesteven	7038 [93%]	410 [5%]	81 [1%]
	Huntingdonshire	5392 [93%]	296 [5%]	93 [2%]
	Fenland	4370 [92%]	289 [6%]	104 [2%]
	South Holland	3079 [97%]	42 [1%]	62 [2%]
	East Northamptonshire	1543 [98%]	31 [2%]	4 [0%]
	Rutland	974 [97%]	9 [1%]	17 [2%]
	King's Lynn and West Norfolk	478 [96%]	17 [3%]	3 [1%]
	South Cambridgeshire	397 [97%]	8 [2%]	6 [1%]
	East Cambridgeshire	257 [83%]	8 [3%]	43 [14%]
	Kettering	249 [100%]	0 [0%]	0 [0%]
GREAT YARMOUTH = ORIGIN				
	Mode of Transport	Car & Passenger	Bus	Train
DESTINATIONS	Waveney	2311 [88%]	328 [12%]	1 [0%]
	Norwich	1666 [86%]	178 [9%]	87 [5%]
	Broadland	1165 [91%]	106 [8%]	8 [1%]
	South Norfolk	779 [97%]	22 [3%]	1 [0%]
	North Norfolk	717 [96%]	29 [4%]	0 [0%]
	Breckland	207 [86%]	32 [13%]	2 [1%]
	King's Lynn and West Norfolk	198 [89%]	25 [11%]	0 [0%]
	Mid Suffolk	109 [69%]	50 [31%]	0 [0%]
	Suffolk Coastal	76 [88%]	9 [10%]	1 [1%]
	St Edmundsbury	37 [95%]	1 [3%]	1 [3%]
GREAT YARMOUTH = DESTINATION				
	Mode of Transport	Car & Passenger	Bus	Train
ORIGINS	Waveney	3794 [97%]	119 [3%]	1 [0%]
	Broadland	1534 [97%]	28 [2%]	17 [1%]
	South Norfolk	831 [100%]	3 [0%]	0 [0%]
	Norwich	757 [93%]	36 [4%]	24 [3%]
	North Norfolk	719 [98%]	12 [2%]	3 [0%]
	King's Lynn and West Norfolk	135 [92%]	12 [8%]	0 [0%]
	Breckland	124 [97%]	3 [2%]	1 [1%]
	Suffolk Coastal	63 [88%]	8 [11%]	1 [1%]
	Mid Suffolk	38 [100%]	0 [0%]	0 [0%]
	St Edmundsbury	13 [100%]	0 [0%]	0 [0%]
NORWICH = ORIGIN				
	Mode of Transport	Car & Passenger	Bus	Train
DESTINATIONS	Broadland	5468 [88%]	711 [11%]	14 [0%]
	South Norfolk	4866 [84%]	909 [16%]	35 [1%]
	Breckland	1298 [94%]	61 [4%]	15 [1%]
	North Norfolk	831 [90%]	53 [6%]	36 [4%]
	Great Yarmouth	757 [93%]	36 [4%]	24 [3%]
	Waveney	464 [90%]	15 [3%]	35 [7%]
	King's Lynn and West Norfolk	218 [97%]	6 [3%]	0 [0%]
	Mid Suffolk	160 [86%]	17 [9%]	10 [5%]
	St Edmundsbury	90 [87%]	9 [9%]	5 [5%]
	Ipswich	69 [57%]	0 [0%]	53 [43%]
NORWICH = DESTINATION				
	Mode of Transport	Car & Passenger	Bus	Train
ORIGINS	Broadland	15078 [85%]	2521 [14%]	153 [1%]
	South Norfolk	10469 [84%]	1798 [14%]	150 [1%]
	Breckland	3883 [88%]	394 [9%]	126 [3%]
	North Norfolk	3091 [90%]	198 [6%]	133 [4%]
	Great Yarmouth	1666 [86%]	178 [9%]	87 [5%]
	Waveney	1295 [84%]	132 [9%]	115 [7%]
	King's Lynn and West Norfolk	529 [95%]	21 [4%]	4 [1%]
	Mid Suffolk	251 [77%]	9 [3%]	66 [20%]
	Suffolk Coastal	153 [79%]	12 [6%]	29 [15%]
	St Edmundsbury	111 [87%]	1 [1%]	16 [13%]
LOWESTOFT = ORIGIN				
	Mode of Transport	Car & Passenger	Bus	Train
DESTINATIONS	Great Yarmouth	3794 [97%]	119 [3%]	1 [0%]
	South Norfolk	1499 [97%]	37 [2%]	7 [0%]
	Norwich	1295 [84%]	132 [9%]	115 [7%]
	Suffolk Coastal	1267 [98%]	18 [1%]	8 [1%]
	Broadland	508 [95%]	15 [3%]	11 [2%]
	Mid Suffolk	303 [85%]	51 [14%]	1 [0%]
	Ipswich	250 [89%]	6 [2%]	25 [9%]
	North Norfolk	133 [96%]	4 [3%]	2 [1%]
	Breckland	132 [96%]	2 [1%]	3 [2%]
	St Edmundsbury	89 [98%]	2 [2%]	0 [0%]
LOWESTOFT = DESTINATION				
	Mode of Transport	Car & Passenger	Bus	Train
ORIGINS	Great Yarmouth	2311 [88%]	328 [12%]	1 [0%]
	South Norfolk	2128 [98%]	28 [1%]	9 [0%]
	Suffolk Coastal	855 [97%]	13 [1%]	13 [1%]
	Norwich	464 [90%]	15 [1%]	35 [7%]
	Broadland	374 [97%]	3 [3%]	8 [2%]
	Mid Suffolk	224 [100%]	0 [0%]	1 [0%]
	Breckland	139 [99%]	1 [1%]	0 [0%]
	Forest Heath	109 [99%]	1 [1%]	0 [0%]
	North Norfolk	101 [99%]	1 [1%]	0 [0%]
	Ipswich	85 [96%]	0 [0%]	4 [4%]

In the Peterborough area it is clear that the car is the principal mode of transport. Use of public transport is low with only the commute to Cambridge showing considerable use in comparison to the car (Train and Bus, 16%). Over 1,000 people use the bus to commute to Peterborough daily from South Kesteven, Huntingdonshire and Fenland, but this is still a low ratio in comparison to using the car.

In the Norwich area car and passenger is still the most used mode of transport however Norwich does have good public transport links. Large volumes of commuters are using bus links to and from South Norfolk and Broadland and 43% of commuters opt for the train when travel to Ipswich. Over 28,000 commuters travelling into Norwich by car or passenger from Broadland, South Norfolk and Breckland, you can assume there is a strong dependence on the A47 corridor. These three wards are also the top 3 destinations from Norwich reinforcing the significance of this road to commuters.

In the Great Yarmouth area, car and passenger is still the predominant mode of transport, it appears that there is a considerable amount of people using bus from Great Yarmouth to other wards.

Surprisingly, this isn't the case in the opposite direction, where numbers of commuters using the bus is significantly lower. The use of train links in both directions is almost non-existent to all wards, with the exception of Norwich, totalling 5%. People travelling from the Kings Lynn and West Norfolk ward by car (89%) indicates use of a large section of the eastern part A47 corridor.

The Lowestoft origin and destination data shows that car and passenger is the overriding mode of transport. Bus links between Lowestoft and Great Yarmouth are regularly used in both directions and a sizeable mode of transport to Norwich (9%). Ipswich and Norwich train links are also utilised (9% and 7% respectively), unlike to the rest of the wards. Car and passengers from Norwich, Great Yarmouth and Broadland suggest that a significant number of commuters are using the A47. The public transport into Lowestoft is scarce with the bottom 5 wards registering less than 5 journeys per ward.

AVAILABILITY OF PUBLIC TRANSPORT

This section will provide an overview of the bus and rail services that operate between the main settlements along the corridor. There are bus passenger services that currently operate along the entire corridor.

There are rail passenger services between Norwich and Great Yarmouth and between Norwich and Lowestoft. Nevertheless, there are no direct train services parallel to the A47 between Peterborough and Norwich. Rail journeys between these two locations are made via Ely.

RAIL SERVICES

Rail into East Anglia operates through Cambridge and Ely where it then splinters off westwards towards Peterborough, northward towards Kings Lynn or eastwards towards Norwich, Great Yarmouth and Lowestoft. The services are currently operated by Abellio Greater Anglia, East Midlands and Thameslink Great Northern.

Rail passenger services operate on two routes between Norwich and Great Yarmouth providing an hourly daytime service from Monday to Friday (average of 23 trains two-way per day). The journey time

is 35 minutes in average. On Saturdays, in addition to the hourly service there are 6 direct trains which take 28 minutes to cover the distance between these two conurbations. The service is less frequent on Sundays, with trains operating a Sunday service every two hours (17 per day).

There is an hourly rail service between Norwich and Lowestoft (19 per day), from Monday to Saturday. Travel time is between 37 and 45 minutes, depending on the number of stops made. On Sundays, the service is less frequent with trains every two hours (9 per day). There is no rail service provided between Great

Yarmouth and Lowestoft; therefore, rail passengers have to travel via Norwich.

There are no direct train services parallel to the A47 between Peterborough and Norwich. Rail journeys between these two locations are made via Ely. Abellio Greater Anglia and East Midlands trains operate between Peterborough, Ely and Norwich.

Rail journeys between Peterborough and King's Lynn can be made via Ely. Train services between Ely and King's Lynn are run by Abellio Greater Anglia and Thameslink Great Northern. Abellio Greater Anglia operates only from Monday to Friday connecting these two conurbations in the morning and evening

peak. There are 2 morning peak trains running from King's Lynn and Ely while there are 3 trains operating from Ely to King's Lynn between 6.30pm and 8.30pm. The average travel time is 34 minutes.

The frequency of Thameslink Great Northern trains is higher. There are hourly daytime services from Monday to Friday (25 trains per day). The service is less frequent on the weekends, with 19 trains per day on Saturdays and 16 trains per day on Sundays. The travel time is about 31 minutes.

The fastest journey times between the main conurbations along the A47 and A12 are shown in **Table 3.1**.

Table 3.1 Fastest journey times in minutes between the main conurbations

From / To	Peterborough	Ely	King's Lynn	Norwich	Great Yarmouth	Lowestoft
Peterborough		33	64 (via Ely)	90 (via Ely)	122 (via Ely – Norwich)	127 (via Ely – Norwich)
King's Lynn	65 (via Ely)	30		87 (via Ely)	119 (via Ely – Norwich)	124 (via Ely – Norwich)
Norwich	93 (via Ely)	58	89 (via Ely)		32	37
Great Yarmouth	125 (via Norwich – Ely)	150 (via Norwich)	121 (via Norwich – Ely)	32		-
Lowestoft	129 (via Norwich – Ely)	94 (via Norwich)	125 (via Norwich – Ely)	36	-	

BUS SERVICES

There are a number of bus services that operates end to end along the corridor. First Group operates the Excel X1 service along the A47/A12 corridor connecting Peterborough, King’s Lynn, Norwich, Great Yarmouth and Lowestoft.

The journey by bus from Peterborough to Lowestoft can approximately 4 hours when in comparison to driving the entire route this can take just over 2 hours.

