

A47 North Tuddenham to Easton Dualling

Scheme Number: TR010038

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**The Infrastructure Planning
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The A47 North Tuddenham to Easton
Development Consent Order 202[x]

CASE FOR THE SCHEME

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1 INTRODUCTION

1.1 Purpose of this Document

- 1.1.1 This Case for the Scheme relates to an application for a Development Consent Order (DCO) made by Highways England Company Limited (the Applicant) to the Secretary of State for Transport (the SoS) via the Planning Inspectorate under Section 37 of the Planning Act 2008 (PA 2008). If made, the DCO would grant consent for the A47 North Tuddenham to Easton Scheme (the Scheme).
- 1.1.2 Under Section 104(2) of the PA 2008 the SoS must have regard (among other matters) to any relevant national policy statement when deciding an application for a DCO. The relevant national policy statement (NPS) for the Scheme is the National Policy Statement for National Networks (NPS NN), which sets out the need and Government's policies for delivering the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England.
- 1.1.3 The NPS NN has a particular weight in the consideration of this DCO application as, under Section 104(3) of the PA 2008, the SoS is required to determine the application in accordance with the relevant NPS, subject to the exceptions set out in Section 104 (4) to (8). The Scheme's compliance with the NPS NN is assessed in the NPS NN Accordance Tables (**TR010038/APP/7.2**).
- 1.1.4 This document is therefore intended to supplement this assessment of the Scheme's compliance with the NPS NN and identify 'any other matters' that are considered 'important and relevant' to the determination of the application in accordance with Section 104(2) of the PA 2008.

1.2 The Applicant

- 1.2.1 The Applicant is Highways England, the strategic highway company responsible for operating, maintaining and improving the strategic road network (SRN) in England. Highways England became a Government owned company in April 2015 succeeding to the functions of the Highways Agency.
- 1.2.2 The SRN is made up of the motorway and major A roads network. The A47 is part of the SRN.

1.3 Requirement for a Development Consent Order

- 1.3.1 The Scheme is a NSIP within Sections 14(1)(h) and 22(1) of the PA 2008. Under Section 22 an NSIP must fall within one of the three categories specified, which are expressly stated to be alternatives. This Scheme is the "alteration" of a highway within the meaning of Section 22(1)(b).
- 1.3.2 The Scheme satisfies Section 22(3) in that:
- the highway is wholly in England
 - the Applicant, as strategic highways company, will be the highway authority for the highway
 - the area of the land on which the part of the highway to be altered is situated and any adjoining land expected to be used in connection with its alteration is

greater than the relevant limit set out in subsection (4), which in this case is 12.5 hectares, and speed limits on the highway will be 50mph or greater.

- 1.3.3 To comply with the PA 2008, the Applicant are required to secure a DCO in order to construct and operate the Scheme.
- 1.3.4 An application for a DCO has been submitted to the Planning Inspectorate, who will determine whether the application should be accepted for examination. If accepted the Planning Inspectorate will appoint an Examining Authority or Panel to examine it and make a recommendation to the SoS on whether development consent should be granted. The SoS will make the final decision on whether development consent should be granted.

1.4 Requirement for an Environmental Impact Assessment

- 1.4.1 The Scheme is an Environmental Impact Assessment (EIA) development, as defined by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- 1.4.2 An EIA Scoping Report was prepared (September 2019) (**TR010038/APP/6.5**) to comply with regulation 10 of the Regulations. The purpose of a Scoping Report was to establish the scope of the EIA and the level of detail required. A Scoping Opinion was adopted by the SoS (November 2019) (**TR010038/APP/6.6**).
- 1.4.3 An Environmental Statement (ES) (**TR010038/APP/6.1**) has been submitted as part of the DCO application. The ES provides an assessment of the potential impacts of the Scheme and sets out proposals for mitigation.
- 1.4.4 Chapters 5 to 15 of the ES (**TR010038/APP/6.1**) provide details of the assessments that have been undertaken. They also set out the impacts, a description of the likely significant effects on the environment and identify the measures that are proposed to reduce and, if possible, offset likely significant adverse effects on the environment.

1.5 Planning Policy Context

- 1.5.1 Section 104 of the PA 2008 states that, where a relevant NPS has been designated, decisions about applications for a DCO must be taken in accordance with it.
- 1.5.2 The NPS NN was designated on 14 January 2015. The NPS NN sets out the Government's vision and policies to deliver road networks that meet the country's long-term needs, support a prosperous and competitive economy and improve the quality of life for all.
- 1.5.3 Further details can be found in Section 6 of this document and the NPS NN Accordance Tables (**TR010038/APP/7.2**).
- 1.5.4 The aims of the Scheme are fully in line with the Government's policies and illustrate the need for the Scheme on a national level. The Government has highlighted the express need for further growth and improvements to the national networks within the NPS NN. The Road Investment Strategy (both RIS¹ and RIS²), which explore these needs in further detail, supports the Scheme as a required improvement to the SRN.
- 1.5.5 The Scheme will reduce congestion-related delay, improve journey time reliability and

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/408514/ris-for-2015-16-road-period-web-version.pdf

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf

increase the overall capacity of the A47 while improving road safety and traffic flow. There will be improve connectivity for local people and the network for walkers, cyclists and horse-riders.

- 1.5.6 The Scheme accords with the Joint Core Strategy for Broadland, Norwich and South Norfolk 2011 which acknowledges the congestion issues on the A47 to the west of Norwich caused by the single carriageway sections of the road through the area. The Scheme accords with other policies of the Strategy in relation to sustainability, incorporation of green infrastructure networks and inclusion of good design.
- 1.5.7 The Scheme is also located within the designated Norwich Policy Area which is the focus for major growth and development. Future residential developments of over 4,800 dwellings are expected within the Norwich Policy Area with related service provision, meaning the Scheme is a strategic necessity underpinning growth and investment.
- 1.5.8 By increasing capacity and removing many of the constraints associated with the existing single carriageway between North Tuddenham and Easton, the Scheme meets the objectives contained in the transport and economic strategies for the area as well as policies within the Joint Core Strategy and the Broadland, South Norfolk and Breckland local development plans.
- 1.5.9 The Scheme is also strongly supported at a sub-regional level, as being essential and integral to the Region's drive for economic success articulated in the objectives of the various sub regional policy documents. Improvements to the SRN are considered to be key priorities for the delivery of economic growth in Norfolk and the East of England as a whole.
- 1.5.10 The Scheme has been assessed in the context of the environment. Where any unavoidable impacts occur, suitable mitigation is proposed and overall the benefits of the Scheme are considered to outweigh any unavoidable adverse effects.
- 1.5.11 Following public consultation and feedback, the Scheme is considered by the Applicant to be the best available option for the dualling of the A47 between North Tuddenham and Easton. It is an opportunity to secure a deliverable and fully funded A47 North Tuddenham to Easton Scheme in accordance with the RIS, and current and emerging planning and transport policies.
- 1.5.12 A full planning and transport policy overview is provided in Section 6 of this document.

1.6 Structure of the Report

- 1.6.1 This document comprises seven Sections as set out below:
- Section 1 – sets out the details of the application, confirms the details of the Applicant, and explains why the Scheme is a NSIP which requires the submission of a DCO application
 - Section 2 – describes the Scheme and the surrounding area and sets out how the Scheme has developed over time. It sets out the route options that have been considered and how the preferred route option was selected
 - Section 3 – sets out the need for the Scheme, describes the existing environment and describes the Scheme itself
 - Section 4 – presents the transport case for the Scheme

- Section 5 – presents the economic case for the Scheme and describes its monetised and non-monetised benefits
- Section 6 – assesses the Scheme against national, regional and local planning and transport policy, and considers the policy justification for the Scheme
- Section 7 – provides a summary, bringing together the case for the Scheme and setting out its overall compliance with the NPS NN and relevant planning policy and other important considerations.

2 SCHEME DEVELOPMENT AND OPTIONS CONSIDERED

2.1 Development History and Alternative Options

- 2.1.1 During 2014 a A47/A12 Corridor Feasibility Study (Feasibility Study) was undertaken by AECOM, on behalf of the then Highways Agency and the Department for Transport (DfT), to identify issues on the SRN on the A47/A12 Corridor between the A1 west of Peterborough and Lowestoft (south of the A47 junction with the A12).
- 2.1.2 Twenty-two locations were identified that were considered to have current or imminent problems. These were then considered further at a high-level using criteria from the DfT's Early Assessment and Sifting Tool (EAST). AECOM developed the Options Assessment Report ('OAR') for each scheme.
- 2.1.3 The studies informed the Government's RIS and an initial case was made to carry out the following improvements:
- A47 Wansford to Sutton Dualling
 - A47 Guyhirn Junction Improvements
 - A47 North Tuddenham to Easton Dualling
 - A47 Thickthorn Interchange Improvements
 - A47 Blofield to North Burlingham Dualling
 - A47 Great Yarmouth Junction
- 2.1.4 In December 2014 the DfT published the RIS for 2015 to 2020³. The RIS includes a package of six schemes (identified in 2.1.3 above) to be developed and constructed by the Applicant during Roads Period 1 (2015 to 2020) and Roads Period 2 (2020 to 2025). These will improve journeys on the 185 kilometre (km) section of the A47 between Peterborough and Great Yarmouth. These schemes have been branded as the A47 Improvement Programme.
- 2.1.5 Following the publication of the RIS, a high-level appraisal of benefits for the identified schemes was created for the DfT. This work was summarised in the A47 and A12 Corridor Feasibility Study (dated February 2015) published on the DfT website in March 2015 and can be found at: <https://www.gov.uk/government/publications/a47-and-a12-corridor-feasibility-study-technical-report>.
- 2.1.6 Stage 1 of the Feasibility Study⁴ reviewed the existing evidence to identify any problems along the corridor, with the report's summary stating:
- “Current Situation: 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.*
- 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*

³ <https://www.gov.uk/government/collections/road-investment-strategy>

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411142/a47-stage-1.pdf

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 a Rackheath and Wisbech, Norwich and on the fridges 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 trip.

