Fenland District Council

PETERBOROUGH CITY COUNCIL

Cambridgeshire County Council

A47 Alliance

A47 Peterborough and Cambridgeshire

Case for Improvement

Evidence and Wider Economic Benefits

A47 Alliance

A47 Cambridgeshire and Peterborough
Case for Improvement – evidence and wider economic benefits

Peterborough City Council

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1.0 Introduction

The purpose of this technical note is to develop an up to date 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.

The A47 is a trunk road maintained by the Highways Agency, which forms a strategic link between the A1 and Yarmouth connecting Peterborough with Wisbech, Kings Lynn, Dereham, Norwich and Great Yarmouth as well as Lowestoft via the A12.

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Peterborough City Council, Cambridgeshire County Council and Fenland District Council, for a number of years have been working in partnership with other local authorities, MPs and businesses in Norfolk and Cambridgeshire as part of the A47 Alliance. The aim of the A47 Alliance is to see the A47 become a dual carriageway from A1 at Peterborough to Great Yarmouth, however, it is expected that this will be a phased approach over time. In order to achieve this aim, there is a need to work in partnership and to develop an evidence base which supports the need for improvements.

The A47 Alliance approach has been to develop the Gateway to Growth Business Case which sets out improvements in the short, medium and long term. These improvements aim to address known problems along A47 and also to release the potential for further development of new homes and jobs. In August 2012, Norfolk County Council and Mott McDonald released a report titled A47 Wider Economic Benefits. This report suggested that in the Norfolk area there would be an additional 9,615 jobs, an increase of £390m per annum in GVA and an additional £802m of private investment.

This Technical Note aims to develop an evidence base for the Peterborough and Cambridgeshire element of A47 to assess the wider economic benefits of making changes to the road. There is also recognition that over the last 20 years a significant evidence base for the road has already been put in place, but there is a need to reassess the information and ensure that it is accurate in the context of today.

1.1 Background

A Norwich to Peterborough Multi-Modal Study (N2PMMS) was previously, undertaken in 2002 (published 2003) to examine the role of all modes of travel between Peterborough and Norwich, including along the A47 between the A1 and the start of the Norwich Bypass just west of Norwich at Easton.

The N2PMMS concluded that if no interventions were made that transport problems would continue to grow along the Norwich to Peterborough corridor. In particular, congestion would grow on specific sections of the A47 which would result in increased delays to traffic for all vehicles, including cars, buses and goods vehicles. The N2PMM additionally concluded that this increased levels of road congestion could also lead to wider problems within the economy of the sub-region.

The N2PMMS identified the need to improve the sections of the A47, which were or would become congested, through a combination of dualling and other lower scale improvements, taking account of environmental constraints as necessary.

The Norfolk A47 Wider Economic Benefits Study sets out a methodology for calculating economic benefits and for assessing the benefits of improvements to the road such as journey times. This report will follow the same methodology as the Norfolk Study to make the economic case for improving the A47 in Peterborough and Cambridgeshire; this includes the use of 2012 data for comparison purposes. A number of tables will be included within this Technical Note that are based on the tables from the Norfolk report; this is to ensure that there is consistency between all the study work undertaken for A47.

This study will also assist Norfolk County Council and A47 Alliance to develop an update on the ‘Gateway to Growth’ brochure.

2.0 Peterborough

From the west the A47 enters the Peterborough Authority area approximately 5.3km west of the A1 intersection at Wansford as an evolved single carriageway road. It then continues to the Sutton Roundabout, also as an evolved single carriageway by passing the villages of Ailsworth and Castor and passing through the northern extent of the City of Peterborough as a dual carriageway road. The A47 east of the city then bypasses the village of Eye in the form of a modern 10m wide single carriageway road (with hatched central reservation) before reverting to an evolved single carriageway road until it reaches the Thorney bypass. The 4.75km Thorney bypass is a modern dual carriageway, after which the A47 again reverts to an evolved single carriageway road as it leaves the authority area at Thorney Toll en route to Guyhirn in the Fenland district.

Peterborough is a Unitary Authority area, approximately 75miles north of London, with an estimated population of 214,000 (ONS, 2011), 156,061 of which reside in the urban area. Peterborough is the largest city in Cambridgeshire and the 27th largest in the UK. The city is strategically located on A1 Trunk Road and East Coast Main Rail lines which connect the north and south of the UK and other important strategic roads (A15, A16, A47 and A605) which traverse the region and UK. The unitary authority is bound by Northamptonshire and Rutland to the west, Lincolnshire to north, Fenland District to the east and Huntingdonshire and greater Cambridgeshire to the south.

3.0 Cambridgeshire

The A47 in Cambridgeshire, which is entirely within Fenland District, runs through the village of Guyhirn and to the south of the Market Town of Wisbech. Wisbech is the largest settlement in Fenland with a population of approximately 20,500 people. It has an inland port and is a key employment centre for food processing industries as well as manufacturing, logistics and storage.

Wisbech is situated in the very north of Cambridgeshire bordering with South Lincolnshire, which has a similar economy and a similar transport network. The A47 is a key access road for traffic wanting to head north and to the midlands from Wisbech and some areas of South Lincolnshire. There is no other bypass except for A47 and heavy levels of traffic move through Wisbech to access A47 from Lincolnshire. This increases congestion and traffic issues within the town.