However the buses that utilise the route run every 30 minutes Monday to Saturday and every hour on Sundays on

the service between Peterborough and Norwich, with a number of intermediate stops, including King’s Lynn. The travel time between Peterborough and King’s Lynn is 1 hour and 26 minutes and the bus takes around 3 hours to travel from Peterborough to Norwich.

The frequency of the Excel X1 between Norwich and Great Yarmouth is higher. Buses run every 20 minutes Monday to Saturday and every 30 minutes on Sundays. The travel time is 38 minutes, with a single intermediate stop at Acle.

There are also buses every 20 minutes Monday to Saturday and every 30

minutes on Sundays between Great Yarmouth and Lowestoft. The travel time of this Excel X1 service is 49 minutes.

First Group also operates the Excel X2 service between Norwich and Lowestoft, with intermediate stops at Loddon and Beccles. There are buses running every 20 minutes Monday to Saturday and every hour on Sundays. The travel time is approximately 1 hour and 15 minutes.

Table 3.2 below summarises the bus service offered between the main conurbations of the A47 / A12 corridor.

Table 3.2 Bus services between the main conurbations

Route	Bus Service (per day)			Travel Time
	Monday – Friday	Saturday	Sunday	
Peterborough to Norwich (Peterborough – Wisbech – King’s Lynn – Norwich)	22 buses	21 buses	11 buses	2 hrs 50 mins
Norwich to Peterborough (Norwich – King’s Lynn – Wisbech – Peterborough)	22 buses	21 buses	12 buses	3 hrs 10 mins
Norwich to Great Yarmouth	41 buses	40 buses	24 buses	35 mins
Great Yarmouth to Norwich	42 buses	40 buses	38 buses	38 mins
Norwich to Lowestoft	40 buses	33 buses	9 buses	1 hr 15 mins
Lowestoft to Norwich	40 buses	33 buses	9 buses	1 hr 20mins

TRAFFIC FLOWS ON THE A47/A12 CORRIDOR

A review was carried out of available traffic flow data, based on the Highways Agency Hatris TRADS database – data records kept by the Agency².

Traffic flow data has been extracted from the TRADS database based on a neutral month (October 2013), using a factor to account for seasonal variation. Flow data is available for sites along the length of the study corridor and set out in **Table 3.3** and also illustrated as **Figure 3.3** as Annual Average Daily Traffic (AADT) at various locations along the study area.

Table 3.3 shows the AM and PM HGV proportions. The data shows that the sections closest to Wisbech have a high HGV proportion both east and west bound in the AM peak. The lowest proportion is at Breydon Bridge which is below 10% in both the AM and PM peaks. This data does however indicate that there is a large variation in proportion of HGV's using the corridor

Table 3.3 Traffic Flow Data

Feasibility Study ID	Two-way AADT (24hr) 2013	AM Peak % HGV	PM Peak % HGV
A47 Between A1 and Sutton (West of Peterborough)	22,719	19.2	10.2
A47 Eye to Thorney	24,562	28.4	17.2
Thorney to Walton Highway (Thorney to Guyhirn)	18,537	36.5	18.7
Thorney to Walton Highway (Guyhirn to Wisbech)	22,126	31.8	18.0
Thorney to Walton Highway (South of Wisbech)	16,447	37.7	19.9
Thorney to Walton Highway (East of Wisbech)	15,814	27.4	15.5
A47 Middleton to East Winch	15,095	27.1	14.6
A47 Middleton to East Winch	14,627	24.8	14.7
A47 Around Swaffham, Dereham	16,810	23.0	12.9
A47 North Tuddenham to Easton	24,354	21.7	9.8
Norwich Bypass	42,380	22.3	10.1
A47 Blofield to Burlingham	27,443	25.7	11.6
A47 Acle Straight	18,960	17.9	6.5
Breydon Bridge	33,312	9.8	3.9

² The Highways Agency (HA) currently maintains, operates and develops traffic databases and associated applications. The Traffic Flow Data System (TRADS) holds information on traffic flows at sites on the network. These two databases are known collectively as the HA Traffic Information System (HATRIS). - <https://www.hatris.co.uk/>

The graph within **Figure 3.3** shows that along the corridor there are varying levels of traffic with the highest volumes around Norwich followed by Great Yarmouth the Peterborough. The Wisbech and Kings Lynn section of the corridor has the lowest levels of traffic.

Annual Average Daily Traffic one-way flow fluctuates along the study corridor between approximately 7,300 and 17,700. Peaks in AADT occur on the following links:

- A12 Breydon Bridge (15,550 SB / 17,762 NB)
- A47 Blofield to Burlingham (13,728 EB / 13,715 WB)
- A47 Eye to Thorney (12,303 EB / 12,259 WB)

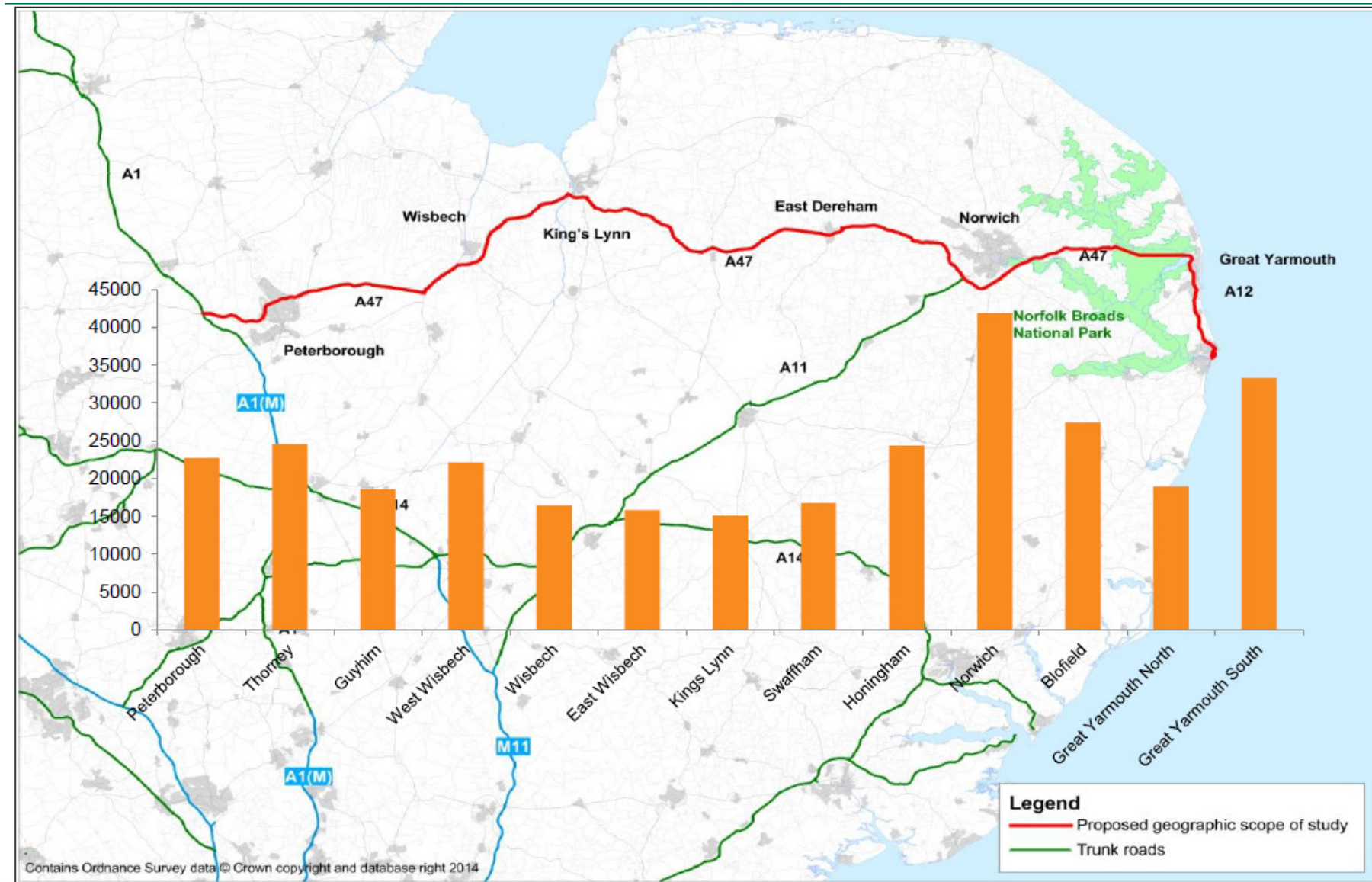
The lowest AADT flows are observed on the A47 east of Wisbech (7,926 EB / 7,888 WB) and Between Middleton and East Winch (7,311 EB / 7,316 WB).

Fluctuation in flows along the route suggests that a significant proportion of trips are made along a short section of the route, rather than long-distance trips along the entire route. For example, large variations in flows are seen at the following locations:

- AADT flow on the Eye to Thorney link (12,303 EB / 12,259 WB) is higher than flow between Thorney and Guyhirn (9,422 EB / 9,115 WB). Flow increases again on the immediately adjacent link Guyhirn to Wisbech (11,063 EB/WB).

- AADT flow on the A47 Blofield to Burlingham link (13,728 EB / 13,715 WB) is higher than flow on the Acle Straight (9,332 EB / 9,628 WB), indicating that a significant volume of traffic either joins or leaves the route at Acle. AADT flows increase again on the Breydon Bridge link, immediately south of the Vauxhall Roundabout. AADT recorded between Vauxhall Roundabout and Gapton Roundabout is 15,550 EB / 17,762 WB.

Figure 3.3 Annual Average Daily Traffic (2013) Source DfT



AVERAGE SPEED DATA

A review has been carried out of available speed data, based on the HATRIS Journey Time Database (JTDB).

Data has been extracted from JTDB based on the average of four neutral weekdays, Monday to Thursday (15/10/2012 to 18/10/2012). Average speed and total flow data has been extracted for AM peak (08:00-09:00) PM peak (17:00-18:00).

JTDB ranks data as high, medium or low quality. Average speeds and total flow counts marked as low quality have been excluded as they are not based on a representative sample of observed data. The number of days available for each link is given below, out of a maximum of 4 days (Monday to Thursday).

The 24-hour average speed for each link has been calculated for to allow comparison of peak and off-peak average speeds.

Data extracted from JTDB is summarised in **Table 3.4** and **Table 3.5**.

Average speed during the AM peak is significantly lower than daily average speed on a number of links:

- 15 – A47 North Tuddenham to Easton (eastbound)
- 20 – A47 Blofield to Burlingham (westbound)
- 21 – A47 Acle Straight (eastbound)
- 23 – Breydon Bridge (southbound)

The daily average speed is lower than the posted speed limit at Breydon Bridge and Bascule Bridge in both directions, potentially indicating significant congestion at these sites which is not connected to bridge openings.