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 highway network and generate further issues. There are safety issues in certain locations where there are currently high collision and incident rates that could be addressed.

A summary of the challenges was considered within the 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 lack of realistic alternatives to support planned growth, hence the need for interventions to address such problems.”

- 2.1.7 The feasibility study identified that the A47 between North Tuddenham and Easton, west of Norwich, experiences peak period congestion, with growth in Norwich expected to exacerbate the situation. This was demonstrated by the average speed being significantly less than the daily average during the AM peak; an indicator of congestion which affects journey reliability on the link. The feasibility study stated the following:
- “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 over 100% in both peaks”.*⁵
- 2.1.8 The feasibility study concluded that whilst around half of the A47 is already built to dual carriageway standard, the North Tuddenham to Easton section is not and the single carriageway section of the road no longer meets the needs of its users, instead acting as a bottleneck, resulting in congestion that leads to longer journey times. Further, this section of the A47 has a poor safety record.
- 2.1.9 The feasibility study states that dualling the section of the A47 North Tuddenham to Easton offers a solution to the congestion and will allow economic growth in the area. This also confirmed a study in 2003, the Norwich to Peterborough multi-model study, that recommended upgrading this section for the A47 to a dual-2-lane standard.
- 2.1.10 In April 2015 the Applicant assumed responsibility for the SRN and delivering the Government’s vision for that network as set out in the RIS. As a result, the Applicant took ownership of the previously DfT led ‘Strategy, Shaping and Prioritisation’ phase of Scheme development.

⁵ Table 7.1 in https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411142/a47-stage-1.pdf

2.2 Options Identification and Assessment

- 2.2.1 Each of the six schemes were progressed separately but collaboratively under this approach. A study was undertaken to identify broad solutions to dual the A47 North Tuddenham to Easton in an effective and economically cost-effective way.
- 2.2.2 Fourteen potential route options were identified and initially assessed comparatively in terms of their engineering, environmental, transportation and economic suitability. These assessments were undertaken based on data gathered from desk-based information supplemented by initial walk over environmental surveys undertaken in 2016.
- 2.2.3 Each of the assessments qualitatively and comparatively rated each option as either red, amber or green. The options rated red having the least favourable outcome for the assessment, the options rated green the more favourable outcome from the assessment. Amber ratings were given where assessments were in-between the red and green ratings.
- 2.2.4 **Environmental Assessment:** A qualitative environmental assessment, based on available environmental data, was undertaken and the following environmental topics considered:
- noise
 - air quality
 - greenhouse gases
 - landscape
 - townscape
 - historic environment
 - biodiversity
 - water environment.
- 2.2.5 **Transportation Assessment:** Each of the options offered a solution to the transportation problem and each provided additional capacity on the network. The consideration of transportation issues was therefore predominantly based on route length. The shorter the route, the lower likely journey times and the more favourable the option was rated in the assessment.
- 2.2.6 **Engineering:** A qualitative engineering assessment, based on the data available, was made taking the following engineering criteria into consideration:
- buildability
 - land take requirement
 - general alignment
 - accommodation works
 - geotechnical
 - structures
 - impact on Statutory Undertakers.

- 2.2.7 **Economic Assessment:** A comparative economic assessment of each option was made based on high level comparative estimates of scheme costs and potential benefits.
- 2.2.8 An updated local transportation model was developed, based on the Norwich Area Transportation Strategy (NATS) model, and used to further assess the Options and to provide transportation information to inform the economic analysis of each of the Options.
- 2.2.9 **Assessment Results:** The Scheme Assessment Report (SAR) produced by the Applicant and Amey (December 2017⁶) summarises the findings of the technical, operational, safety, traffic, economic and environmental assessments. This formed the basis for recommendations for which option should be taken forward for non-statutory public consultation. The results are summarised in Figure 2.1, below.

Figure 2.1 - Results of comparative qualitative option assessment⁷

| Option | Option rankings from individual assessments | | | | Overall Rank |
|-----------|---|------------------------|--------------------|---------------------|--------------|
| | Environment Assessment | Engineering Assessment | Traffic Assessment | Economic Assessment | |
| Option 1 | 8 | 1 | 1 | 1 | 1 |
| Option 2 | 10 | 9 | 14 | 8 | 11 |
| Option 3 | 1 | 5 | 4 | 12 | 3 |
| Option 4 | 3 | 3 | 3 | 2 | 1 |
| Option 5 | 10 | 5 | 11 | 6 | 10 |
| Option 6 | 10 | 2 | 8 | 3 | 4 |
| Option 7 | 8 | 12 | 2 | 5 | 7 |
| Option 8 | 5 | 14 | 10 | 14 | 13 |
| Option 9 | 3 | 11 | 7 | 11 | 9 |
| Option 10 | 1 | 8 | 5 | 9 | 4 |
| Option 11 | 5 | 7 | 12 | 7 | 8 |
| Option 12 | 5 | 13 | 13 | 13 | 14 |
| Option 13 | 10 | 9 | 9 | 10 | 12 |
| Option 14 | 10 | 3 | 6 | 4 | 4 |

Note: Options ranked 1 best to 14 worst and RAG rated (1-4 green, 5-8 amber, 9-14 red)

⁶ https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-february/supporting_documents/A47%20North%20Tuddenham%20to%20Easton%20Scheme%20Assessment%20Report%20SAR.pdf

⁷ Extracted from A47 North Tuddenham to Easton Scheme Assessment Report (SAR), (Highways England, December 2017). Available at: https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-february/supporting_documents/A47%20North%20Tuddenham%20to%20Easton%20Scheme%20Assessment%20Report%20SAR.pdf

- 2.2.10 Four of the fourteen options were selected to be taken forward to public consultation:
- Option 1 – ranking joint first with Option 4, this was the best offline dualling option to the north of the existing A47
 - Option 3 – representing as close to an online dualling improvement that modern standards allow
 - Option 4 – ranking joint first with Option 1, this was the best offline dualling solution to the western part of the route to the north of the existing A47
 - Option 6 – best representation of offline dualling to the south of the existing A47 route.
- 2.2.11 Options 6, 10 and 14 all ranked 4th, but only Option 6 was taken forward because:
- Options 6 and 14 are similar offline to the south routes, but Option 6 was considered a preferable alignment so it was decided it would be taken forward to represent the best offline to the south route.
 - Options 3 and 10 are similar predominantly online routes, but Option 3 was closest to the existing alignment so was taken forward to represent the best online route.
- 2.2.12 For simplicity in gathering public comment and presentation at the consultation the Options 1, 3, 4 and 6 were renumbered sequentially as follows:
- Option 1 – offline dualling to the north of the existing A47
 - Option 2 – online dualling following the existing A47
 - Option 3 – offline dualling to the south and the north of the existing A47
 - Option 4 – offline dualling to the south of the existing A47.
- 2.2.13 The junction strategy for all four options was similar with the existing grade separated junction at Fox Lane to be retained. The proposed second junction would be provided to the eastern end of the Proposed Scheme between Easton and Honingham. No other junctions or accesses were included in the options.
- 2.2.14 No walking, cycling and horse-riding facilities were proposed or any crossings proposed in any of the options.

Option 1

- 2.2.15 Proposed to construct a new section of offline dual carriageway with appropriate junctions to the north of the existing A47 highway corridor. The proposed alignment would pass to the south of the Hockering Wood (SSSI) and to the north of the village of Hockering, the remainder of the route passing predominantly through open farmland and some woodland habitat before crossing the river Tud close to Easton. To accommodate this proposed option, it would be necessary to acquire land along the route of improvement. The existing A47 would remain unaffected and part of the local road network (Figure 2.2).
- 2.2.16 This option was identified as having a larger environmental impact than online options due to the proposed increased land take and disturbance. The Scheme Assessment Report identified that the impacts on landscape, biodiversity and water environment

were assessed as adverse impacts and the noise impact was assessed as slight adverse due to proximity of route to Hockering. The Report identified this option as the third preferred option for the environment.