Since 2008 Cambridgeshire County Council, Fenland District Council and The Highways Agency have been working on the Wisbech Area Transport Study. This study aimed to assess the transport impacts of growth and development in and around Wisbech. It included the building of a traffic model for Wisbech. The key results of this traffic modelling will be discussed later in this report in terms of the impact on A47. However, for further information about the study all the Technical Notes and reports are available on Fenland District Council website at:

http://www.fenland.gov.uk/article/7085/Wisbech-Area-Transport-Study

4.0 Existing Traffic Conditions

The A47 trunk road links the east coast ports with the Midlands and the North and provides a vital link between the communities along the route, such as King's Lynn with Wisbech. The route serves a number of functions, from a strategic function linking the ports with the rest of England, to providing access for the tractor between farm and field. There are also high proportions of HGV traffic using A47. The route is also of variable quality, frequently changing between single carriageway and dual carriageway along the length of the route. The carriageway standard of each section is shown in Table 1.

Table-1 A47 Characteristics

Section	Link Type	Link Length (km)
A1 to Sutton Roundabout	Evolved Single	2.5
Castor Ailsworth Bypass	Dual	5.9
Peterborough Parkway	Dual	6.8
Eye Bypass	Modern Single	2.6
Eye to Thorney	Evolved Single	4.5
Thorney Bypass	Dual	4.6
Thorney Bypass to Guyhirn	Evolved Single	8.3
Guyhirn to Wisbech	Evolved Single	6.7
Wisbech Bypass	Single	7.5
		49.4

The mix of functions and varying quality of route leads to varying and unpredictable journey times due to slow moving vehicles such as tractors and caravans mixing with other traffic. The 2002 N2PMMS study showed that, although there were delays at major junctions and at road works, the average vehicle speeds, between junctions, were consistent with little or no variation: Journey times between the A1 and Easton varied between 97 and 118 minutes (a range of 21 minutes) on both carriageways, depending on time of day.

N2PMMS revealed that journey times were lowest during the off-peak period but would potentially extend by between by between 9 and 55 minutes over the full route between the A1 and Easton by 2031, depending on the assumed growth scenario. The figures from the N2PMMS also indicate that there would, in future, be marginally more variation in journey times for eastbound traffic than westbound. The N2PMMS also predicted that by 2016 under high growth conditions, journey times would increase to between 106 and 189 minutes (a range of 83 minutes), whilst by 2031they increase further to between 126 and 306 minutes (a range of 180 minutes). It is therefore apparent, that as travel demand increases so not only journey times would increase, but also the variation in journey times by time of day and thus unreliability.

This increase in journey time along the A47 would equally apply to lorries, buses and coaches. Therefore, without any intervention, any increase in travel demand would create very significant problems for both private and road-based public transport alike.

4.1 Traffic Data

Sections 4.1 – 4.5 below includes data and analysis to show the likely future conditions of the road in terms of traffic growth, traffic flow and congestion.

The observed Average Annual Daily Traffic (AADT) flows along the A47 are shown in the following Table 2 below, which shows that traffic flows along the corridor varies from 15,000 to over 42,000 vehicles per day. With the sections that have the most traffic being at Peterborough Parkway, Guyhirn to Wisbech and A1 to Sutton roundabout.

Table-2 A47 Traffic AADT Traffic Flow: 2012

	Link Type	Link Length (km)	AADT		
			EB	WB	2 Way
A1 to Sutton Roundabout	Single	2.5	10,492	10,351	20,843
Castor Ailsworth Bypass	Dual	5.9	9,897	9,787	19,684
Peterborough Parkway	Dual	6.8	20,410	22,082	42,492
Eye Bypass	Single	2.6	9,809	9,866	19,675
Eye to Thorney	Single	4.5	8,382	7,131	15,513
Thorney Bypass	Dual	4.6	8,787	7,795	16,581
Thorney Bypass to Guyhirn	Single	8.3	8,819	8,804	17,623
Guyhirn to Wisbech	Single	6.7	10,583	10,747	21,330
Wisbech Bypass	Single	7.5	8,193	8,508	16,701
		49.4	95,372	95,070	190,442

The AM (8:00-9:00) and PM (17:00-18:00) peak hour flows are shown in Table 3, whilst the current levels of Heavy Goods Vehicles (HGV's) along the corridor are shown in Table HGV flows are shown in Table 4.

From Table 4 it is noted that the Cambridgeshire sections of the road from Thorney to Wisbech have the highest levels of HGV traffic with the Wisbech bypass having 18% HGV traffic. These high percentage figures may be due to the high levels of food processing and manufacturing businesses that are a significant part of the local economy, all of which rely on HGV traffic for the movement of their goods.

Table-3 2012 Observed Peak Traffic Flows

	Link Type	Link Length (km)	AM Peak		PM Peak	
			EB	WB	EB	WB
A1 to Sutton Roundabout	Single	2.5	1,462	770	1,004	1,322
Castor Ailsworth Bypass	Dual	5.9	1,440	667	835	1,305
Peterborough Parkway	Dual	6.8	2,178	2,286	2,187	2,386
Eye Bypass	Single	2.6	648	1,007	634	781
Eye to Thorney	Single	4.5	655	1,015	911	655
Thorney Bypass	Dual	4.6	639	758	853	595
Thorney Bypass to Guyhirn	Single	8.3	676	839	868	760
Guyhirn to Wisbech	Single	6.7	909	925	915	928
Wisbech Bypass	Single	7.5	562	703	717	637
		49.4	9,169	8,970	8,923	9,369