Table 3.4 Speed Data AM Peak 08:00 – 09:00

Feasibility Study ID	Daily Average Speed (km/h)	Average AM Peak Hour Speed (km/h)	Total Recorded Flow (Veh)
A47 Between A1 and Sutton (West of Peterborough)	87.5	81.5	1051
A47 Eye to Thorney 10 - Thorney to Walton Highway (Thorney to Guyhirn)	77.0	72.5	682
Thorney to Walton Highway (Guyhirn to East of Wisbech)	83.5	82.0	590
A47 Middleton to East Winch	73.0	73.0	590
A47 Around Swaffham, Dereham	79.0	79.0	685
A47 North Tuddenham to Easton	83.0	63.0	979
A47 Blofield to Burlingham	80.0	69.5	1207
A47 Acle Straight	72.0	49.5	768
Breydon Bridge	57.0	42.5	1394
A12 Bascule Bridge	29.0	29.5	1668

Table 3.5 Speed Data PM Peak 17:00 – 18:00

Feasibility Study ID	Daily Average Speed (km/h)	Average PM Peak Hour Speed (km/h)	Total Recorded Flow (Veh)
A47 Between A1 and Sutton (West of Peterborough)	87.5	88.5	993
9 – A47 Eye to Thorney 10 - Thorney to Walton Highway (Thorney to Guyhirn)	77.0	75.5	751
A47 Eye to Thorney 10 - Thorney to Walton Highway (Thorney to Guyhirn)	83.5	84.0	778
Thorney to Walton Highway (Guyhirn to East of Wisbech)	73.0	74.0	606
A47 Middleton to East Winch	79.0	80.5	751
A47 Around Swaffham, Dereham	83.0	82.5	1144
A47 North Tuddenham to Easton	80.0	78.0	1255
A47 Blofield to Burlingham	72.0	65.5	936
A47 Acle Straight	57.0	45.5	1449
Breydon Bridge	29.0	30.5	1041

ROAD SAFETY

Road safety was assessed at a strategic level using the HA Area 6 Quarterly Road Safety Reports. The collision data which was collected is presented in Table 3.6 with a summary of the pertinent points gathered from the report.

The following junctions was identified as having an accident rate above the national average:

- J20 A47/A15 Dogsthorpe Junction (grade separated roundabout)
- A47/A17 Pullover Junction (large roundabout)
- A47/A148 Hardwick Junction (grade-separated roundabout, signalised)
- A12 Harfreys Roundabout (standard roundabout)
- Entrance to James Paget Hospital (signalised junction)

The majority of links with an accident rate above the national average are single carriageway in standard. These include sections of the A47 around Peterborough, Guyhirn, Wisbech, Middleton, East Winch, Dereham, Great Yarmouth and Lowestoft.

However, a number of links of dual carriageway standard were also identified as above the national average. These are:

- Peterborough J19 to J20 (A15)
- B1167 The Causeway to Station Road, Thorney
- A17 Pullover Roundabout to A10/A149 Hardwick Roundabout
- Cucumber Lane Roundabout to Blofield
- A12 Great Yarmouth to Lowestoft

None of the links on the A47 Norwich bypass, between Longwater Interchange and Postwick Interchange, were identified as above the national average.

It was noted that reported accident locations may be inaccurate, or may tend towards easily identifiable landmarks. More detailed and recent road safety data will be sought where necessary in subsequent stages to verify a challenge.

Table 3.6 summarises collision severity recorded on the A47 and A12 along the study corridor, as presented in the HA Area 6 Quarterly Safety Report (2012 Q4).

Table 3.6 Collision Severity On Study Corridor

Route	Collisions Severity	2010	2011	2012
A47	Fatal	9	13	7
	Serious	32	22	17
	Slight	134	150	147
A12	Fatal	1	0	0
	Serious	4	9	8
	Slight	39	46	46
Total KSI Collisions		46	44	32
Total Collisions		219	240	225

The number of collisions along the corridor resulting in a fatality or serious injury (Killed or Seriously Injured, KSI) reduced from 46 collisions in 2010 to 32 collisions in 2012. The total number of collisions recorded rose from 219 collisions in 2010 to 240 collisions in 2011, before falling again to 225 collisions in 2012.

Figure 3.4 illustrates the collision hotspots. Links and junctions along the route are shown in red where the number of collisions involving personal injury, per billion vehicle miles, is above the national average.



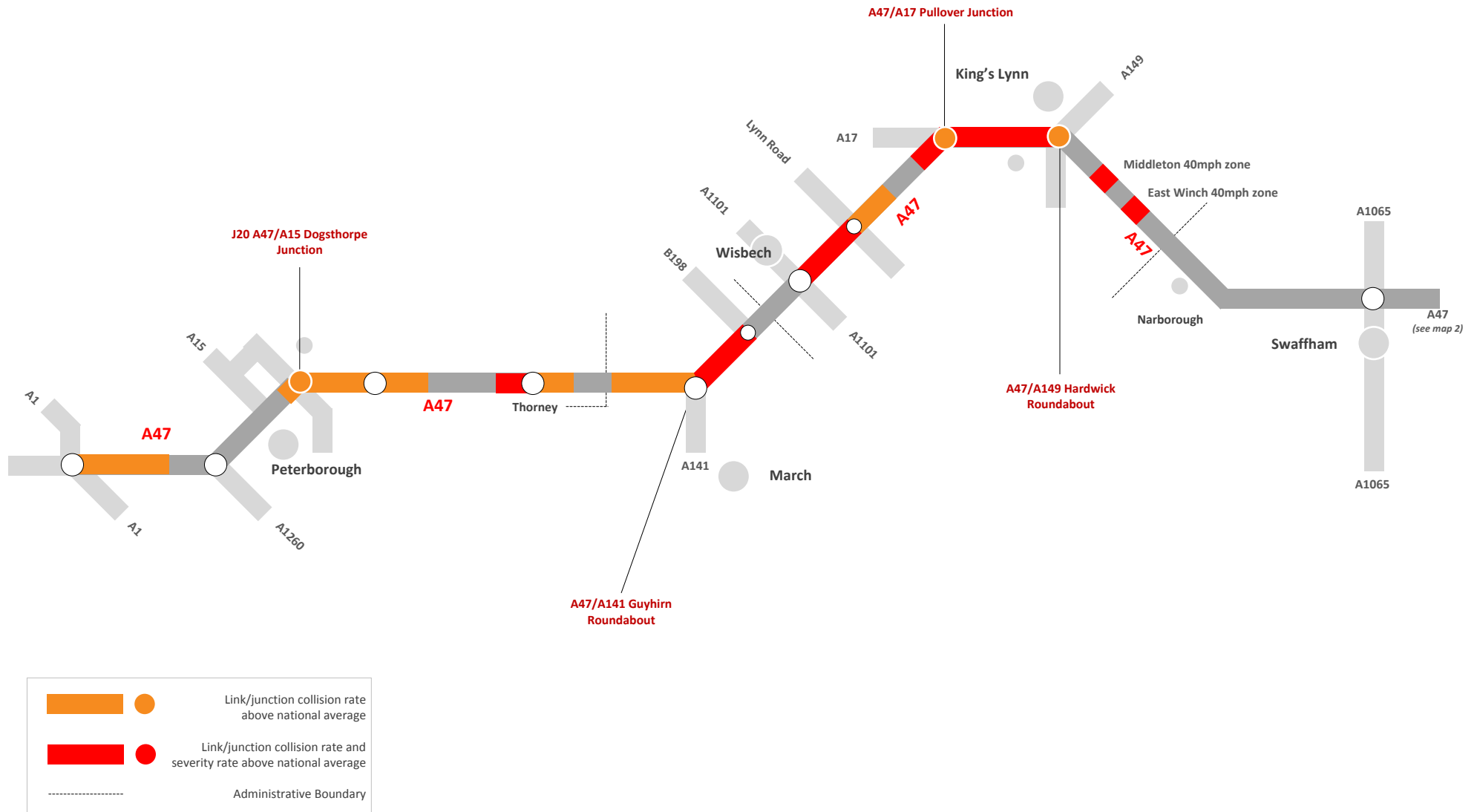
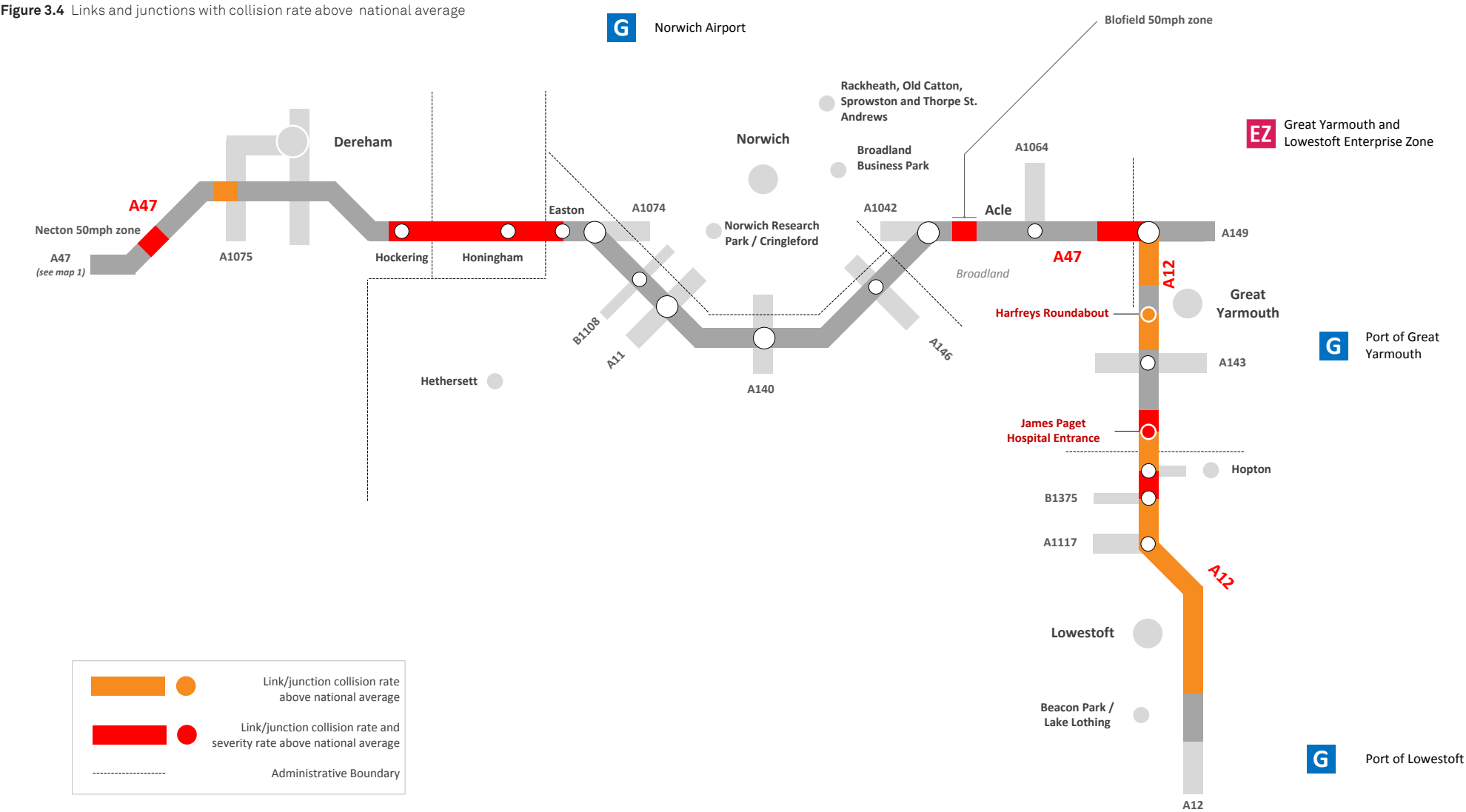
Figure 3.4 Links and junctions with collision rate above national average

Figure 3.4 Links and junctions with collision rate above national average



ENVIRONMENT AND HERITAGE

The congestion on the route has environmental consequences and the route traverses an area which is rich in environmental assets and cultural heritage.