- 2.2.17 The initial transportation assessment identified this option as being the shortest route and therefore was the best ranked option in the Scheme Assessment Report. The engineering assessment stated that this option was the best ranking due to the fact it is offline which is considered easier to construct than online solutions. In the economics assessment, this option was the best ranking due to the costs for construction was considered to be cheaper due to decreased traffic management costs as it is an offline option and the fact it is the shortest route.

Figure 2.2: Option 1

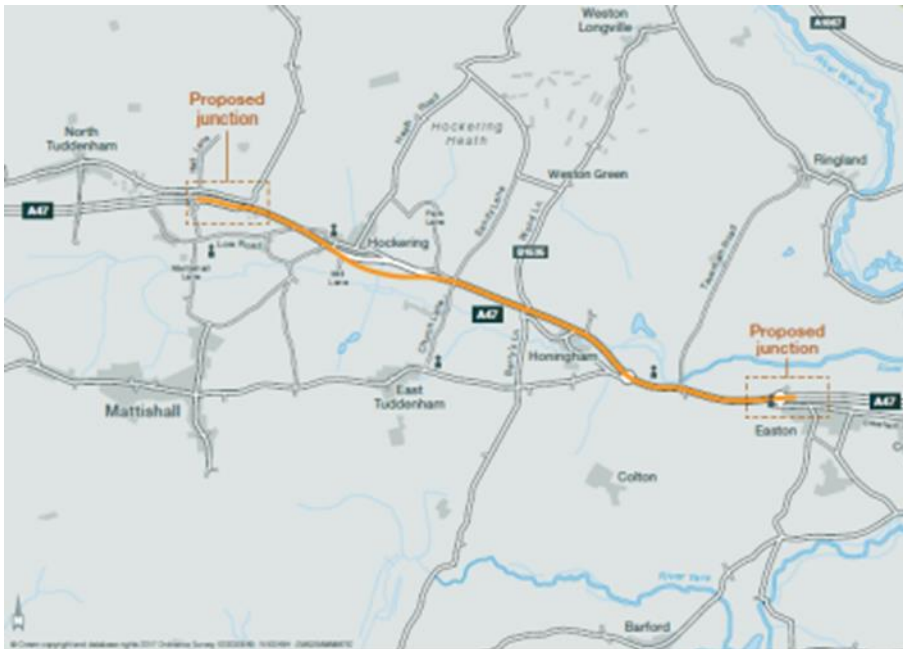


Option 2

- 2.2.18 Proposed that the single carriageway section of the A47 between North Tuddenham and Easton be improved to dual carriageway standard by the construction of a new section of online dual carriageway with appropriate junction improvements. The proposed new dual carriageway would run as close to the existing A47 as practical. Improvement to the existing alignment to bring the route up to dual carriageway standards and the practicalities and safety of construction will make it necessary for the alignment in some section to move away from the existing highway corridor particularly as the route passes through the south of the village of Hockering. Due to the width of the new carriageway it would be necessary to acquire additional land along the route to accommodate the improvement (see Figure 2.3).
- 2.2.19 This option was identified as having less of an environmental impact than the other offline solutions due to less disturbance and impact on soil, particularly with regard to impact on landscape, biodiversity and water environment. This option was identified as being the environmentally preferred option.
- 2.2.20 The transportation assessment in the Scheme Assessment Report identified this

option as being the fourth best performing option due to the shorter route which would offer quicker journey times. The engineering assessment concluded as this option was online it is considered to be more difficult to construct due to increased phasing and traffic management. This option would also present an increased effect on statutory undertakers. In the economic assessment, this option was ranked 12th due to the fact it is online and offline as the cost of construction and traffic management delays caused by online construction. Consultation feedback identified this option as being the preferred option.

Figure 2.3: Option 2



Option 3

- 2.2.21 Proposed offline dualling south of the existing A47, for the western part of the route and to the north of the existing A47 for the eastern part of the route. The single carriageway section between North Tuddenham and Easton would be improved to dual carriageway standard by the construction of a new section of offline dual carriageway with appropriate junction improvements. The proposed new dual carriageway would run to the south of the A47 but to the north of the existing A47 as the route passes the village of Honingham, crossing the existing A47 between the villages. The route passes predominantly through open farmland and some woodland habitat and crosses the River Tud at the Easton end. To accommodate the proposed dualling it would be necessary to acquire land along the route of the improvement. The existing A47, where unaffected by the new Dual carriageway, would remain part of the local road network (see Figure 2.4).
- 2.2.22 The offline option was likely to have larger environmental impact than the online options. In the Scheme Assessment Report the impacts on landscape, biodiversity and water environment were assessed as adverse impacts. Noise and air quality impacts were assessed as being neutral due to the route moving traffic further from Hockering and Honingham. The Report concluded that this option would be the second preferred option for the environment.

- 2.2.23 The transportation assessment in the Scheme Assessment Report identified this option as being the third best performing option due to the shorter route which would offer quicker journey times. The engineering assessment concluded that this option would be the third best performing as it is offline and therefore considered easier to construct. The economics assessment ranked this option as the second best performing due to the costs for construction are considered to be cheaper due to decreased traffic management costs as it was an offline option.

Figure 2.4: Option 3



Option 4

- 2.2.24 Proposed offline dualling south of the existing A47 route. The single carriage way section of the A47 between North Tuddenham and Easton would be improved to dual carriage way standard by the construction of a new section of offline dual carriageway with appropriate junction improvements. The proposed new dual carriageway follows an alignment running to the south of the existing A47 and to the south of the River Tud. At the western end of the scheme, the proposed alignment crosses the River Tud before passing to the south of the village of Honingham and returning to the A47 at Easton. The route runs predominantly through arable farmland and semi-improved grassland. To accommodate the proposed dualling, it would be necessary to acquire land along the route of the improvement. The existing A47 would, where unaffected by the new dual carriageway remain part of the local road network (see Figure 2.5).
- 2.2.25 This option was likely to have a larger environmental impact than the online options. The Scheme Assessment Report assessed the impacts on landscape, biodiversity and water environment as adverse impacts. Any noise impacts were assessed as slight adverse due to proximity of route to Honingham. This option was identified as being the least preferred option for the environment.
- 2.2.26 The transportation assessment in the Scheme Assessment Report identified this option as being the eighth best performing option due to the shorter route which would offer quicker journey times. The engineering assessment concluded that this would

be the second best performing option as it is an offline solution which is considered easier to construct than online options. In terms of economics, this option was the third best performing option as the costs for construction are considered to be cheaper due to decreased traffic management costs as it was an offline option. Consultation feedback identified this option as being least favourable.