Table-42012 Observed Peak HGV Traffic Flows

	Link Type	HGV AM			HGV PM		
		EB	WB	Pk%	EB	WB	Pk%
A1 to Sutton Roundabout	Single	128	114	10.84	113	113	9.72
Castor Ailsworth Bypass	Dual	109	95	9.68	98	84	8.50
Peterborough Parkway	Dual	149	170	7.15	159	145	6.65
Eye Bypass	Single	131	117	14.93	124	115	16.86
Eye to Thorney	Single	80	94	10.42	97	76	11.05
Thorney Bypass	Dual	135	119	18.11	116	113	15.79
Thorney Bypass to Guyhirn	Single	150	145	19.47	137	135	16.71
Guyhirn to Wisbech	Single	183	173	19.41	147	175	17.47
Wisbech Bypass	Single	155	137	23.08	118	136	18.76
		1,219	1,163		1,109	1,092	

Table 4 shows the A47 accommodates a high percentage of HGV's which would contribute to the delays currently experienced on the single carriageway sections, particularly as they are restricted to the 40mph national speed limit when travelling on derestricted sections of single carriageway road. It is also noted that the 6.7km length of A47 between Guyhirn and Wisbech is built on a high embankment with a number of bends and turns, with little opportunity for safe overtaking. This is a difficult stretch of road for HGV movements in a location where there is no real alternative route.

4.2 Traffic Growth – Future Conditions

For the purpose of this study traffic growth is assumed to follow the Government's TEMPRO 6.2 NTM traffic forecasts, which inherently assume the planned demographic growth along the corridor. TEMPRO is a DfT computer program used to forecast traffic growth. It allows access to information such as underlying car ownership, planning data projections and National Trip End Model forecasts of growth, These growth figures are shown in the following Figure 1, and include additional housing or employment growth that may be required as part of Local Plans.

Figure 1 Growth Rates (Indices 2012 - 100)

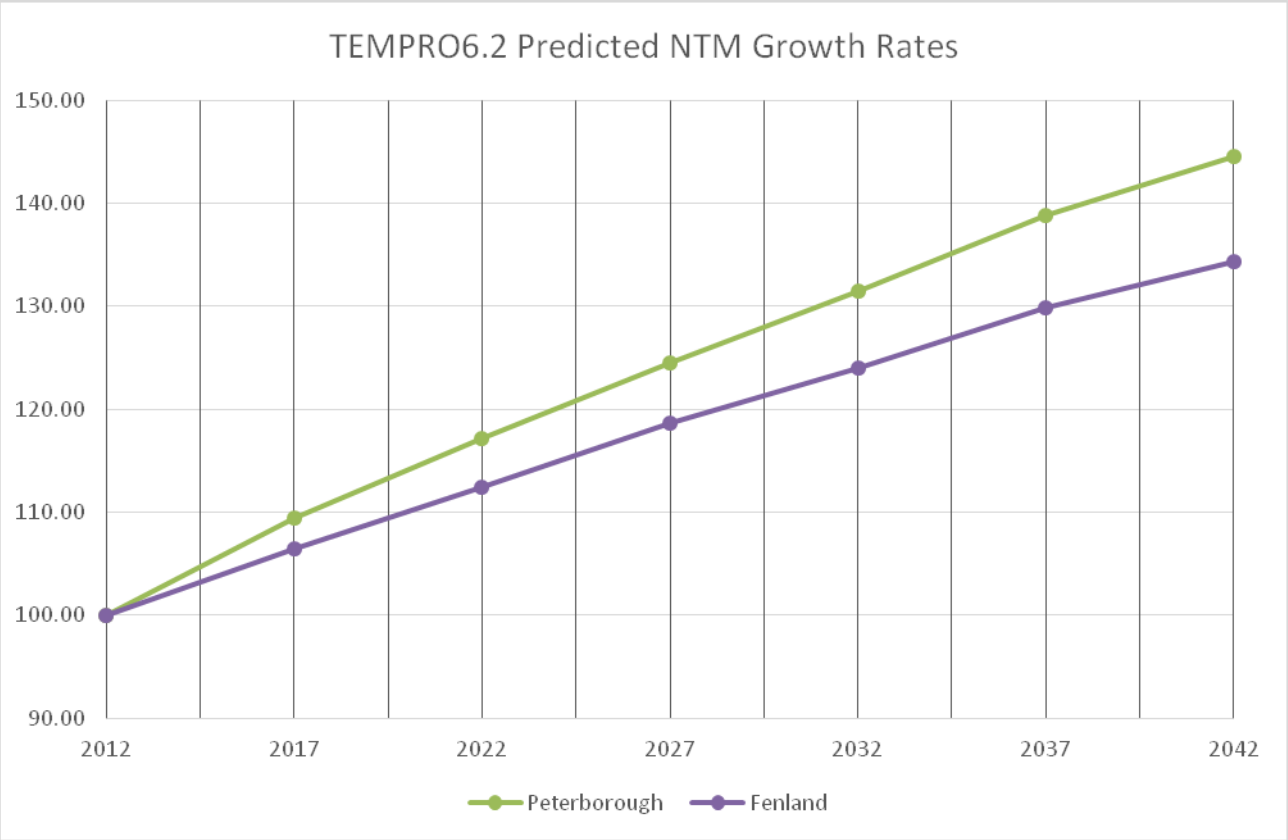


Figure 1 shows that traffic in the forecast is predicted to grow by 45% within the Peterborough area over the 30 year period of this study (2012 to 2042) and by 34% in the Fenland area respectively. These growth factors have been applied to previously listed AADT (Table 2), to enable the impact of these forecasts to be analysed.

4.3 Congestion Reference Flow (CRF)

The AADT flow has been compared with the Congestion Reference Flow (CRF). The Congestion Reference Flow of a link is a standard measure and is an estimate of the Annual Average Daily Traffic (AADT) at which the carriageway is likely to be 'congested' in the peak periods on an average day, where congestion is defined as the situation when the hourly traffic demand exceeds the maximum sustainable hourly throughput of the link.