A review has been carried out of relevant environmental management and preservation areas along the study corridor. Analysis has been carried out largely based on GIS data sets.

Environmental and historical designations along the route have been reviewed in order to determine at this early stage where they may impact upon feasible scheme options.

There are several Sites of Specific Scientific Interest (SSSI) along and in very close proximity to the full extent of the corridor. In the western section of the corridor these sites are located at Sutton Heath & Bog, Dogsthorpe Star Pit. The eastern section of the corridor has several SSSIs at Potter

and Scaming Fens, Damgate Marshes Acle and Berney Marshes and Breydon Water.

Berney Marshes and Breydon Water (near Great Yarmouth) and Nene Washes (near Peterborough) are Special Protection Areas (SPA) and are wetlands under international importance as stated by the RAMSAR convention.

Further consideration should be given to historic and scheduled monuments such as the Roman fort and enclosure at Sutton Cross near Peterborough, or Ferry Bridge also near Peterborough as well as the site at Markshall near Norwich.

Designated sites are taken into account where they lie within 50m of the corridor as a proxy to establish whether there are major constraints along the corridor.

The route is most severely constrained by environmental and historical designations

at the Acle Straight as it passes through the The Broads National Park. Environmental designations may have an impact on the options considered for resolving the issues identified with respect to the Acle Straight.

The A47 between Guyhirn and Wisbech is raised above the surrounding land and the presence of the River Nene immediately to the north may have an influence on solutions which could be considered. The designated areas connected to the Nene Washes are located immediately south-west of the A47/A141 junction, and may have an impact on the options considered for resolving the issues identified.

A range of data sources have been used to review the impact of environmental and historical designations on the study corridor. The key environmental constraints and designations are illustrated as **Figure 3.5**.

Figure 3.5 A47/A12 corridor environmental and historical factors

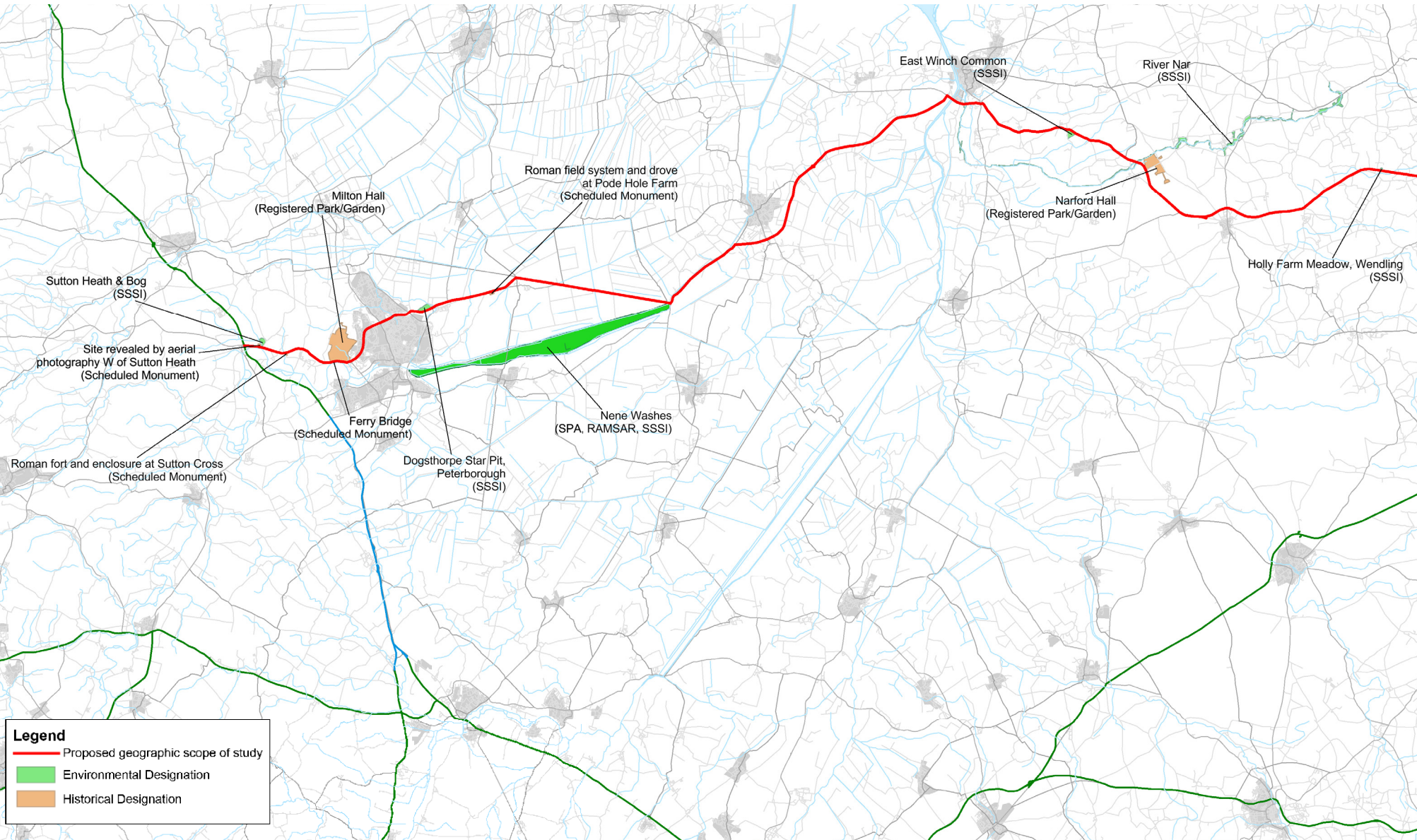
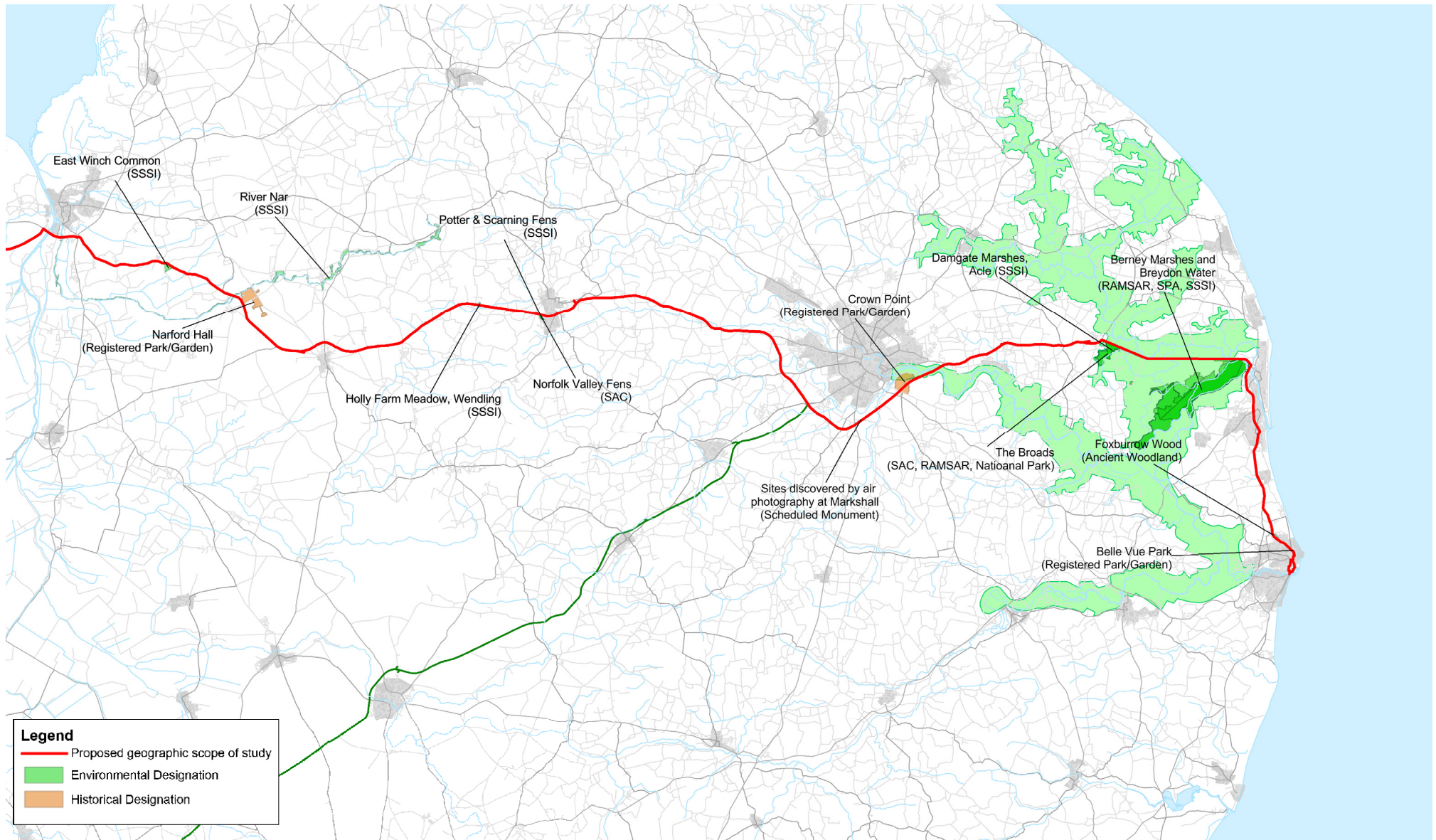


Figure 3.5 A47/A12 corridor environmental and historical factors



4 UNDERSTANDING THE FUTURE SITUATION

INTRODUCTION

This chapter sets out planned development and future growth aspirations as well as predictions of the resultant traffic growth and where this could potentially lead to a decrease in network performance.

PLANNED GROWTH

This section has been developed from the growth plans and aspirations from the Strategic Economic Plans set out by the Local Economic Partners. This has also been informed by the Statutory Development Plans set by the Local Planning Authorities adjoining the corridor.

STRATEGIC ECONOMIC PLANS

The Greater Cambridge Greater Peterborough Strategic Economic Plan (GCPSEP) is a key priority in the area. It has been identified that despite being in an advantageous location, accessed by key national routes and international gateways, the transport connectivity is seen by many businesses more of a constraint to growth.³

Key routes, fundamental to economic growth, are already severely congested and/or unreliable. Use of smart technology is at a minimum, and east-west connections (whether Peterborough to Norwich, Cambridge to Bedford/Oxford, or Cambridge to East Coast ports) are poor. Peterborough has relatively good transport infrastructure,

but a significant maintenance liability from its ageing Parkway. The rurality of much of the LEP places a greater reliance on car-based travel. With travel demand expected to grow by 40% across the area to 2031.