Figure 2.5: Option 4

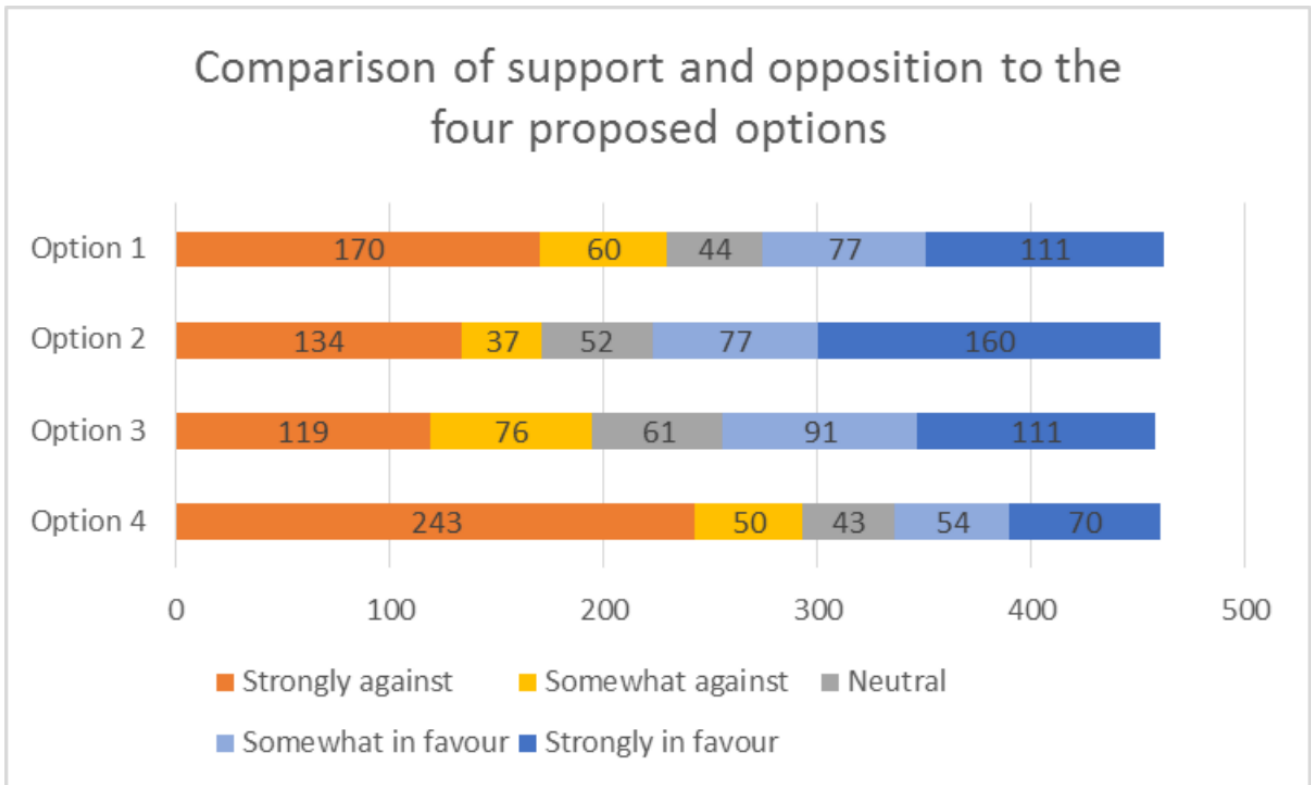


2.3 Options Consultation

- 2.3.1 The four options shown in Section 2.2, above, were presented at a non-statutory public consultation between March and April 2017. The purpose of the consultation was to seek views on the outline proposals from the general public, statutory consultees, including local authorities, and other interested bodies.
- 2.3.2 The total number of respondents to the consultation was 529, which included responses from stakeholders and members of the public. The consultation was reported in the 'A47 Corridor Improvement Scheme Public Consultation Report A47 North Tuddenham to Easton Improvement (August 2017)⁸.
- 2.3.3 A summary of the level of support for each of the options is provided in Figure 2.6.

⁸ https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-dualling/results/a47-tuddenham-cons-report_final_080817.pdf

Figure 2.6: Summary of the level of support for each of the options at consultation



2.3.4 Following the options consultation, the above four options were subject to further assessment as detailed in the Scheme Assessment Report December 2017 (SAR). This included traffic analysis and the following considerations:

- drainage and flooding assessments
- geotechnical considerations
- mining assessments
- assessment of structures
- assessment of public utilities
- topography
- buildability
- operational, technology and maintenance
- safety assessments
- environmental assessments
- cost assessments.

2.3.5 The SAR included a summary of the previous assessments, reported on the non-statutory public consultation and included the further surveys, investigations and assessment work undertaken.

2.4 Preferred Route Announcement

2.4.1 The Preferred Route, 'Option 2 – the online dualling following the existing A47', was announced by the Applicant in August 2017.

2.4.2 The assessment of the short listed four options led to Options 1 and 4 being discounted due to the high impacts on the environment and the local community

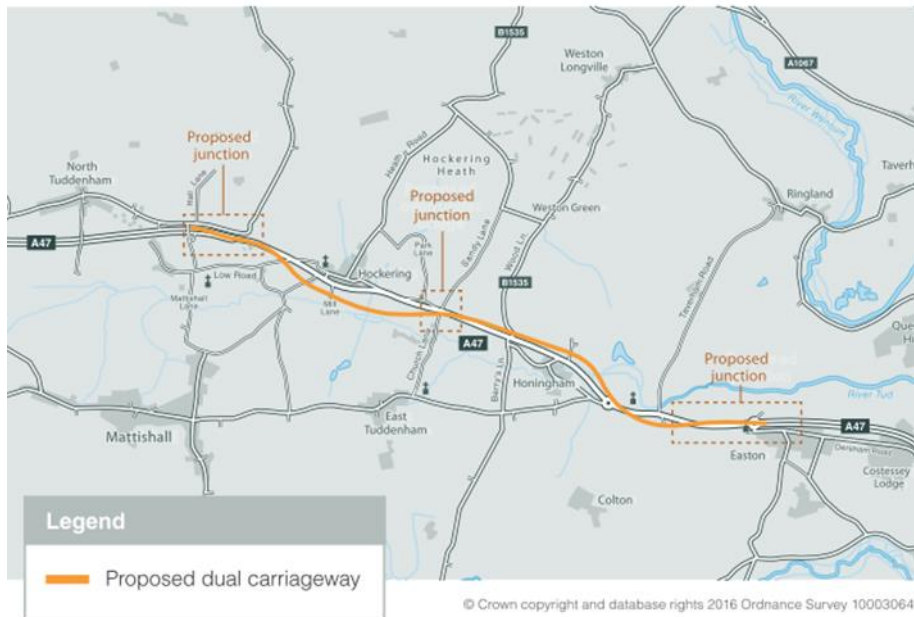
- **Option 1** – the western end of the route would have large impacts as the route passes through the north of the village of Hockering, severing part of the village and passing through the now consented housing development land, local sports facilities and fishing lakes. The east of the route would have large impacts on areas of woodland and on Easton estates.
- **Option 4** – passes close to the River Tud and creates a new crossing of the river in the west. There would be large impacts on East Tuddenham, Honingham, Earthsea House School, Ailwyn Hall and the wood to the north of it (Warren Plantation). There would also be impacts on the Icehouse listed building as well as the high risks associated with ground conditions and proximity to the River Tud.

2.4.3 Option 2 was subsequently identified as the preferred route option due to the higher environmental impact of Option 3 coupled with the higher public consultation preference for Option 2 that both outweighed the higher cost and longer delivery programme.

2.4.4 However, as Option 2 and Option 3 were close in overall terms, an exercise was undertaken to develop Option 2 by removing or reducing some of the potential issues associated with it. The alignment of Option 2 was moved to ensure the preferred route could be built with the least disruption to drivers during construction as the existing road could remain open for local traffic movements, walkers, cyclists and horse-riders. The final preferred option alignment (see Figure 2.7) deviates locally from the existing A47 to provide the following benefits:

- reduce the impact at the western end on Oak Farm
- minimise the impact on the existing properties on Mattishall Lane
- minimise, where possible, the impact on the properties on close to the existing A47 at Hockering
- reduce the impact of the road on the River Tud
- keep the route to the north side of the corridor as it passes Honingham to achieve noise and air quality benefits
- keep the route to the north at the existing Easton junction to maximise the chance of the local road reconnection being alongside and to the north of the church at Easton.

Figure 2.7: Preferred Option



2.5 Statutory Consultation

- 2.5.1 Statutory consultation on the Preferred Route was held between 26 February and 30 April 2020. Full details of this consultation are provided in the Consultation Report (TR010038/APP/5.1).
- 2.5.2 The Applicant consulted with the local community in accordance with the SoCC provided in Annex G of the Consultation Report (TR010038/APP/5.2) as prescribed by Section 47(7) of the PA 2008.
- 2.5.3 The Applicant invited all consultees, including those identified under Section 42, Section 47 and Section 48 of the Planning Act 2008 (PA 2008), to submit feedback within the consultation period noted above.
- 2.5.4 A total of 419 responses were received during the consultation period.
- 2.5.5 When asked if they agreed or disagreed with the proposal to make the A47 a dual carriageway between North Tuddenham and Easton (Question 6a) of the questionnaire, 70% (244) of the 339 who responded to this question said they agreed with the dualling proposals; 13% (37) were neutral and 17% (58) disagreed.

2.6 Design Development

- 2.6.1 Following consideration of the responses to the statutory consultation and further design work the Preferred Option was refined. This has included consideration of the land required for the necessary utilities diversions and resulted in changes to the red line boundary presented at the statutory consultation.
- 2.6.2 Stakeholder engagement post the statutory consultation included a number of meetings with Norfolk County Council, the District Councils (Breckland, Broadland and South Norfolk) and environmental bodies including the Environment Agency, Natural England and Historic England.
- 2.6.3 A further focused non-statutory consultation on the changes to the Scheme was also

undertaken between December 2020 and January 2021.

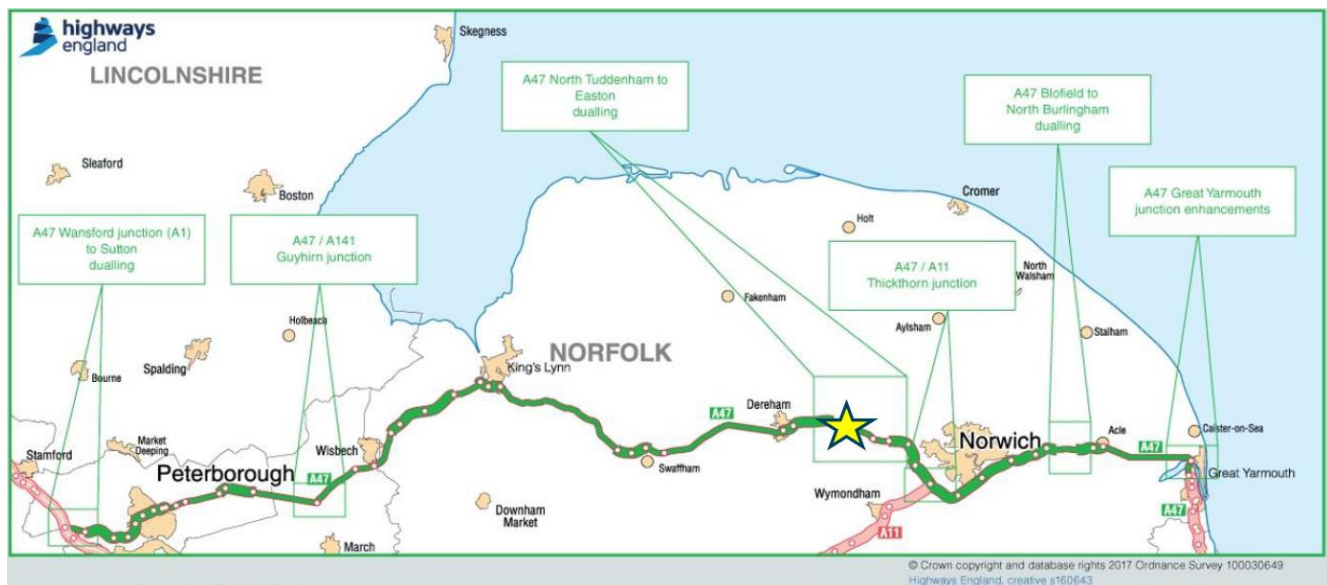
- 2.6.4 The feedback received from both consultations, together with direct stakeholder engagement on the design, proposed mitigation measures or issues raised during statutory consultation, has informed the Scheme as presented within the application documents.
- 2.6.5 Full details of engagement and consultation are set out in the Consultation Report (**TR010038/APP/5.1**).
- 2.6.6 The Scheme development is further detailed within ES Chapters 2 and 3 (**TR010038/APP/6.1**) and the Scheme Design Report (**TR010038/APP/7.3**) including the key features of the design presented at consultation and the Scheme which is included within the application.