At this point, the effect on traffic is likely to be one or more of the following: flows break down with speeds varying considerably, average speed drops significantly, the sustainable throughput is reduced and queues are likely to form. It should be noted that the CRF is a measure of the performance of the road link between junctions, and that the effect of junctions is considered separately.

It should be noted that whilst the CRF is a measure of the performance of the road link between junctions that the effect of junctions is considered separately.

Table 5 indicates when the forecast AADT flow is greater than the CRF (shown in red).

Table-5 AADT compared to CRF

Flow > CRF	Road Type	2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Castor Ailsworth Bypass	Dual	No	No	No	No	No	No	No
Peterborough Parkway	Dual	No	No	No	No	No	No	No
Eye Bypass	Modern Single	No	No	No	No	No	No	No
Eye to Thorney	Evolved Single	No	No	No	Yes	Yes	Yes	Yes
Thorney Bypass	Dual	No	No	No	No	No	No	No
Thorney Bypass to Guyhirn	Evolved Single	No	No	No	No	No	Yes	Yes
Guyhirn to Wisbech	Evolved Single	No	No	No	Yes	Yes	Yes	Yes
Wisbech Bypass	Single	No	No	No	No	No	No	No

The above table shows that the A1 to Sutton section of the A47 is already exceeding capacity at some times of the day. It also shows that within the next 15 years the section between Eye and Thorney and also Guyhirn and Wisbech will also exceed capacity.

It is also normal to compare the AADT with 85% of the CRF rather than the total capacity alone as it is important to identify links that are approaching capacity rather than waiting until they are at or beyond capacity and restricting economic growth or worse 'throttling' an existing economy. The AADT compared to 85% of the CRF is shown in Table 6 below, where again values in red show where this has been exceeded.

Table-6 AADT compared to 85% CRF

Flow > 0.85CRF	Road Type	2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Castor Ailsworth Bypass	Dual	No	No	No	No	No	No	No
Peterborough Parkway	Dual	No	No	No	No	No	Yes	Yes
Eye Bypass	Modern Single	No	No	No	No	No	No	Yes
Eye to Thorney	Evolved Single	No	Yes	Yes	Yes	Yes	Yes	Yes
Thorney Bypass	Dual	No	No	No	No	No	No	No
Thorney Bypass to Guyhirn	Evolved Single	No	No	Yes	Yes	Yes	Yes	Yes
Guyhirn to Wisbech	Evolved Single	No	Yes	Yes	Yes	Yes	Yes	Yes
Wisbech Bypass	Single	No	No	No	No	No	Yes	Yes

Table 6 shows the A1 to Sutton section of the A47 is currently operating over capacity. It also shows that the single carriageway sections of the road between Eye and Thorney and Guyhirn to Wisbech will, also be operating beyond capacity within the next five years, thus reducing the ability of these sections of road to accommodate future growth, and hence future development aspirations. This over-capacity will stop the road link performing as the 'gateway to growth' as it should be. By 2042 there will only two dual carriageway sections in the study area operating within capacity; Thorney Bypass and the Castor and Ailsworth Bypass.

4.4 Link Stress

Link stress is defined as the ratio of AADT to CRF and is therefore a measure of the ratio of flow to capacity. The current and future link stress values by direction and peak period are shown in the Tables 7 to 10 below. Values of stress in the region of 0.85 (amber in the table) indicate that the link is suffering stress, where some queuing and delay will occur and values in excess of 1.00 (red in the table) denote extreme stress and substantial queues and delays will occur.

For both east and west bound traffic substantial stress is being shown on many sections of the road, most notably A1 to Sutton Roundabout and Guyhirn to Wisbech.

Table-7 AM Peak Eastbound Link Stress

AM Peak	Link Type	EB						
		2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	1.17	1.26	1.40	1.52	1.64	1.75	1.87
Castor Ailsworth Bypass	Dual	0.37	0.40	0.44	0.48	0.52	0.56	0.60
Peterborough Parkway	Dual	0.55	0.60	0.66	0.73	0.78	0.84	0.90
Eye Bypass	Modern Single	0.41	0.43	0.46	0.51	0.54	0.57	0.61
Eye to Thorney	Evolved Single	0.55	0.59	0.64	0.70	0.75	0.81	0.86
Thorney Bypass	Dual	0.19	0.20	0.22	0.24	0.25	0.27	0.29
Thorney Bypass to Guyhirn	Evolved Single	0.65	0.67	0.70	0.77	0.81	0.86	0.90
Guyhirn to Wisbech	Evolved Single	0.84	0.88	0.93	1.01	1.07	1.13	1.19
Wisbech Bypass	Single	0.58	0.60	0.62	0.68	0.71	0.75	0.78

Table-8 AM Peak Westbound Link Stress

AM Peak	Link Type	WB						
		2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	0.66	0.73	0.78	0.85	0.91	0.97	1.03
Castor Ailsworth Bypass	Dual	0.18	0.20	0.21	0.24	0.25	0.27	0.29
Peterborough Parkway	Dual	0.59	0.63	0.70	0.77	0.83	0.89	0.95
Eye Bypass	Modern Single	0.56	0.62	0.66	0.72	0.78	0.83	0.89
Eye to Thorney	Evolved Single	0.82	0.87	0.97	1.06	1.14	1.22	1.31
Thorney Bypass	Dual	0.21	0.23	0.25	0.27	0.29	0.31	0.33
Thorney Bypass to Guyhirn	Evolved Single	0.75	0.79	0.83	0.91	0.96	1.02	1.07
Guyhirn to Wisbech	Evolved Single	0.84	0.89	0.93	1.01	1.07	1.13	1.20
Wisbech Bypass	Single	0.65	0.70	0.71	0.78	0.82	0.87	0.91