The New Anglia Strategic Economic Plan (NASEP) identified key settlements along “growth corridors” associated with the major transport routes in Norfolk and Suffolk. The corridors provide the greatest opportunity to realise housing and jobs growth and are where there is greatest demand for development sites owing to the accessibility to employment. The most significant of these are along the A11, the A14 and the Enterprise Zone at Lowestoft/ Great Yarmouth and the A47 from Great Yarmouth to Norwich and King’s Lynn⁴.

³ Greater Cambridge Greater Peterborough Strategic Economic Plan: http://www.gcgp.co.uk/wp-content/uploads/2013/10/GCGP-Strategic-Economic-Plan_WEB.pdf: Accessed March 2014

⁴ New Anglia Strategic Economic Plan: <http://www.newanglia.co.uk/wp-content/uploads/2014/03/New-Anglia-Strategic-Economic-Plan-V2.pdf>: Accessed March 2014

Realising the potential of the key assets, in air and sea ports, enterprise zones, research and development hubs, prize agricultural land and tourism attractions, means increasing the capacity of the road and rail routes and improving transport links within New Anglia. The SEP indicates that targeting resources to unlock those sites that will deliver the greatest return in terms of both housing and jobs growth is a significant priority

STATUTORY DEVELOPMENT PLANS

The respective Local Authority development plan documents have been reviewed to understand the future development pressures along the corridor. A Local Plan or Core Strategy document is the key development plan document specified in planning law. Every other local development document is built on the principles it sets out, regarding the development and use of land in a local planning authority's area.

The following Statutory development plan documents were reviewed for the overall requirements for residential and employment growth up to the period of 2031. The resulting growth predictions are presented **Table 4.1** below which provides a review of residential and commercial development growth up to 2031.

The following statutory development plans that were consulted were:

- The Peterborough Core Strategy was adopted in February 2011
- The King's Lynn and West Norfolk Core Strategy was adopted in July 2011
- The Breckland Core Strategy was adopted in 2009
- The Fenland Communities Development Plan Core Strategy
- The Joint Core Strategy for Broadland, Norwich and South Norfolk was adopted in March 2011 (amendments adopted January 2014).
- Great Yarmouth Borough Council adopted the Great Yarmouth Core Strategy in 2014
- The Waveney Core Strategy was adopted in 2009

Table 4.1 Route Strategy Growth Predictions

Location of Development	Development Type	Scale by 2015	Scale by 2021	Scale by 2031	Anticipated Location of Impact on Route
Peterborough City Council	Residential Commercial	4,521 units Not known	15,617 units Not known	24,266 units 20,000 jobs (up to 2026)	A47 (east of A1)
Fenland District Council	Residential Commercial	1,590 units 1,440 jobs	4,810 units 3,600 jobs	11,000 units 7,200 jobs	A47 junctions between Guyhirn – Wisbech
King's Lynn and West Norfolk Borough Council	Residential Commercial	3,090 units 1,000 jobs	9,472 units 2,500 jobs	14,489 units Not known (up to 2026)	A47 junctions including King's Lynn bypass
Breckland Council	Residential Commercial	2,206 units Not known	8,604 units 6,000 jobs	14,209 units 6,000 jobs (up to 2026)	A47 Swaffham – Dereham
Greater Norwich area	Residential Commercial	8,765 units 6,000 jobs	22,894 units 15,000 jobs	32,039 units 22,500 jobs (up to 2026)	A47 including Norwich bypass and A11
Great Yarmouth Borough Council	Residential Commercial	704 units Not known	3,333 units Not known	6,285 units Not known (up to 2029)	A12 junctions and A47/ A12 Vauxhall Roundabout
Waveney District Council	Residential Commercial	803 units 1,000 jobs	2,717 units 2,500 jobs	3,828 units Not known (up to 2025)	A12, Lowestoft

Figure 4.1 illustrates the development pressures along the corridor based on Core Strategy targets and allocations for each local authority.

PROPOSED AND COMMITTED DEVELOPMENTS

In discussion with the Highways Agency a review of recent and current planning applications for development sites near to the corridor has been undertaken with the aim of identifying developments which could have an influence on the future performance of the corridor. A further aim of the review is to identify committed developments with associated proposed highway improvement schemes which will result in revisions to the current highway layout. The following local authorities' planning application databases have been examined:

- Peterborough City Council
- Fenland District Council
- Borough Council of King's Lynn and West Norfolk
- Breckland Council
- Broadland District Council
- South Norfolk Council
- Norwich City Council
- Great Yarmouth Borough Council
- Waveney District Council

Committed development around Peterborough includes 4,475 residential units in committed urban extensions, the majority of which are to be built to the south-west of the town between Peterborough and the A1. An additional 5,350 residential units are currently under consideration as part of the Great Haddon development.

Proposed development around Kings Lynn includes 1,100 residential units currently awaiting planning permission, with a possible urban extension comprising of 3,000 residential units.

Committed development around Norwich includes 2,920 residential units located mainly in extensions to the towns of Wymondham and Hethersett. A further 1,450 residential units at Cringleford, adjacent to the Norwich urban area, are currently awaiting planning permission.

In addition, a large commercial development (Longwater Retail Park) and residential development (Lodge Farm) are under construction to the north of the A47/A1074 Longwater Interchange. An extension to the existing Broadland Business Park is expected to impact on the A47 at the Postwick Interchange to the east of Norwich. Planned growth and local development plan targets (as defined in Core Strategies and Local Plans) are illustrated as **Figure 4.1**.

Figure 4.1 A47/A12 planned growth in housing and jobs from April 2011, planned infrastructure improvements

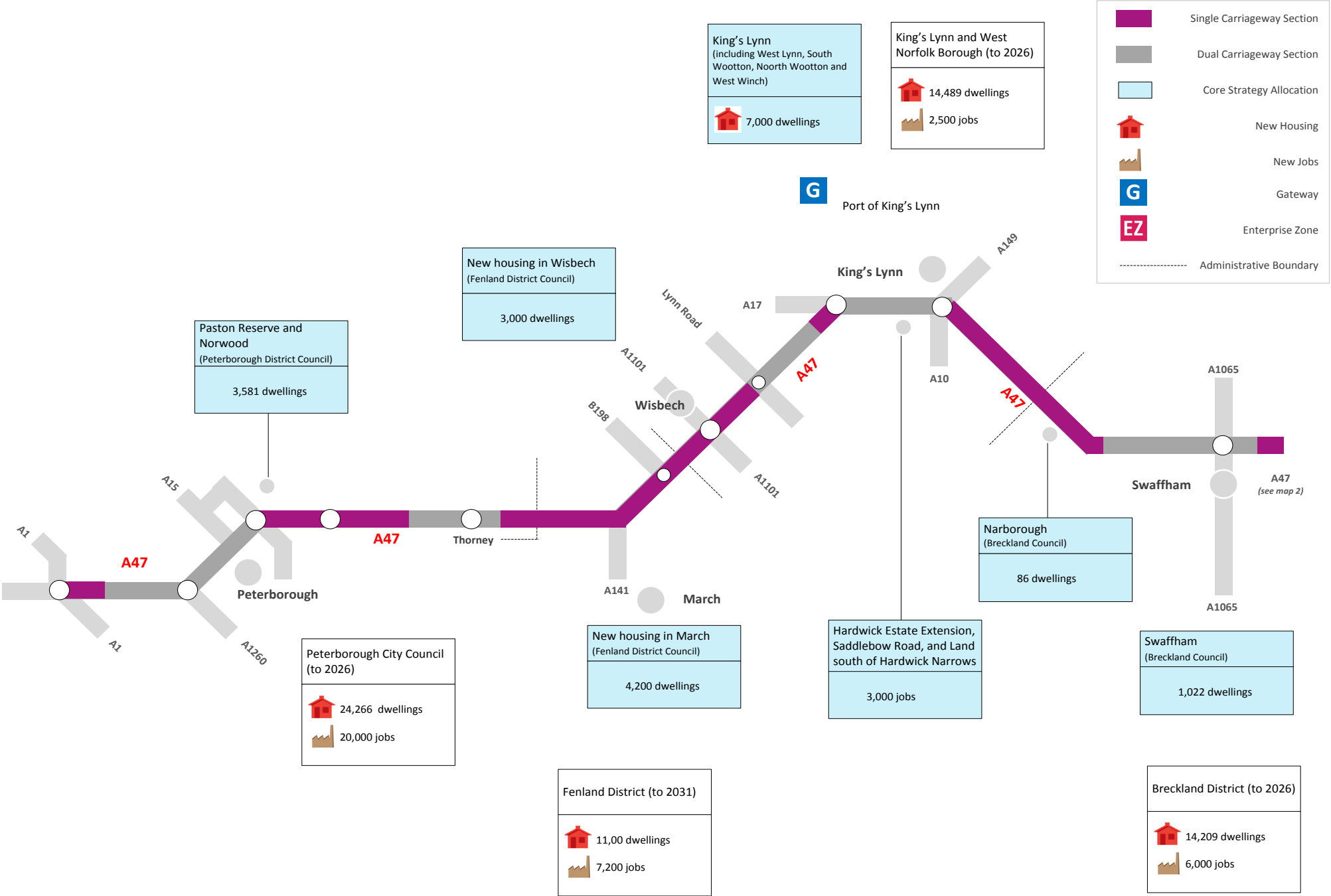
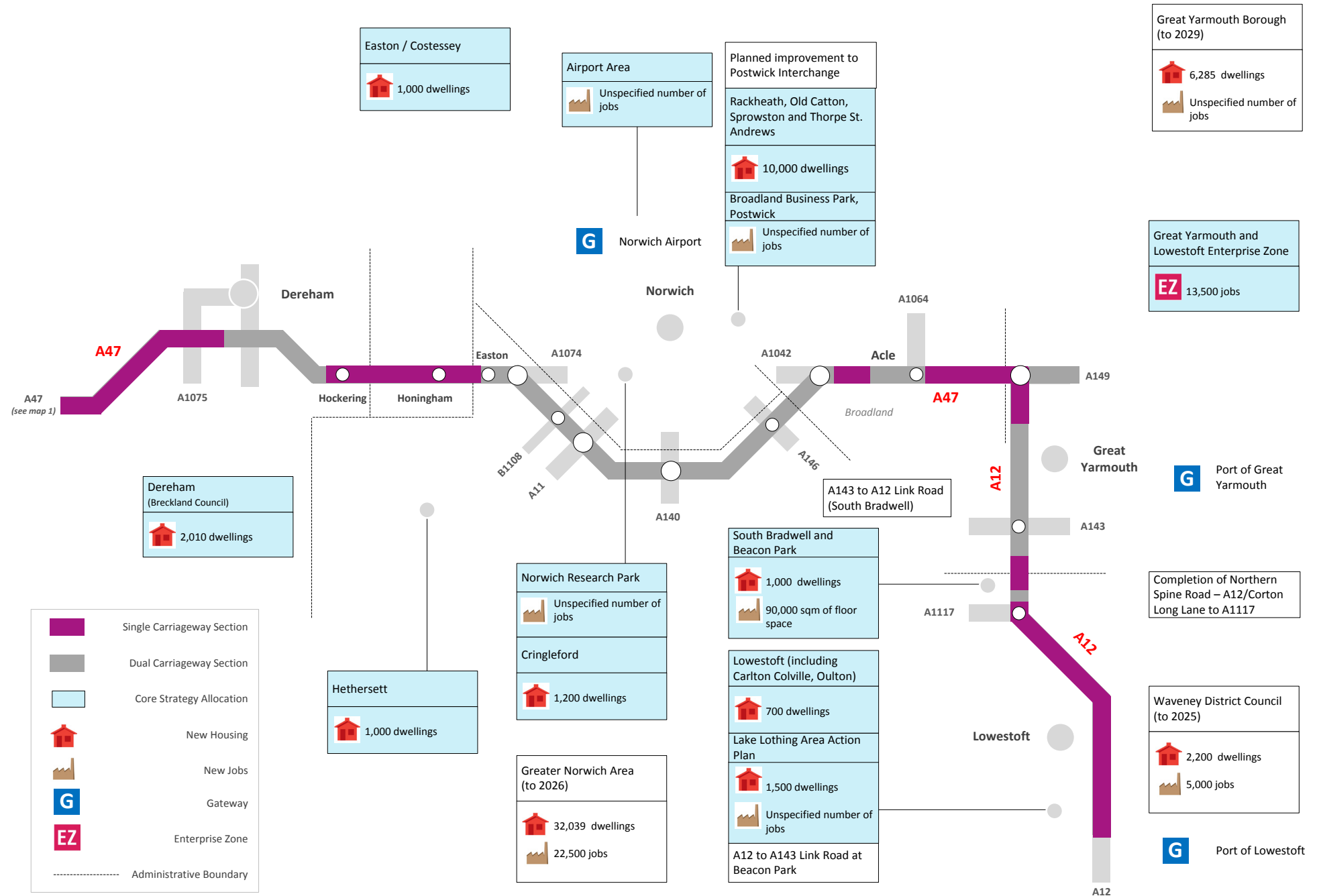