3 THE NEED FOR THE SCHEME

3.1 Overview

- 3.1.1 The A47 from North Tuddenham to Easton is located to the west of Norwich and forms part of the main arterial highway route connecting Norwich and Great Yarmouth to King's Lynn and then on to Peterborough, Leicester and the Midlands.
- 3.1.2 In the wider context, the A47 and A12 trunk roads form part of the SRN and provide for a variety of local, medium and long-distance trips between the A1 and the eastern coastline. The corridor connects the cities of Norwich (population over 141,000⁹) and Peterborough (population over 201,000), the towns of Wisbech, Kings Lynn, Dereham, Great Yarmouth and Lowestoft and a succession of villages in what is largely a rural area. The A47 also links with the A11 Cambridge Norwich Tech Corridor – an initiative, supported by four District Councils, to attract up to 15,000 new jobs, £900 million private sector investment in construction and 20,000 new homes along the corridor¹⁰. The location the A47 corridor, including the 6 identified schemes from the RIS is shown in Figure 3.1 below. The North Tuddenham to Easton Scheme is indicated with a yellow star.

Figure 3.1: Scheme context¹¹



- 3.1.3 Norwich and Peterborough have developed service-based economies and the towns along the route of the A47 have retained market town and other functions including agricultural-related industry. In recognition of the potential for businesses and economic growth in these areas on the eastern coast, the Chancellor announced in the 2011 budget the establishment of the Great Yarmouth and Lowestoft Enterprise Zone, particularly for energy related businesses to maximise support for the offshore energy sector. In December 2013, the Government announced a Greater Norwich City Deal to enable knowledge-based industries to develop.
- 3.1.4 There has been a rapid growth in the economy along the A47 corridor over the past

⁹ ONS 2018 Population estimates for Norwich and Peterborough

¹⁰ Cambridge Norwich Tech Corridor: Vision and Spatial Strategy Report 2020, Perkins & Will

¹¹ Extracted from RIS East Area 6, A47 North Tuddenham to Easton, Scheme Assessment Report, December 2017

decade and the area is expected to continue to grow. The cities of Peterborough and Norwich attract additional traffic along the route, particularly during the morning and evening peak periods¹².

- 3.1.5 Traffic is forecast to grow across the country and as set out in Section 2.1 above, and the A47 & A12 Corridor Feasibility Study (Stage 1, Page 3), this 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 A47 corridor, including Peterborough, Kings Lynn, Norwich and Great Yarmouth and Lowestoft. There are several major proposed housing developments close to the A47, including at Easton and Norwich.
- 3.1.6 The A47 Corridor is around 185km long; 87km (47%) is dual carriageway while 98km (53%) is single carriageway. Previous studies have proposed dualling a number of sections of the A47 in the short and long term, together with a number of junction improvements.
- 3.1.7 The A47 Alliance, comprising of Local MPs, local government, businesses and other stakeholders, have been campaigning for comprehensive improvement of the A47. Their aim is to capitalise on the potential economic benefits of improved accessibility to the Midlands and the North as well as address road safety issues.
- 3.1.8 The single carriageway section of A47 between North Tuddenham and Easton lies between two dual carriageway sections of the A47 and acts as a bottleneck, resulting in congestion and leading to longer and unreliable journey times. This section of the A47 also has a poor safety record. In developing this Scheme, the Applicant aims to address these issues by upgrading the existing section of 7.9km of single carriageway to a high-quality dual carriageway.
- 3.1.9 The section of the A47 between North Tuddenham and Easton experiences congestion and is currently operating over capacity.
- 3.1.10 The A47 North Tuddenham and Easton (Eastbound) currently has an average speed significantly lower than the daily average during the AM peak. This is an indicator of congestion and affects journey times and journey time reliability on the road.
- 3.1.11 The A47 North Tuddenham and Easton stretch of single carriageway also has a poor safety record. The A47 is ranked 2nd nationally for fatalities on A roads and the accident severity ratio is above average. During the period 2014 to 2018 a total of 2 fatal, 15 serious and 76 slight accidents have been recorded along a 11km length of the existing A47 from North Tuddenham to Easton.
- 3.1.12 Due to the lack of nearby alternative routes, route resilience on this link is also an issue.
- 3.1.13 The proposed solution to the traffic and safety issues put forward in the RIS lists the A47 North Tuddenham to Easton scheme as one of the schemes which make up the package of improvements as: *“A47 North Tuddenham to Easton – dualling of the single carriageway section of the A47 between Norwich and Dereham, linking together two existing sections of dual carriageway.”*

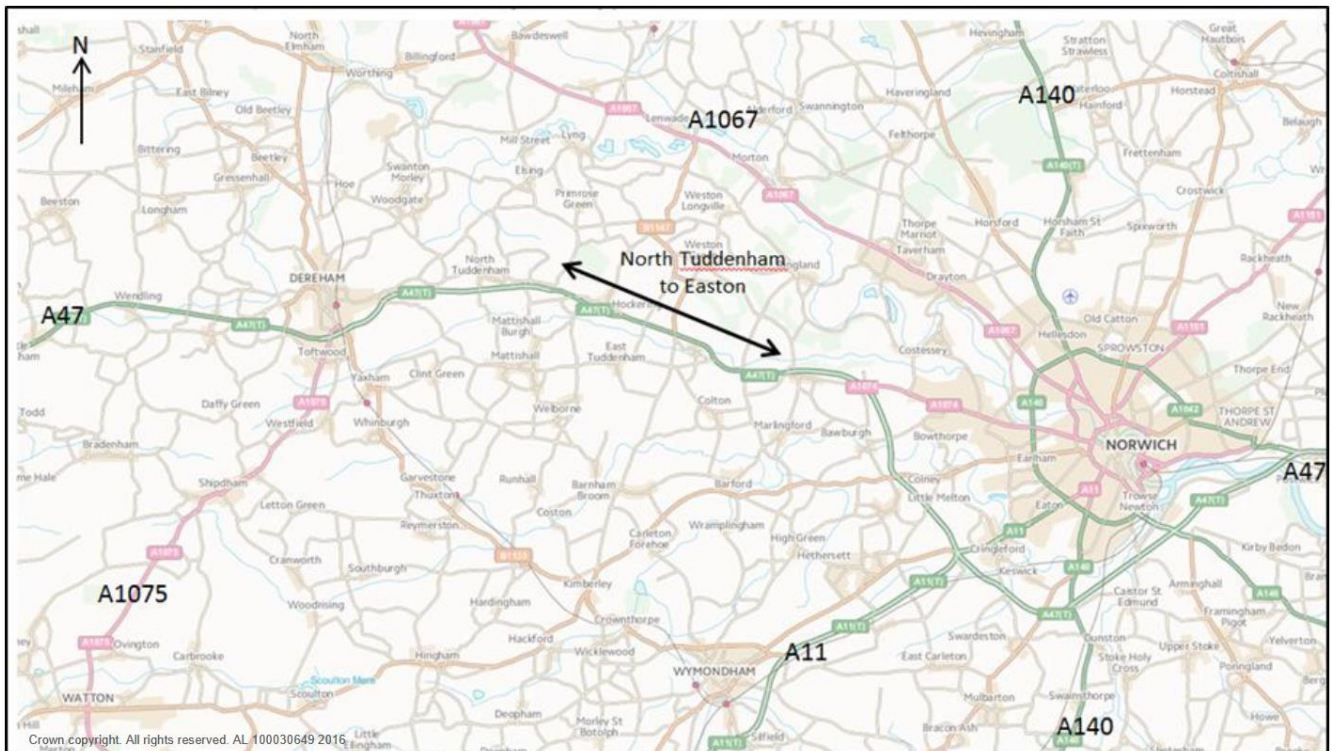
¹² Extracted from A47 & A12 Corridor Stage 3: The Case for Investment, AECOM
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411144/a47-stage-3.pdf

3.1.14 Dualling of this section of the A47 offers a solution to the congestion issue and will allow economic growth in the area and reduce the number of accidents. These points are expanded upon in Sections 4 (Transport Case) and 5 (Economic Case) of this document.