Table-9 PM Peak Eastbound Link Stress

PM Peak	Link Type	EB						
		2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	0.83	0.89	0.98	1.07	1.15	1.23	1.31
Castor Ailsworth Bypass	Dual	0.22	0.24	0.27	0.29	0.31	0.33	0.36
Peterborough Parkway	Dual	0.56	0.61	0.67	0.73	0.79	0.85	0.91
Eye Bypass	Modern Single	0.39	0.42	0.46	0.49	0.52	0.56	0.59
Eye to Thorney	Evolved Single	0.75	0.80	0.89	0.96	1.04	1.11	1.18
Thorney Bypass	Dual	0.23	0.25	0.28	0.30	0.32	0.34	0.37
Thorney Bypass to Guyhirn	Evolved Single	0.76	0.80	0.86	0.92	0.98	1.04	1.10
Guyhirn to Wisbech	Evolved Single	0.80	0.84	0.91	0.98	1.04	1.10	1.16
Wisbech Bypass	Single	0.63	0.66	0.72	0.77	0.82	0.86	0.91

Table-10 PM Peak Westbound Link Stress

PM Peak	Link Type	WB						
		2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	1.06	1.14	1.26	1.37	1.48	1.58	1.69
Castor Ailsworth Bypass	Dual	0.33	0.36	0.40	0.43	0.47	0.50	0.54
Peterborough Parkway	Dual	0.60	0.65	0.72	0.79	0.85	0.92	0.98
Eye Bypass	Modern Single	0.45	0.49	0.53	0.58	0.62	0.66	0.70
Eye to Thorney	Evolved Single	0.54	0.58	0.64	0.70	0.75	0.80	0.86
Thorney Bypass	Dual	0.17	0.18	0.20	0.22	0.23	0.25	0.26
Thorney Bypass to Guyhirn	Evolved Single	0.68	0.71	0.77	0.83	0.87	0.92	0.98
Guyhirn to Wisbech	Evolved Single	0.85	0.88	0.95	1.02	1.08	1.14	1.20
Wisbech Bypass	Single	0.60	0.63	0.67	0.72	0.76	0.80	0.84

The maximum link stress identified by any direction or peak period within Tables 7 to 10 is summarized in Table 11 below.

Table-11 – Maximum Link Stress

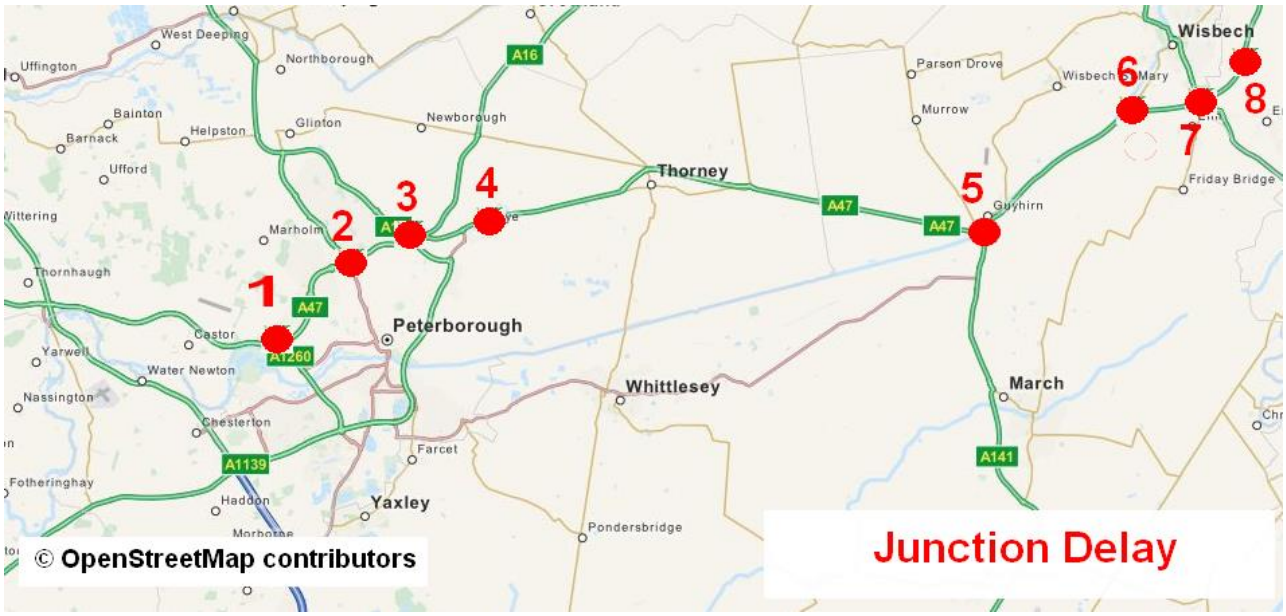
	Link Type	Max Stress						
		2012	2017	2022	2027	2032	2037	2042
A1 to Sutton Roundabout	Evolved Single	1.17	1.26	1.40	1.52	1.64	1.75	1.87
Castor Ailsworth Bypass	Dual	0.37	0.40	0.44	0.48	0.52	0.56	0.60
Peterborough Parkway	Dual	0.60	0.65	0.72	0.79	0.85	0.92	0.98
Eye Bypass	Modern Single	0.56	0.62	0.66	0.72	0.78	0.83	0.89
Eye to Thorney	Evolved Single	0.82	0.87	0.97	1.06	1.14	1.22	1.31
Thorney Bypass	Dual	0.23	0.25	0.28	0.30	0.32	0.34	0.37
Thorney Bypass to Guyhirn	Evolved Single	0.76	0.80	0.86	0.92	0.98	1.04	1.10
Guyhirn to Wisbech	Evolved Single	0.85	0.89	0.95	1.02	1.08	1.14	1.20
Wisbech Bypass	Single	0.65	0.70	0.72	0.78	0.82	0.87	0.91

Table 11 shows the those sections of A47 operating at or over capacity within the study area, and therefore suffering variable journey times, congestion and delay, as summarised below.