Figure 4.1 A47/A12 planned growth in housing and jobs from April 2011, planned infrastructure improvements



PREDICTED TRAFFIC GROWTH

Predicted traffic growth for the A47 has been calculated using factors for trunk roads in the Eastern Region from the National Transport Model (NTM) and the DfT TEMpro database, adjusted for development growth specifically in Norfolk.

Cars, light and heavy goods vehicles have different growth rates but the overall growth is expected to be 21% by 2021 and 45% by 2031 from a base year of 2013. These growth rates have been applied to the existing hourly flows on each section of the A47 single carriageway to produce traffic forecasts. For each single carriageway section, the maximum hourly demand (in either direction) has been determined and compared to the estimated capacity of the link (calculated as per guidance on Congestion Reference Flows, which varies according to % HGVs).

Table 4.2 and **Table 4.3** show which single carriageway sections are predicted to be over-capacity and by when, as well as those that are operating at 90-100% of capacity. These tables highlight that sections near to Peterborough, Wisbech and Norwich are all over capacity in the AM and PM peaks.

Table 4.2 AM Peak Link Flow Stress Factors

Link	2013	2021	2031	2035
A47 Between A1 and Sutton (West of Peterborough)	1.107	1.365	1.699	1.829
A47 Eye to Thorney	0.716	0.813	0.943	0.988
Thorney to Walton Highway (Guyhirn to Wisbech)	0.835	0.947	1.099	1.151
A47 Middleton to East Winch	0.593	0.671	0.778	0.815
A47 Around Swaffham, Dereham	0.567	0.641	0.744	0.779
A47 North Tuddenham to Easton	0.839	0.949	1.101	1.153
A47 Blofield to Burlingham	1.210	1.371	1.583	1.666
A47 Acle Straight	0.673	0.754	0.865	0.904
Breydon Bridge	1.163	1.304	1.497	1.564

Table 4.3 Table 4.3: PM Peak Link Flow Stress Factors

Link	2013	2021	2031	2035
A47 Between A1 and Sutton (West of Peterborough)	0.997	1.234	1.551	1.674
A47 Eye to Thorney	0.643	0.736	0.866	0.912
Thorney to Walton Highway (Guyhirn to Wisbech)	0.811	0.929	1.092	1.149
A47 Middleton to East Winch	0.566	0.644	0.755	0.794
A47 Around Swaffham, Dereham	0.628	0.715	0.838	0.881
A47 North Tuddenham to Easton	0.956	1.088	1.276	1.341
A47 Blofield to Burlingham	1.089	1.229	1.418	1.491
A47 Acle Straight	0.771	0.867	1.001	1.047
Breydon Bridge	1.074	1.207	1.394	1.458

INVESTMENT PROPOSALS

A review has been made of highway improvement schemes currently in the planning process. These schemes are detailed in **Table 4.4**.

It has been assumed that the schemes above was the base case for the A47/A12 corridor and will be part of the consideration process going forward as part of the study.

Table 4.4 Highway Improvement Schemes

Planning Application No	Description	Status
-	A47 Wansford, Peterborough: HA Pinch Point Scheme – Capacity and safety benefits plus improved access to developments along the A47 and A1 corridors.	Committed
Pins: DPI/ K2610/12/16	Postwick Interchange and Norwich Northern Distributor Road (NDR): Planned improvements to Postwick Interchange will unlock development to the north adjacent to the NDR.	Planned
2013/0567	Lodge Farm 2: Planned mitigation measures to A47 on-slips.	Pending Decision
-	Great Yarmouth Third Harbour Crossing: This would connect the A12 at the 'Harfreys' roundabout across the river to the South Denes area	Pending Decision
Y6/293/6006	Beacon Park Link Road: A12-A143 Link Road. Local Pinch Point funding. Developer funding may also be requested.	Committed
DC/13/3310/CCC	Lowestoft Northern Spine Road Phase V: This scheme would complete the northern spine road by linking the Millennium Way-Bentley Drive junction with the A12 at its junction with Corton Long Lane and Blundeston Road in a five-arm roundabout junction which would also terminate the dual carriageway section of the A12 coming into Lowestoft from the north.	Committed
DC/13/0056/CCC	Lowestoft Swing Bridge: Provide a pedestrian and cyclist bridge alongside and immediately to the west of the A12 Bascule Bridge	Committed

5 *ESTABLISHING THE NEED FOR INTERVENTION*

INTRODUCTIONS

This chapter draws upon previous analysis and Government policy and establishes the need for intervention in principle with consideration given to targeting that intervention.

GOVERNMENT POLICY

Government Policy makes reference to the importance of investing in infrastructure and recognising the importance to the UK economy through supporting growth in employment and housing. The following section sets out the Government's visions and policy of the future development of infrastructure projects on the national road network supported in addition by the Government's announcement that it

will “identify and fund solutions, initially through feasibility studies to look at problems and identify potential solutions to take some of the most notorious and long standing road hotspots in the country”.

NATIONAL INFRASTRUCTURE PLAN 2011

Investing in infrastructure is a key part of the Government's economic strategy. At the 2010 Spending Review the Government protected capital spending and committed to prioritise investment in infrastructure projects that would support growth.

The National Infrastructure Plan (NIP) set out its investment strategy for all parts of the UK, helping to promote growth across regions and nations. The decisions they made to support new roads for a more balanced economy.

This NIP set out a strategy for meeting the infrastructure needs of the UK economy. There are three elements to this strategy which are:

- First, the Government planned for the medium term and across sectors. Delivering projects will ensure that the overall performance of the UK's infrastructure is maintained and improved over time. They will also address the areas where the UK's infrastructure lags behind the best performers in the world, while achieving best value for taxpayers and users;
- Second, to mobilise the finance required to deliver these projects, the National Infrastructure Plan sets out a new approach to coordinating public and private investment in UK infrastructure. The Government committed at the 2010

Spending Review to prioritise public capital investment towards infrastructure that supports growth; and

- Third, the Government will take an active role in ensuring the infrastructure in the Plan is delivered efficiently and on time.

The principles of the NIP are set out, focusing on maintaining good performance, addressing weaknesses and ensuring value for money. In support of this the Government has identified priority infrastructure investments based on three main criteria:

- potential contribution to economic growth – investment that enhances productivity and enables innovation;
- nationally significant investment that delivers substantial new, replacement or enhanced quality, sustainability and capacity of infrastructure; and
- projects that attract or unlock significant private investment.

ACTION FOR ROADS: A NETWORK FOR THE 21ST CENTURY 2013

The road network is vital to the UK and a crucial part of the national transport

system. It provides real and direct economic benefits: to business, to workers and to consumers. Better connections support individual towns and cities and strengthen the country as a whole. Failures of the road network increase costs, stifle employment opportunities and make it harder to do business in the UK.

Without investment, conditions on the most important routes are expected to worsen by 2040. By then, around 15% of the entire strategic road network may experience regular peak-time congestion and often suffer poor conditions at other times of the day.

Action for Roads also

- Major national arteries will start to jam. Travel from one region to another will become slower and more congested, hampering business.
- Workers will find their job opportunities constrained by travel times. People travelling between towns and cities in areas like the North West will face significant delays, cutting the number of places where they can easily work.

- Congestion will work against current efforts to help the economy grow. Enterprise Zones, potential housing sites and areas of high growth will be held back by bottleneck conditions
- British businesses will find it harder to access export markets as stress increases on roads to ports and airports.
- Safety and the environment will also suffer, as congested traffic is more polluting and more at-risk of collisions.

NATIONAL NETWORK NATIONAL POLICY STATEMENT – DECEMBER 2013 (DRAFT)

The Draft National Policy Statement (DNNPS) set out the Government's vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks.

The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system. This means:

- Networks with the capacity and connectivity to support national and local

economic activity and facilitate growth and create jobs;

- Networks that support and improve journey quality, reliability and safety. Networks which support the delivery of environmental goals and the move to a low carbon economy; and
- Networks which join up our communities and link effectively to each other

SUMMARY OF CHALLENGES

The preceding chapters have established where there is a current and future challenge. For the purpose of this study this will focus where the investment needs in principle are required. The route is a key

corridor in the east-west links for East Anglia. It connects the main key population and economic hubs of Peterborough, Norwich and Great Yarmouth. These key areas also the main focus for growth in the region in terms of residential expansion, economic proposals and the focus of the LEP SEP plans. All of these factors highlight the value of this route and how important it is and how the corridor could support the additional growth and associated traffic.

There is a wide range of traffic issues along this route due to the varying nature of the corridor in terms of local environment, travel patterns and requirements. The main issues for the route relate to capacity issues; the links and junctions are currently over capacity and/or will be over capacity.

The limited capacity impacts on the route reliability and creates journey time delays. It also can cause for traffic to divert into the nearby network and generate further issues. There are safety issues in certain locations where there are currently high collision and incident rates which could be addressed.

A summary of the challenges has been considered within this feasibility study is provided in and **Figure 5.1** illustrating the proximity of the challenge, running from west to east along the A47 corridor and north to south on the A12 corridor. These detail that there are 32 challenges identified along the route with the majority being capacity issues. Other challenges raised relate to asset condition, network operation, safety and social and environmental issues.