3.2 Description of the Existing Road

3.2.1 The North Tuddenham to Easton section of the A47 is located approximately 8km to the west of Norwich. The 7.9km single carriageway section of the A47 forms a part of the main arterial highway route connecting Norwich to the west. The location of the Scheme in relation to these population centres is shown in Figure 3.2.

Figure 3.2: Existing highway network¹³

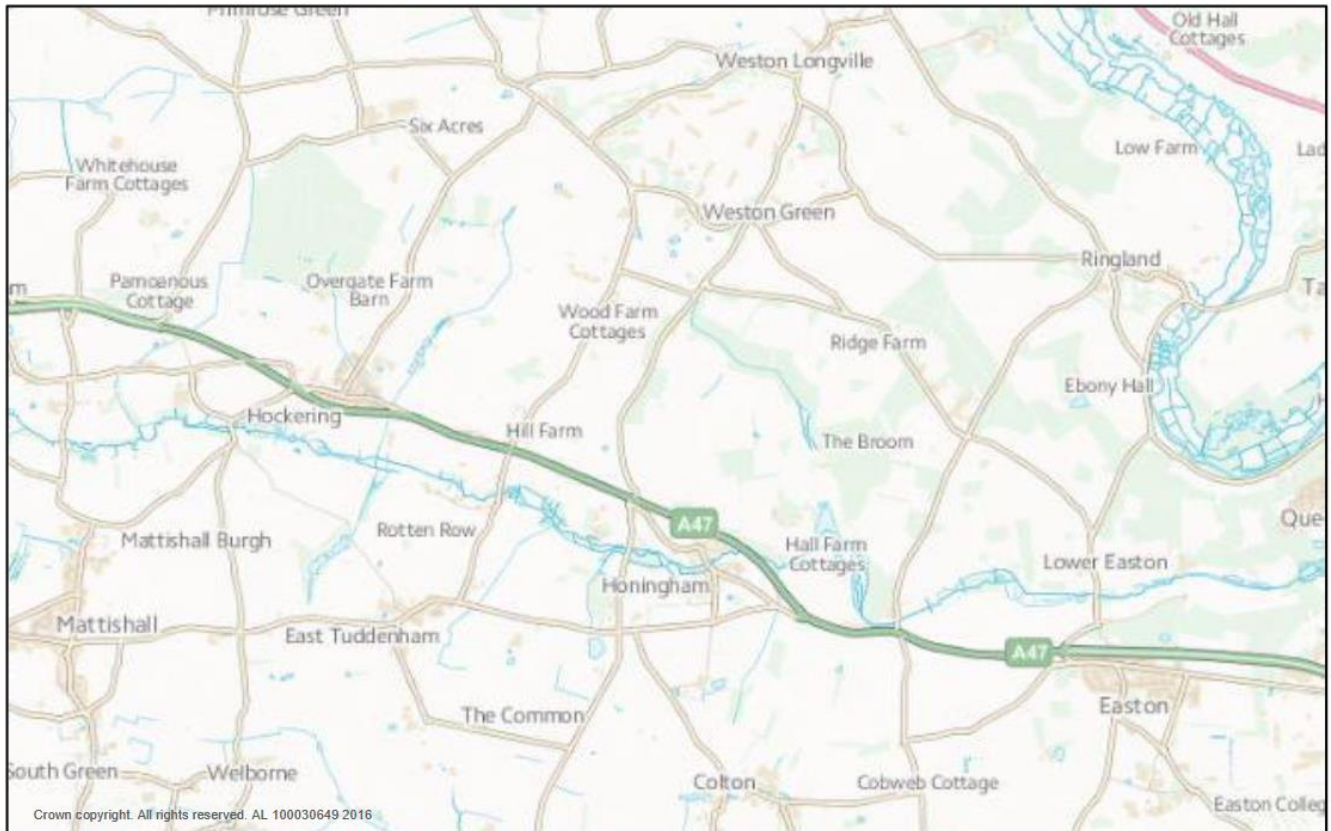


3.2.2 Travelling from west to east towards Norwich the A47 narrows from dual carriageway to single carriageway at the eastern outskirts of the town of North Tuddenham.

3.2.3 The section of road is an important highway link for both local commuter traffic to and from the west of Norwich as well as providing the main route in the area for longer distance trips across the country travelling east and west. The Scheme location is shown on Figure 3.3 (below).

¹³ Extracted from RIS East Area 6, A47 North Tuddenham to Easton, Scheme Assessment Report.

Figure 3.3: Scheme location¹⁴



- 3.2.4 The 7.9km section of rural all-purpose single carriageway passes to the south of the village of Hockering and to the north of the village of Honingham, where it crosses over the River Tud, returning to dual carriageway to the north-west of the village of Easton. The section of single carriageway road is generally between 7.3m and 7.9m wide with central marking to delineate east and west bound traffic.
- 3.2.5 The A47 is subject to the national speed limit of 60mph on the single carriageway section.
- 3.2.6 There is a pedestrian crossing point on the A47 for connecting the kerbed footway provision on Mattishall Lane and The Street. There is footway provision on the northern verge of the A47, connecting pedestrian movements between Hockering and Sandy Lane through Park Lane. Between Norwich Road junction and Blind Lane there is footway provision on the northern verge. There is also a footway between Ringland Lane, also known as Dog Lane north of the A47, and Dereham Road crossing the A47 Eastern Bypass at grade.
- 3.2.7 There are a number of side roads joining the A47 along the scheme length, via at grade priority simple and right turn lane T junctions, from west to east the following side roads and junction types are noted:
- Low Road – minor T junction
 - Mattishall Lane – T junction

¹⁴ Extracted from RIS East Area 6, A47 North Tuddenham to Easton, Scheme Assessment Report

- The Street west of Hockering village – ghost island junctions right turn for westbound traffic
 - Mill Lane – minor T junction
 - The Street east of Hockering village – ghost island junction right turn for westbound traffic
 - Egress from Hockering towards east ‘Give Way’ for eastbound traffic
 - Park Lane – minor T junction
 - Sandy Lane and Church Lane – crossroad/minor T junctions
 - Wood Lane and Berrys Lane – ghost island right turns in both directions
 - Blind Lane and the Taverham Lane – minor T junctions.
- 3.2.8 A number of private means of access present on both sides of the A47 into surrounding fields, properties and businesses. There is direct access to St Andrew’s Church, Honingham, from the A47.
- 3.2.9 The single carriageway section is generally at existing ground level or on a low level 0m to 2m embankment. Embankment heights rise slightly to 2-3m on the approaches to the crossing of the River Tud. There is a section of false cutting locally where the road passes close to St Peter’s church at the east end of the Scheme.
- 3.2.10 There are 5 lay-bys on the Section, situated on the north and south sides of the A47 to the west of Hall Drive, on the eastbound A47 west of Blind Lane and on the eastbound and the westbound carriageways to the west of the Easton Junction.
- 3.2.11 There are no national cycleways within the Scheme area, but there are Public Rights of Way and other local footpaths.

3.3 Existing Land Uses & Character

Introduction

- 3.3.1 The Scheme is located within the districts of Breckland Council, Broadland District Council and South Norfolk Council, which are all within the administrative boundary of Norfolk County Council.
- 3.3.2 This section summarises the geographical, environmental, socio-economic and health receptors that have the potential to be affected by the Scheme, in accordance with the criteria set out in the UK Design Manual for Roads and Bridges (DMRB) (Highways England, 2020)¹⁵.
- 3.3.3 The study areas for each topic are described in the respective chapters of the ES **(TR010038/APP/6.1)**.

Air quality

- 3.3.4 There are currently no Air Quality Management Areas (AQMAs) declared in the Broadland District Council or South Norfolk Council boundaries. There is one AQMA declared in Breckland Council, in Swaffham town centre approximately 24km west of the Scheme.

¹⁵ The Design Manual for Roads and Bridge can be viewed at: <https://highwaysengland.co.uk/industry/design-manual-for-roads-and-bridges-dmrb/>

- 3.3.5 The nearest AQMA to the Scheme is the Central Norwich AQMA over 3km to the north-east, within Norwich City Centre, declared by Norwich City Council. The AQMA is not within the affected road network.
- 3.3.6 Further details can be found in ES Chapter 5 Air Quality (**TR010038/APP/6.1**).