Table 11 shows a need to dual the A1 to Sutton, Eye to Thorney and Guyhirn to Wisbech sections of the A47 in the medium term and Thorney through to Wisbech in the longer term. However, whilst it is evident that there is a pressing need to dual the Guyhirn to Wisbech section in the medium term, it is recognised that this section has complexities which might be better addressed as part of the dualling of the Thorney to Guyhirn section of the A47. The development of a realistic and deliverable solution for the Guyhirn to Wisbech section will make this a longer term scheme.

4.5 Junction Delay

Traffic using the A47 is also subject to junction delay as well as link delay. The junctions shown below have been identified as bottlenecks causing traffic delay, and which need to be improved in the short term. The A47 Alliance Business Case work supports the need for these improvements.



The congested junctions within Peterborough are:

1. Parkway Junction with A1260 (Jn15)
2. Parkway Junction with A15 Lincoln Road (Jn 18)
3. Parkway Junction with A15 Paston Parkway (Jn 20)
4. Roundabout with old A1073

Peterborough's LTP3 and Long Term Transport Strategy documents have highlighted issues at these junctions.

The congested junctions within Fenland (referred to as the Wisbech Junctions) are:

5. Guyhirn Roundabout, Junction with A141
6. Wisbech: Redmoor Lane Roundabout. Junction with B198
7. Wisbech: Roundabout with A1101.
8. Wisbech: Broad End Road staggered Junction

The Wisbech Area Transport study referred to in section 3 above has highlighted issues at these A47 junctions and has also looked at potential solutions. The Local Authorities and the Highways Agency working on this study are agreed that for future development to come forward improvements are required at these junctions.

4.6 Road Safety

The study has also examined the number of road traffic crashes (RTC) involving personal injury (personal Injury accident - PIA) along the A47 corridor (A1 to Wisbech) over the 5 year period 2008 and 2012, with the results shown below in Table 12 in terms of RTC per million vehicle kilometres. .

Table-12 Road Traffic Accidents (RTC per MVKM)

	Road Type	RTC				Casualties			
		Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
A1 to Sutton Roundabout	Evolved Single	1	2	30.5	33.5	1	3	53.5	57.5
Castor Ailsworth Bypass	Dual	1	2	17.5	20.5	1	2	31.5	34.5
Peterborough Parkway	Dual	2	5	77	84	2	5	111	118
Eye Bypass	Modern Single	0	4	25	29	0	4	47.5	51.5
Eye to Thorney	Evolved Single	1	3	27	31	1	3	54.5	58.5
Thorney Bypass	Dual	0	7	21	28	0	8	33.5	41.5
Thorney Bypass to Guyhirn	Evolved Single	2	4	44	50	2	5	94	101
Guyhirn to Wisbech	Evolved Single	3	8	31	42	3	15	62.5	80.5
Wisbech Bypass	Single	1	3	12	16	1	3	31	35
Total		11	38	285	334	11	48	519	578

Table 12 clearly shows a high level of casualties on the Peterborough Parkway, Thorney to Guyhirn and Guyhirn to Wisbech sections of A47.

The observed accident rates shown in Table 12 have then been compared to the expected accident rate for the type of road concerned, shown in Table 13.

Table-13 Accident Rates

	Road Type	Severity	AADT	Accident Rate		
				Local	National	
				PMVK	Link	Combined
A1 to Sutton Roundabout	Single	0.090	20,843	0.35	0.226	0.381
Castor Ailsworth Bypass	Dual	0.146	19,684	0.10	0.089	0.131
Peterborough Parkway	Dual	0.083	42,492	0.16	0.089	0.131
Eye Bypass	Single	0.138	19,675	0.31	0.113	0.171
Eye to Thorney	Single	0.129	15,513	0.24	0.226	0.381
Thorney Bypass	Dual	0.250	16,581	0.20	0.089	0.131
Thorney Bypass to Guyhirn	Single	0.120	17,623	0.19	0.226	0.381
Guyhirn to Wisbech	Single	0.262	21,330	0.16	0.226	0.381
Wisbech Bypass	Single	0.250	16,701	0.07	0.174	0.171

The analysis shows that the accident rate of 0.35 Accidents per Million Vehicle Kilometres (PMVK) for the single carriageway section of the A47 between the A1 and the Sutton Roundabout is particularly high, though no higher than the National Average for that type of road (0.381 PMVK). This could be addressed through upgrading that section of road to dual carriageway, which would be expected to reduce the observed accident rate from 0.35 PMVK to 0.131 PMVK.

The analysis also shows that the accident rate along the A47 corridor on the Eye Bypass is also relatively high (0.31), and on this occasion significantly higher than the National Average at 0.171 PMVK for that a type of road which is a modern wide (10m) single carriageway.

The study also found that the accident record of other single carriageway sections of the A47 were not particularly high in comparison to the National Average.