Figure 5.1 A47/A12 issues and challenges

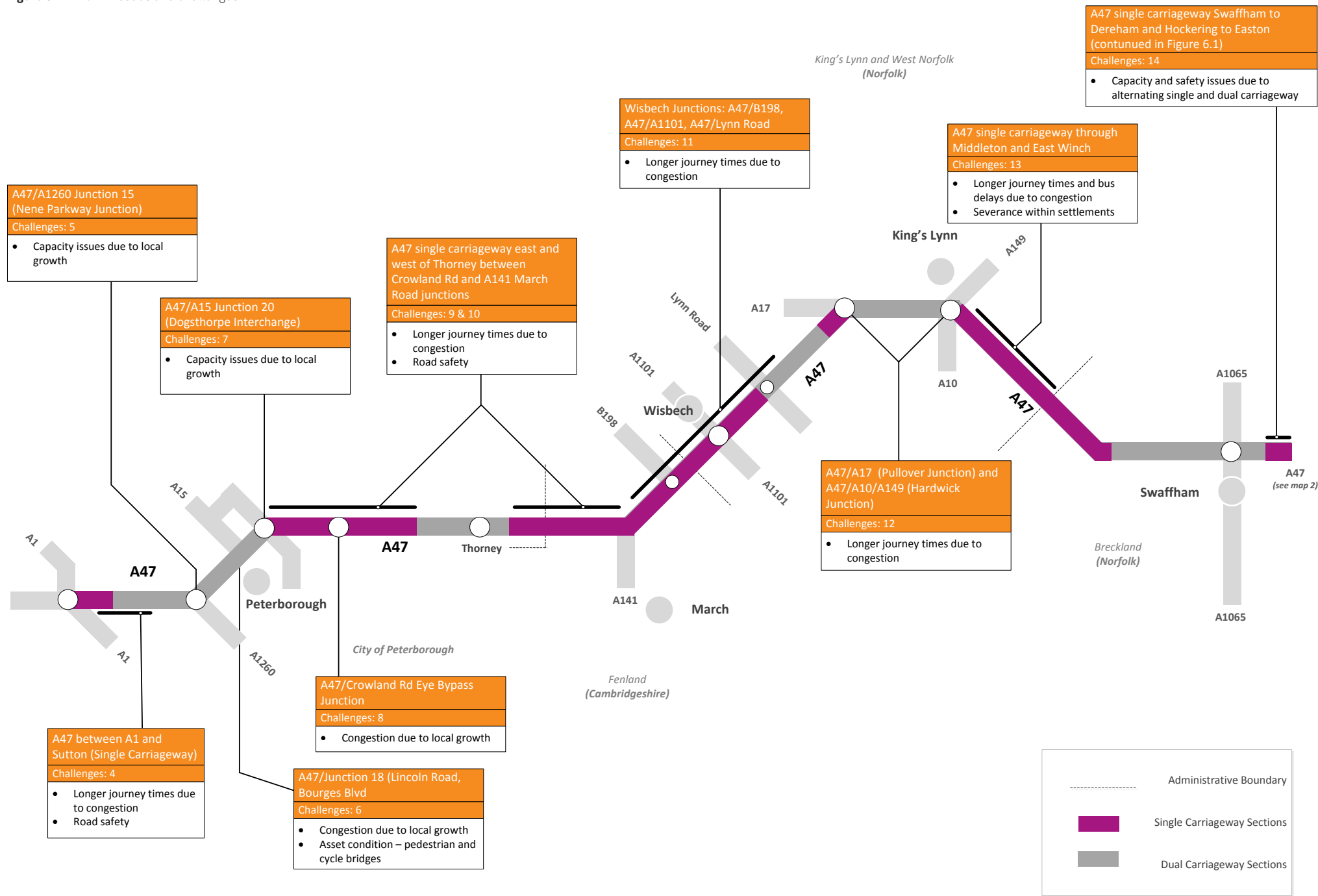
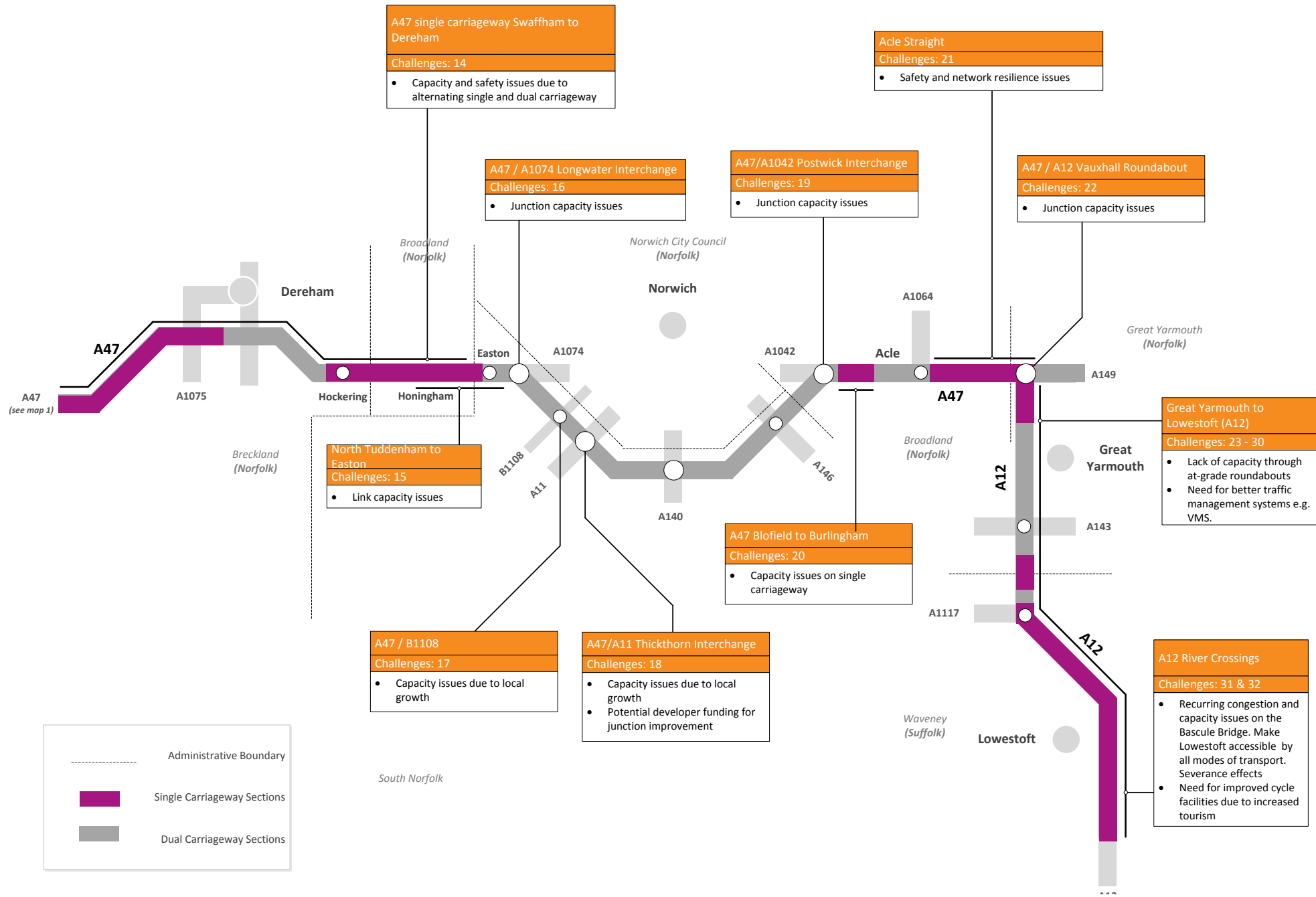


Figure 5.1 A47/A12 issues and challenges



SUMMARY

Appraisal of each challenge was undertaken and the study concludes the work undertaken in Stage 1 to confirm the understanding of the nature, scale and importance of the problems affecting the A47/A12 corridor.



6 *REFINING OBJECTIVES*

INTRODUCTION

This chapter sets out objectives defined specifically for the corridor in the context of the problems identified in this stage of the study.

INTERVENTION SPECIFIC OBJECTIVES

The aims of the study have been established and have been set out in Chapter 1. From this it is important to set clear objectives to help shape appropriate measures to address challenges. The objectives have been aligned and refined with discussions made during the stakeholder engagement. These have also been informed by an appreciation of the underlying issues gathered as part the evidence gathering process.

Table 6.1 below sets out the objectives as defined at this stage of the study.

Table 6.1 Overall Objectives

Strategic Objectives	Supporting Economic Growth	Facilitate growth in employment at key centres and locations along the A47/A12 corridor	Facilitate growth in housing at key development hotspots along the corridor
	Capacity	Reduce delay and queues that occur during the peak hours and seasonal times of the year	
Operational Objectives	Resilience	Improve the resilience of the route, such that the number of incidents and the effects of incidents is reduced	
	Safety	Reduce the number of collision on the A47/A12 at key hotspots on the corridor	
	Environmental	Minimise unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring.	

7 *REFINING GEOGRAPHIC AREA OF INTEREST*

INTRODUCTION

This section identifies where an intervention is required, established by preceding chapters, and focuses on those as part of the study.

GEOGRAPHIC AREA REFINED

The challenges were verified and refined geographically by reviewing them against the proposed growth areas along the corridor. This established those areas in the vicinity of Peterborough, Norwich and Great Yarmouth as being the highest priority. In addition through the evidence gathering and validation process of the challenges an exercise of establishing link stresses along the corridor and junction modelling to assist with verifying where an intervention is either a current or future challenge. Further refinement of the challenge also considered whether an emerging scheme

or intervention could be realistically delivered within the timescale of 2021. At this stage anecdotal evidence was also included as part of the considerations.

The following **Table 7.1** provides a prioritised list of challenges that are to be addressed by a possible intervention at the next stage of the study. The challenges was grouped into current issues and future issues. By prioritising the current and those future problems identified as being imminent based on forecast growth in the area, the study prioritised 23 challenges at this stage of the study.