Cultural heritage

- 3.3.7 The heritage assets located in the vicinity of the Scheme are a combination of ancient, post medieval and modern in origin with historic features including: prehistoric flint tools and flakes, Roman cropmarks, early medieval tweezers, medieval settlement, post-medieval rural land and modern industrial activities. There are no scheduled monuments, conservation areas, registered parks and gardens or historic battlefields within the DCO boundary or zone of theoretical visibility (as defined in Chapter 6 Cultural Heritage (**TR010038/APP/6.1**)). There are a number of listed buildings within these extents, with closest to the Scheme comprising:
- Grade I Church of St Peter, approximately 25m south of the existing A47
 - Grade II* Church of St Andrew, approximately 50m north of the existing A47
 - Grade II Barn at Church Farm, approximately 140m north of the existing A47
 - Grade II Church Farm House, approximately 100m north of the existing A47
 - Grade II Berry Hall, approximately 300m south of the existing A47
 - Grade I and Grade II buildings in the villages of Hockering and Honingham
- 3.3.8 Further details can be found in ES Chapter 6 Cultural Heritage (**TR010038/APP/6.1**).

Landscape and visual

- 3.3.9 The Scheme extents are predominantly arable land enclosed by winding lanes and hedgerows, with pockets of ancient woodland and remnant heath cut through by pastoral river valleys. The broadly flat, rural landscape is an ancient countryside with a long-settled agricultural character. The eastern scheme extents are more gently undulating relative to the broadly flat landscape of the western extents. The western part of the Scheme extents lies within the Breckland Council's landscape character assessment. The eastern extents of the Scheme coincide with the coverage of Broadland District and South Norfolk Council landscape character areas.
- 3.3.10 Further details can be found in ES Chapter 7 Landscape and Visual effects (**TR010038/APP/6.1**).

Biodiversity

- 3.3.11 There are valuable habitats and species of nature conservation importance within or close to the Scheme, as defined by its DCO boundary.
- 3.3.12 Three statutory designated sites lie within 2km of the Scheme. The River Wensum Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) is located, at its closest, 1.6km north-east of the eastern extents of the Scheme. Paston Great Barn SAC lies 29.3km north-east of the Scheme and is designated for its barbastelle (*Barbastella barbastellus*) populations.
- 3.3.13 Hockering Wood SSSI lies 0.33km north of the Scheme, north-west of Hockering, and is designated for being one of the largest blocks of ancient, semi-natural woodland in Norfolk. A wide range of habitats have been identified within the DCO boundary and

include, but not limited to: semi-improved natural grassland, broadleaf semi-natural woodland, hedgerows, marshy grassland and dense and scattered scrub.

- 3.3.14 Rosie Curston's Meadow SSSI lies 1.7km south-west of the Scheme. This is a small unimproved calcareous clay pasture grazed by cattle with a herb rich sward composed of over 60 grassland species.
- 3.3.15 Also, within 2km of the Scheme are: 21 non-statutory designated County Wildlife Sites (CWSs) and one proposed CWS, which include a further five ancient woodlands. There are also four unnamed parcels of ancient woodland.
- 3.3.16 Further details can be found in ES Chapter 8 Biodiversity **(TR010038/APP/6.1)**.

Geology and soils

- 3.3.17 The land around the existing A47 is predominantly agricultural the majority of which used for arable production. There are no sites designated for their geological or geomorphological importance within the Scheme DCO boundary.
- 3.3.18 Further details can be found in ES Chapter 9 Geology and Soils **(TR010038/APP/6.1)**.

Materials and waste

- 3.3.19 The Scheme intersects part of a known sand and gravel reserve (mineral safeguarding area) designated as a mineral safeguarding area by Norfolk County Council.
- 3.3.20 Further detail is provided in ES Appendix 10.4 Mineral Impact Assessment **(TR010037/APP/6.2)**, which also concludes it is not anticipated that any mineral safeguarding sites will be sterilised.

Noise and vibration

- 3.3.21 Sensitive receptors, such as residential properties, in proximity to the Scheme have been identified. Over 800 noise sensitive receptors have been identified within 600m of the Scheme.
- 3.3.22 601 noise sensitive receptors were identified within the 300m of potential construction activity for the construction noise assessment. The operational noise assessment considers 1,877 noise sensitive receptors within 600m of new, physically changed road links, road bypassed by the Scheme or 50m either side of road links.
- 3.3.23 The operational noise assessment also considers effects on: Noise Important Areas¹⁶ near Hockering and Easton; Hockering Wood SSSI; and the River Wensum SSSI and SAC.
- 3.3.24 Some of these receptors are located close to the existing A47 so are currently exposed to relatively high noise levels due to road traffic.
- 3.3.25 Further details can be found in ES Chapter 11 Noise and Vibration **(TR010038/APP/6.1)**.

Population and human health

- 3.3.26 Across the Broadland district the population was estimated to be 129,464 in 2011, across Breckland it was estimated to be 130,491 and across South Norfolk it was

¹⁶ Areas identified by the Government in the below DEFRA website for action to control noise levels:
<https://data.gov.uk/dataset/fc786717-3756-4fd1-9c7d-c082331e40e4/noise-action-planning-important-areas-round-2-england>

estimated to be 124,012 (Census, 2011).

- 3.3.27 The area is of relative affluence and high employment. There are proportionally more economically active people in Broadland (87%), Breckland (85%), South Norfolk (85%) and Norfolk (78%) than in England (77%). It also shows that employment is higher in Broadland (83%), South Norfolk (84%) and Norfolk (78%), compared to across England (77%)¹⁷.
- 3.3.28 Broadland is primarily an agricultural area with interspersed residential housing, community and commercial facilities.
- 3.3.29 Hockering, Honingham and Easton are the main population centres within 500m of the DCO boundary and are connected by the existing A47. Norwich is the nearest city to the east, connected by the existing A47. The villages contain primary schools, garages, churches, public houses and a small number of commercial and retail businesses.
- 3.3.30 The existing A47 provides a connection for people, places, businesses and enables access to employment, healthcare, education and other community assets. Walking, cycling and horse-riding facilities are also located within the Scheme extents.
- 3.3.31 The Greater Norwich Local Plan is currently being produced collaboratively between Broadland District Council, Breckland Council and South Norfolk Council. The plan outlines proposals for housing and employment growth in the Greater Norwich area. There is an area of allocated housing growth (Policy EAS1) located within Easton and the DCO boundary. It is allocated for 890 new dwellings, a new school, a new village hall, a retail store, areas of public open space, and the relocation and increased capacity of allotments. The land within the DCO boundary lies east of St Peter's Church and is not allocated for housing allocation requirements.
- 3.3.32 Further details can be found in Chapter 12 Population and Human Health of the ES **(TR010038/APP/6.1)**.

Road drainage and the water environment

- 3.3.33 The main water features within the Scheme within the River Tud catchment. The Scheme crosses the River Tud at one location to the east of Honingham and a tributary of the River Tud south-east of Hockering. There are smaller drainage channels and isolated ponds within the DCO boundary.
- 3.3.34 A small proportion of the Scheme is within the Environment Agency defined Flood Zone 2, associated with medium risk of flooding from rivers, and Flood Zone 3, which is associated with high risk of flooding from rivers.
- 3.3.35 The key groundwater receptors include Secondary superficial aquifers and the Chalk principal aquifer. The Scheme crosses Environment Agency designated source protection zones (SPZs) for public water supplies: an SPZ 3 (outer zone) between Honingham and Easton; and a new SPZ 1 (inner zone) east of Hockering.
- 3.3.36 Further details can be found in ES Chapter 13 Road Drainage and the Water Environment **(TR010038/APP/6.1)**.

¹⁷ Norfolk Insight, Economy and Employment Area Reports: <https://www.norfolkinsight.org.uk/economy-and-employment/reports/>

Climate

- 3.3.37 The Climate Change Act 2008 is central to the UK Government's plan to reduce carbon emissions, committing the UK to a reduction of 80% against 1990 levels by 2050. On 1 May 2019, the UK Government declared a climate emergency, leading to updating the commitments in the 2008 Act to target net zero carbon emissions by 2050 under the Climate Change Act (2050 Target Amendment) Order 2019.
- 3.3.38 Climate change adaptation requires more than just managing carbon emissions. Therefore, ES Chapter 14 Climate (**TR010037/APP/6.1**) assesses the various impacts on climate change and associated mitigation measures by the Scheme. This chapter also assesses the potential impacts by the Scheme and measures to adapt in response to climate change.