4.7 Summary of key issues relating to the existing traffic conditions

Planned housing and employment growth along the A47 corridor will be inhibited without the necessary A47 highway improvements. The traffic information detailed in sections 2.1 to 2.6 shows that both now and in the future some sections of A47 are experiencing problems now without new development. The key points be aware of are:

- The various standards of different sections of the route, most noticeable those which are single carriageway
- High levels of HGV traffic particularly the sections between Thorney and Guyhirn and Guyhirn to Wisbech
- The Government's TEMPRO growth forecasting predicts traffic will grow by 45% in Peterborough and 34% in the Fenland area of Cambridgeshire between 2012 and 2042
- In terms of congestion reference flow and link stress (a measure of performance of the road link between junctions), the A1 to Sutton roundabout section of the A47 was congested at 2012 with Eye to Thorney and Guyhirn to Wisbech exceeding capacity within 15 years.
- Junction delays indicate a number of problems in Peterborough where the A47 intersects with A1260 (Jn 15), A15 (Jn 18 and Jn 20) and the old A1073. Further east there is congestion at the Guyhirn roundabout (A141) and in Wisbech where the A47 intersects with B198 at Redmoor Lane, A1101 and the Broad End Road junction in Norfolk.
- Road traffic accident data shows high levels of casualties on the Peterborough Parkway section and also at Thorney to Guyhirn and Guyhirn to Wisbech.

5.0 Wider Economic Benefits

The congestion and accidents (as shown in Section 2) blights the performance of the road and therefore the economic performance of the road. In 2008 a survey of businesses in and around Wisbech was undertaken to seek their views about the A47 and its impact on their companies. It should be note that no changes have been made to the A47 in this area since the time of the survey and therefore with higher volumes of traffic any problems are likely to be worst in 2014 than 2008. Key information and comments from this survey are as follows:

- 36 businesses (15%) replied. Together they employ about 2,759 people and operate almost 943 vehicles, 75% of which are HGV or LGV
- 85% of the businesses use A47 on a daily basis in terms of staff commuting to work and also for deliveries for their businesses
- 64% reported delays of up to 15 minutes and the same percentage of respondents also reported delays of between 15 and 30 minutes. They suggested that the worst times for these delays are all day on Fridays and Monday mornings but equally long delays are likely to be experienced on any other day of the week.
- They raised concerns about the number and frequency of delays on A47 in and around Wisbech, particularly towards Peterborough and around Guyhirn
- There is greater concern about A47 due to their dependency on the road, as there are a lack of alternative routes
- The businesses expressed support for the dualling of A47 as they feel there would be less congestion caused by slower moving vehicles and that this would reduce accidents

From the perspective of economic issues the businesses reported the following issues:

- 31% reported that congestion on A47 costs them between 1 and 2 labour/machine hours per week
- A further 36% of the businesses reported the loss of a higher number of labour/machine hours per week. This included a transport consortium representing a number of haulage distribution business who in 2008 were losing over 30 hours of labour/machine hours per week
- 17% of businesses said congestion on A47 had resulted in lost orders, work or customers. Some firms highlighted the loss of good will and embarrassment that delays cause
- In monetary terms 42% of business said they lost between £100 and £500 pounds per week due to delays on A47 with one distribution company reporting losses exceeding £1000 per week
- Businesses also complained about the difficulty of avoiding delays due to the lack of an alternative route

The business survey clearly showed that local companies are experiencing problems due to A47 and that this is affecting the economic performance of those businesses. Improvements to A47 would be beneficial to those organisations.

The previous NPMMS estimated £12m to improve the A1 to Sutton section of the A47 and its junctions; and allowing for the more recent development of Optimism Bias (OB) and recorded RPI (Retail Price Index), this equates to £20m in today's market. Identical adjustments were made to the estimates for potential Parkway Junction Improvements (£15m); Eye Bypass Junction Improvements (£3m); Old A1073 roundabout to Thorney Bypass dualling; Thorney Bypass to Guyhirn Roundabout and the Wisbech junction dualling (£79m) and Wisbech and Guyhirn Junction improvements (£9m).

5.1 Development Planning

The study area forms part of the Peterborough, Cambridge and Stansted growth area. Significant levels of housing and employment development have come forward in recent years and further development is planned over the next 20 years. The Peterborough Core Strategy (adopted 2011) includes the provision for 25,500 homes and 20,000 jobs by 2026 (from 2009).

The Fenland Local Plan Core Strategy (submission version 2013) includes provision for 3,000 homes and 1,600 jobs over 30 hectares in the Wisbech area of Fenland. There are also an additional 500 homes on the east side of Wisbech that are in the Borough of Kings Lynn and West Norfolk. The levels of expected homes for Fenland District are 11,000 with 7,200 jobs to 2031. Taking into account the 3,000 homes planned for Wisbech around 1,600 homes will link more directly to the A47, it is expected that this development will not come forward without A47 improvements. The evidence from the Wisbech Area Transport Study makes clear that some of the development for Wisbech is associated with and thus dependant on the necessary upgrades of the A47.

5.2 Assessing the economic benefits of Improving A47

The earlier elements of this technical note show that there are traffic, congestion and safety issues with the A47 between Peterborough and Wisbech. Local businesses are experiencing difficulties as a result of the traffic issues that are affect economic performance. Equally there are significant levels of new development proposed across the route of the study area that without upgrades to A47 will exacerbate current problems. It is estimated that the cost of upgrades that will be needed over the next 20 years are likely to cost in the region of £126 million at today's prices.

Research was therefore undertaken to assess what other benefits might be provided if the improvements were delivered. The benefits took account of new homes and jobs and GVA. The research showed that in 2011 there were 104,900 jobs based in Peterborough and the total GVA was £4,168.0m (or circa £40k per job). Similarly in Fenland District there were 36,300 jobs in 2011 and a GVA of £1,237.7m in 2011 (or circa £34k per job): GVA figures – ONS/East of England Economic Model.