Table 7.1 Summarised list of challenges reviewed against current and future transport related problems

Challenge Location	Current	Future	Summary of Underlying Issues
A47 route (Asset Conditions)	-	-	Highways Agency has a rolling maintenance programme. No specific actions at this stage have been provided.
A47 whole route (Capacity)	-	-	Parts of the corridor will potentially be addressed by other challenges. Currently there are no specific actions
A47 whole route (Social and Environmental)	-	-	Parts of the corridor will potentially be addressed by other challenges. Currently there are no specific actions
A47 Between A1 and Sutton (West of Peterborough)	✓	✓	The current link stress for this part of the corridor suggests that it is already over its theoretical capacity. By 2031 this is further exacerbated by planned development that potentially may utilise this link. In terms of safety Cluster 57 at Sutton Heath Road is also located on this part of the corridor.
A47 Nene Parkway (Junction 15)	✓	✓	Observed queue data indicates significant queuing on the eastbound offslip in the offside lane indicating unequal lane usage. It is possible that queues block back onto the A47 eastbound mainline however this has not been confirmed. Queuing also observed on the northbound circulatory carriageway (opposing the A47 eastbound offslip arm).
A47 Junction 18 Peterborough (A47/A15) Lincoln Road, Bourges Blvd	✗	✓	Junction modelling indicated that the A47 offslips are currently within operational capacity. The issue currently indicates that the A15 and Bourges Boulevard approaches have a degree of saturation of between 95-120%. In 2031 the A47 eastbound offslip will operate above capacity in both the AM and PM peak hours.
A47/A15 Parkway Interchange (Dogsthorpe Junction)	✓	✓	Observed queue data indicates significant queuing on all arms including the A47 east and west arms. Forecast year modelling of the existing large roundabout layout indicates that capacity issues will intensify without intervention. Mitigation measures should focus on providing additional capacity at the junction, especially to the A47 arms.
A47 Eye Bypass Junction (Travelodge Roundabout)	✗	✓	Modelling suggests that the junction currently operates within capacity. In the future however it is predicted to be over capacity in the AM and PM peak hours.
A47 Eye to Thorney	✗	✓	Link stress calculations suggest that the link is predicted to be over 90% of capacity by 2031.
A47 Thorney to Walton Highway	✗	✓	Link stress calculations suggest that there is not a current issue on this link. The link between Guyhirn and Wisbech is predicted to have a link stress of just over 90% by 2021. By 2031 this is above 100%. There is potential that this link is further exacerbated by future development in the Wisbech area. Collision rates along this section indicates there is a current reduction in collisions.
A47/A141 Guyhirn (Guyhirn and Wisbech Bypass Junctions)	✓	✓	Junction capacity assessments completed suggests that the junction is predicted to be over capacity on the A47 approaches. By 2031 this is further exacerbated by future developments in the area. Any proposed highways solution is likely to be constrained by environmental factors.
A47/B198 Cromwell Road (Guyhirn and Wisbech Bypass)	✗	✗	There are no current or future issues on the A47 approaches. The B198 Cromwell Road is anticipated to be over capacity by 2031.
A47/A1101 Wisbech (Guyhirn and Wisbech Bypass)	✗	✓	There are currently no operational capacity issues at this junction. The junction is predicted to operate at less than 90%. By 2031 it is predicted to be operating over capacity in both peak periods on all approaches.
A47/C19 Broad End Road (Guyhirn and Wisbech Bypass)	✗	✓	Junction capacity assessments indicated that there is currently no issue but potentially due to growth in the area there is potential for future capacity issues on the A47 approaches.

Challenge Location	Current	Future	Summary of Underlying Issues
A47/B198 Lynn Road - Guyhirn and Wisbech Bypass	✗	✗	Junction modelling predicts that there will be no issue at this junction.
A47/A17 Pullover Junction	✓	✓	Existing capacity issues have been identified. Observed queue data indicates significant queuing on all arms but especially the A17 western arm. A47 arms also experience notable queuing problems, most notably on the southern arm which is due to the high opposing flow (from A47 east to A17 west). Forecast year modelling of the existing large roundabout layout indicates that queuing will increase significantly in the future on all arms without intervention.
A47/A148 Saddlebow Junction	✗	✗	Junction modelling predicts that there will be no issue at this junction.
A47/A10 Hardwick Junction	-	-	Norfolk County was investigating the impacts of development on Hardwick Green and would be reporting findings in 2015.
A47 Middleton to East Winch	✗	✗	Link stress calculations indicate that there is not a current issue or future issue. Current safety issues have also been implemented with a reduction in speed limits at East Winch and Middleton.
A47 Around Swaffham, Dereham	✗	✗	Link stress calculations indicate that there are no current or future issues on the link.
A47 North Tuddenham to Easton (incl. Honingham)	✓	✓	It is predicted that the link stress on this link is currently an issue. In both peaks by 2021 there will be a link stress of above 100% in both peaks.
A47/A1074 Longwater Interchange	✗	✓	All approaches in the base year modelling are within capacity at present. By 2031 this junction is predicted to be operating over capacity on the approach to the northern roundabout from the south roundabout with an RFC of 1.042. This is expected as proposed development pressures in the area could exacerbate the issues further at this junction.
A47 / B1108 Junction, Norwich Research Park	✗	✗	No specific issue identified from junction modelling.
A47/A11 Thickthorn Interchange	✓	✓	Thickthorn is currently operating over capacity on a number of approaches with a degree of saturation of above 90% and in some cases 100%. By 2031 this is predicted to be worse following the proposed development pressures in the vicinity that could add traffic to this junction.
A47/A1042 Postwick Interchange (Postwick Hub)	Funding secured		
A47 Blofield to Burlingham	✓	✓	Link stress calculations indicate that this link is currently exceeding 100%. This could be further exacerbated by future developments in the area that may use the A47 at this location.
A47 Acle Straight	✗	✓	Link stress calculations indicate that this link is currently running within capacity. However by 2031 this is predicted to be above 100%. There are safety concerns on this link. Network resilience when a collision occurs is a further aspect of concern
A47/A12 Vauxhall Roundabout Gt Yarmouth	✓	✓	Junction modelling predicts that this junction is operating over capacity on all approaches apart from Runham Road. Issues related to u-turning vehicles associated with Asda turning movements also increase the pressures at the junction and vehicles using the offside lane to over-take the queue that is attempting to turn left onto Breydon Bridge.

Challenge Location	Current	Future	Summary of Underlying Issues
A12/Breydon Bridge	✓	✓	Stress calculations indicate the bridge currently operating above 100%. This is further exacerbated by seasonal variations in traffic. Bridge closures exacerbate route capacity issues.
A12 Lowestoft to Great Yarmouth Gapton Roundabout	✓	✓	In the base year the modelling indicates that the A12 southern approach is operating above capacity. This again is further exacerbated by proposed development in the area.
A12 Lowestoft to Great Yarmouth Harfreys Roundabout	✓	✓	Existing capacity issues have been identified. Observed queue data indicates significant queuing, especially on the A12 arms including in particular the northern arm in the PM peak. Forecast year modelling of the existing roundabout layout indicates severe congestion will occur without intervention.
A12 Lowestoft to Great Yarmouth Bridge Road Junction	✗	✓	Junction modelling at Bridge Road, James Paget Hospital and Beacon Park indicated that there is not current capacity issue. However by 2031 there are operational issues. Anecdotal evidence and available Transport Assessments for proposed developments also indicate that these junctions will operate over capacity by 2031.
A12 Lowestoft to Great Yarmouth Junction James Paget Hospital Access/James Paget Lane Junction	✗	✓	
A12 Lowestoft to Great Yarmouth Beacon Park Roundabout	✗	✓	
A12 Lowestoft to Great Yarmouth - Severance	✗	✗	No specific issue identified
A12 Lowestoft - Public Transport Accessibility	✗	✗	No specific issue identified
A12 Lowestoft - Station Square/ Waveney Road	✓	✓	Modelling indicates that the junction is currently operating over capacity. In both the AM and PM peak periods. Modelling also does not take into account the raising of Bascule Bridge and how this impact further on the operation of the junction. Currently there is a Suffolk County Council scheme to improve the junction which needs to be investigated. There are also seasonal variation pressures.
A12 Bascule Bridge Lowestoft	✓	✓	Combined with the raising of Bascule Bridge and the levels of existing congestion on the bridge together with the seasonal variations then this bridge anecdotally is a known congestion hotspot.

SUMMARY

From the current evidence gathering and review it has been established that of the 32 challenges identified there are currently 10 that are considered to be an existing problem and 18 where the future problem is further exacerbated by the proposed development pressures.

Inconsistency between dual- and single-carriageway highway layout may increase the risk of congestion and reduce road safety along the A47/A12 corridor.

The culmination of this section will assist in developing the overarching objectives for the study. This information is provided in Chapter 6 of the study.

However, a number of the challenges raised have little technical analysis to validate the issue and many of the current and future issues are based on anecdotal evidence. Therefore hard evidence is required to be obtained to fully substantiate or dismiss the issue.

8 CONCLUSIONS

This report is the first of three reports which documents the current and future challenges on the corridor and focuses where in principle an intervention is required.

The first stage of the study reviewed evidence from other relevant studies and analysis to form a view as to the nature and scale of current and future performance on the A47 route. It also established the non-availability of a suitable strategic transport model.

The current situation was summarised as a mix of dual and single carriageway, with a dualled bypass to Norwich and a handful of other short dualled sections. On single carriageway sections of the route, traffic flows are between 14,000 and 33,000 vehicles a day, or moderately busy.

Fluctuation in flows along the route indicates that a significant proportion of trips are made along relatively short sections of the route, rather than long-distance trips along the entire route.

The analysis of available traffic data and evidence from other studies indicated a number of problems along the route that impact on the efficient and safe movement of people and goods and have consequential effects on the environment and local communities.

The problems along the route were identified as being:

- Congestion at a number of locations particularly at peak periods;
- Inconsistent carriageway standards leading to problems where standards reduce;
- Lack of overtaking opportunities;
- Poor resilience owing to difficulty in passing incidents and lack of alternative routes;
- Collision hotspots where the collision rate is above the national average; and,
- Lack of alternative east-west rail connections.

The data analysis and identification of current problems and future issues informed the definition of a set of intervention objectives that were subsequently used in generating and assessing options to improve the route. These objectives were to:

- Support economic growth:
- Facilitate growth in employment at key centres and locations along the A47/A12 corridor
- Facilitate growth in housing at key development hotspots along the corridor
- Improve capacity, resilience and safety:
- Reduce delay and queues that occur during the peak hours and seasonal times of the year
- Improve the resilience of the route, such that the number of incidents and the effects of incidents is reduced
- Reduce the number of collision on the A47/A12 at key hotspots on the corridor
- Environmental concerns:

- Minimise unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring.

The study prioritised challenges to be addressed along the route. It did so by drawing upon the Route Strategy Evidence Reports⁵ to identify 32 challenges along the route and categorising these as either current problems or future problems. By prioritising the current and those future problems identified as being imminent based on forecast growth in the area, the study prioritised 23 challenges.

Table 8.1 below presents the challenges which will be taken through to Stage 2 of the study. Those challenges that are already having a measurable effect on the performance of the route are designated “current” and “future” challenges which will be taken forward to Stage 2.

Table 8.1 Current and Future Challenges

Current Challenges
A47 Between A1 and Sutton (West of Peterborough)
A47 Nene Parkway (Junction 15)
A47/A15 Parkway Interchange (Dogsthorpe Junction)
A47/A141 Guyhirn (Guyhirn and Wisbech Bypass Junctions)
A47/A17 Pullover Junction
A47 North Tuddenham to Easton
A47/A11 Thickthorn Interchange
A47 Blofield to Burlingham
A47/A12 Vauxhall Roundabout Gt Yarmouth
A12/Breydon Bridge
A12 Lowestoft to Great Yarmouth Gapton Roundabout
A12 Lowestoft to Great Yarmouth Harfreys Roundabout
A12 Lowestoft – Station Square/ Waveney Road
A12 Bascule Bridge Lowestoft
Future Challenges
A47 Junction 18 Peterborough (A47/A15) Lincoln Road, Bourges Blvd
A47 Eye Bypass Junction (Travelodge Roundabout)
A47/A1101 Wisbech (Guyhirn and Wisbech Bypass)
A47/C19 Broad End Road
A47/A1074 Longwater Interchange
A47 Acle Straight
A12 Lowestoft to Great Yarmouth Bridge Road Junction
A12 Lowestoft to Great Yarmouth James Paget Hospital Access Junction
A12 Lowestoft to Great Yarmouth Beacon Park Roundabout

⁵ East of England Route Strategy: <http://assets.highways.gov.uk/our-road-network/route-strategies/East%20of%20England.pdf> – Accessed November 2014