Table 14 sets out a summary of the key economic impacts relating to the study area including the information detailed above. It is however likely, that a proportion of the planned housing and employment developments will come forward in part irrespective of the upgrade of the A47. Table 14 therefore reflects both sets of figures as a comparison. It also shows the benefits that can be directly attributed to A47 in the study area. A table with the same information is contained in the Norfolk Wider Economic Benefits study so that the effects of the whole route from Peterborough to Great Yarmouth can be measured.

Table-14 Summary of Impacts

Type of Impact	Impact without A47 improvements	Impact with A47 improvements	Benefits Attributed to A47 improvements
Jobs Created (FTEs)			
- Peterborough	7,574	11,574	4,000
- Fenland (Wisbech Area only)	100	1,600	1,500
Additional Jobs Attributable to A47			5,500
Investment			
- Peterborough		£100m	£100m
- Fenland		£15m	£15m
Additional Business Investment Attributable to A47			£115m
GVA (per annum)			
- Peterborough	£250m	£410m	£160m
- Fenland	£3m	£54m	£51m
Additional GVA Attributable to A47			£211m
Housing			
- Peterborough	1738	7,528	5,790
- Fenland	250	2250	2,000
Additional Houses Attributable to A47			7,790

Norfolk County Council on behalf of The A47 Alliance have summarised the economic benefit information of their earlier study work into the Gateway to Growth Business Case Brochure. This document is intended to provide at a glance key details to support the need for improvements to A47. The brochure is being used to inform a wider variety of stakeholders and the UK Government about the key issues and the benefits. Table 15 sets out the key benefits in terms of the Business Case for Peterborough and the Fenland area of Cambridgeshire. The format of the information is consistent with the original business case document so that it can be updated to cover the whole route from Peterborough to Great Yarmouth.

Table-15 The Business Case

	Schemes	Timescale	Cost	Potential local contributions	Scale of Additional Funding to be secured	Jobs	Inv. (£m)	GVA (£m) PA	Homes
Peterborough	A1 Wansford to Sutton Rbt Dualling and Junction Improvements	Medium	£20m		✓✓✓	Improved journey times and reliability			
	Parkway Junction Improvements	Short	£15m	Developer Contribution (CIL / S106)	✓✓	4,000	100	160	5,790
	Eye Bypass Junction Improvements	Short	£3m		✓✓				
	Old A1073 to Thorney Bypass Dualling	Medium	£17m		✓✓✓	Improved journey times and reliability			
Peterborough/ Fenland	Thorney Bypass to Guyhirn Roundabout Dualling	Long	£79m		✓✓✓	Improved journey times and reliability			
Fenland	Guyhirn to Wisbech B198 Dualling	Long							
	Wisbech Bypass Junction Improvements	Short	£9m	Developer Contribution (CIL / S106)	✓✓	1,500	15	51	2,000

Key to the Timescales

Short term = 2013 to 2017

Medium term = 2017 to 2020

Long term = Post 2020

6.0 Conclusions and Recommendations

This and previous studies have identified the single carriageway sections of the A47 to perform poorly in terms of congestion / stress / journey times and road safety. In addition, they have also identified that the current substandard A47 corridor is acting as a barrier for growth preventing the road from operating as the 'gateway to growth' that it should be, especially given its strategic importance, regionally, nationally and to Europe.

In line with the A47 Business Case approach this study recommends that the following sections of the A47 be upgraded to dual carriageway standard.

- Medium Term (2017)
    - A1 to Sutton
    - Eye to Thorney
- Longer Term (2020)
    - Thorney to Guyhirn
    - Guyhirn to Wisbech

To make the A47 a consistent dual carriageway it may also be appropriate to dual the Eye Bypass and other remaining single carriageway sections of the A47 at some future date. These findings reinforce the recommendations of the previous N2PMMS.

However, in the short term, also in line with A47 Alliance Business Case it is recommended that the capacity of the following junctions be improved:

- Peterborough Junction
    - Junction with A1260 (Jn15)
    - Junction with A15 Lincoln Road (Jn 18)
    - Junction with A15 Paston Parkway (Jn 20)
    - Roundabout with old A1073 and
- Wisbech Junctions
    - Guyhirn Roundabout, Junction with A141
    - Wisbech: Redmoor Lane Roundabout. Junction with B198
    - Wisbech: Broad End Road Staggered junction to a roundabout

In the medium and longer term it is recommended that existing single carriageway stretches of the A47 be upgraded to dual carriageway standard.

These upgraded offer value for money, with a total estimated cost of £143m against an expected minimum GVA of £211m per annum. It is noted that without these improvements some 5,500 jobs are at risk of not being formed, together with associated housing.

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Appendices

1.0 References

1.1 Data

- GVA figures – ONS/East of England Economic Model. Source: Oxford Economics
- National Trip End (NTM) - Source: DfT
- TEMPRO figures – Source: DfT

1.2 Development Plans

- Fenland Local Plan Core Strategy – Submission Version September 2013 Source: Fenland District Council
- Peterborough Core Strategy (2011) – Source: Peterborough City Council

2.0 Reports & Studies

- Business Opinion and Impact Survey Report – Report to the Meeting of the A47 Alliance 26 June 2008, Item 7 Source: Fenland District Council
- Norwich to Peterborough Multi Modal Study (2003). Source: Atkins, Roger Tym & Partners and MDS Transmodal
- Wisbech Area Transport Study (2013). Source : Atkins