3.4 Description of the Scheme

- 3.4.1 The layout extents are shown on the **Location Plan (TR010038/APP/2.1)** with further detail provided on the **General Arrangement Plans (TR010038/APP/2.2)**. A detailed description of the Scheme is provided in Chapter 2 The Proposed Scheme of the **ES (TR010038/APP/6.1)**. In summary, the Scheme comprises:
- 9km of new dual carriageway, running to the south of the existing A47 at Hockering and north of the existing A47 at Honingham
 - two new junctions where the A47 passes over the local roads: one where of Berrys Lane meets Wood Lane (Wood Lane junction) and one where Blind Lane meets Taverham Road (Norwich Road junction)
 - removal of the existing roundabout at Easton to create a free-flowing road
 - building four bridges carrying: the A47 over the new Mattishall Lane Link Road, the proposed Wood Lane junction over the A47, the A47 over the River Tud and the proposed Norwich Road junction over the A47
 - Sandy Lane connecting to the A47 via a new side road providing access to Wood Lane junction
 - two new lay-bys on the A47 between Fox Lane and the proposed Wood Lane junction
 - closure to through traffic of: Church Lane (East Tuddenham), Berrys Lane, Blind Lane and Church Lane (Easton), north the of A47
 - widening of the junction of Rotten Row and Church Lane (East Tuddenham)
 - converting sections of the existing A47 for local needs, such as
 - converting to a Class B road north of Honingham, with a new cycle track between the new Dereham Road link road and Honingham roundabout
 - reducing to a single lane in front of St Andrew's church, Honingham, with inclusion of passing places, parking places, turning area and security gate
 - alterations to existing public rights of way and provision of new segregated routes for walkers and cyclists, including:
 - a new route for walkers and cyclists linking Honingham with St Andrew's Church across the A47 via the proposed Honingham Church underpass

- a new route for walkers and cyclists linking Easton with Lower Easton across the A47 via the proposed Easton footbridge
- new drainage systems, including:
 - new outfalls to the River Tud
 - dry culverts to maintain overland flow paths
 - new attenuation basins, with pollution control devices, to control discharges to local watercourses
- compounds, material storage areas and temporary vehicle parking located within the scheme boundary when construction is taking place
- diverting or installing new utilities infrastructure, such as gas pipelines, electricity cables, water pipelines and electronic communications cables
- environmental measures embedded into the Scheme design to reduce the environmental effects and deliver wider benefits, such as noise barriers, low noise road surfaces, permanent mammal crossings and new wetland habitats
- temporary closure of access (exit and entry) to Honingham Lane at the junction with Taverham Road, Weston Road and Telegraph Hill until NWL opens.

3.4.2 A full description of the Scheme is provided in ES Chapter 2 (**TR010038/APP/6.1**).

3.5 Key Objectives of the Scheme

Scheme objectives

3.5.1 The objectives of the A47 North Tuddenham to Easton Dualling Scheme are:

- **Supporting economic growth:** reduce congestion related delay, improve journey time reliability and increase the overall capacity for future traffic growth to help enable regional development and growth in Norwich and its surrounding area
- **A safer and reliable network:** improve safety for all road users and those living in the local area by improving safety issues at junctions along the A47. Improve user satisfaction by quicker and more reliable journeys
- **A more free-flowing network:** increase resilience in coping with incidents such as collisions, breakdowns, maintenance and extreme weather. Support the smooth flow of traffic and improve journey times reliability by maximising the operational capability at the junctions and along the 9km carriageway
- **Improved environment:** protect the environment by minimising adverse impacts and, where possible, deliver benefits
- **An accessible and integrated network:** ensure the new road layout considers local communities and safe access to the A47. Provide a safer route between communities for cyclists, walkers, horse-riders and other vulnerable users of the network, taking into consideration how their requirements can be addressed with improved connectivity
- **Value for money:** ensure the Scheme is affordable and delivers good value for money

3.5.2 Table 3.1 below sets out consideration of the Scheme against the defined Scheme objectives.

Table 3.1 Consideration of the Scheme against the Scheme objectives

| Objectives | How the Scheme Meets the Objectives |
|-----------------------------|--|
| Supporting economic growth | <p>The Scheme will provide additional capacity and improved journey times to encourage economic growth in the local area as well as across the A47 corridor between Peterborough and Norwich. This will help contribute to sustainable economic growth by supporting employment and residential development opportunities.</p> <p>The economic appraisal of the Scheme has adopted a 60-year appraisal period and used a Benefit to Cost Ratio (BCR), in accordance with Department for Transport (DfT) guidelines, to compare the Scheme cost to its benefits over this period. The Economic Case is set out in Section 5 of this Case for the Scheme and provides more details of the economic benefits of the Scheme.</p> <p>Journey time reliability benefits would be worth £6.9m, while the wider economic benefits would be £48.9m. This suggests that business users are the main beneficiaries from the enhanced connectivity and congestion reductions brought about by the Scheme and that there will be an overall, long-term positive impact.</p> |
| Making a safer network | <p>The Scheme will improve safety and operational issues by upgrading to dual carriageway and providing some grade separated junctions at the Wood Lane junction and Norwich Road junction.</p> <p>In total, over a 60-year timeframe the Scheme's improvement will save a total of 291 accidents and 47 KSIs (killed or seriously injured).</p> <p>Section 4.13 in this Case for the Scheme document provides more detail on the safety benefits.</p> |
| A more free-flowing network | <p>The Scheme replaces the direct access points to the A47 from local side roads with two segregated junctions, plus removes the A47 Easton roundabout.</p> <p>Following construction of the Scheme, the operational modelling shows traffic operating with minimal delays, in approximate free-flow condition, supporting a smooth flow of traffic.</p> <p>Overall, the Scheme is forecast to produce user benefits of £211.8 million (PV) over the 60-year appraisal period.</p> <p>The Transport Case for the Scheme, in Section 4 of this document, provides more detail on traffic movements.</p> |
| Protected environment | <p>The Scheme provides a new alignment that runs parallel to the existing A47, south of Hockering and north of Honingham. A design has been progressed that supports mitigation of environmental impacts, as explored in the Scheme Design Report (TR010038/APP/7.3).</p> |

| Objectives | How the Scheme Meets the Objectives |
|---|--|
| | <p>In this regard there will be improvements in the environmental effects of transport for some receptors. An ES has been undertaken (TR010038/APP/6.1) which assesses and proposes mitigation to minimise any impacts on biodiversity, heritage, climate, air quality, flooding, and geology, and from any cumulative effects. Mitigation measures are detailed on the Masterplan (TR010038/APP/6.8) and in the Environmental Management Plan (EMP) (TR010038/APP/7.4).</p> <p>Table 6.2, in Section 6.2 of this Case for the Scheme, presents an overview of the impacts and benefits of the Scheme on the environment, while a summary of the ES is presented in the ES Non-technical Summary (TR010038/APP/6.4).</p> |
| <p>An accessible and integrated network</p> | <p>The A47 provides a strategic road connection between the A1 and the eastern coastline. Within this context the Scheme forms part of the main arterial highway route connecting Norwich and Great Yarmouth with Peterborough, Kings Lynn, the Midlands and the north of England and a succession of villages along the A47 corridor. It plays a vital role in supporting the economy which relies on strong transport links in this area.</p> <p>The Scheme design has considered local community access to the road network, providing safer routes between villages for cyclists, walkers, horse-riders and vulnerable users where a need is identified. The Scheme will provide new walker and cyclist facilities as well as re-using the existing A47 alignment for the local road network or provision of new cycle tracks. These will provide a continuous link for walkers, cyclists and horse-riders between Sandy Lane (east of Hockering) and Easton. The new facilities to be provided and the facilities to be replaced are detailed in Section 4.14 of this Case for the Scheme document. The benefits and impacts are set out in Section 12.10 of ES Chapter 12 - Population and Human Health (TR010038/APP/6.1).</p> <p>The inclusion of new or improved walking and cycling routes align to sustainable and integrated transport objectives and will mitigate against a number of issues of severance raised during the consultations.</p> <p>In terms of severance there are a significant number of amenities in the areas surrounding the Scheme and a large proportion of older people. Due to the increased capacity of the A47 mainline and the reduced traffic levels on the local road network, the elderly will be able to access key amenities such as hospitals, GP surgeries and places of worship easier and safer with reduced walking times. The rest of the vulnerable groups within the study area are also expected to benefit from the Scheme in the same way but not of the same magnitude.</p> <p>All these measures support NPS paragraphs 3.17 to 3.22 on sustainable transport and accessibility.</p> |
| <p>Value for money</p> | <p>The economic benefits of the Scheme include travel time savings and thus vehicle operating costs, accident savings and indirect savings relating to</p> |

| Objectives | How the Scheme Meets the Objectives |
|------------|---|
| | <p>the reduction in greenhouse gases and improvement in air and noise quality. Its increased road capacity will create more reliable journey times that in turn will encourage investment in housing and support employment growth.</p> <p>Overall, the Scheme is forecast to produce user benefits of £211.8 million (Present Value (PV)) over the 60-year appraisal period. Overall, taking into account a balance of benefits and disbenefits, the Scheme would provide benefit-cost ratio 2.2, whereby the economy get £2.20 for every £1 spent on the scheme. As per the DfT Value for Money Framework, this is categorised as high value for money.</p> <p>An overview of the economic benefits of the Scheme is provided in Section 5 of this Case for the Scheme.</p> |

National Policy Statement for National Networks (NPS NN)

- 3.5.3 The NPS NN (designated on 14 January 2015) sets out the need for, and Government’s policies for delivering NSIP developments on the national road network. The compliance of the Scheme with the environmental requirements of the NPS NN is considered in detail in the NPS NN Accordance Tables (**TR010038/APP/7.2**). This section sets out how the Scheme is consistent with the aims of the NPS NN at a strategic level.
- 3.5.4 Paragraph 2.2 of the NPS NN recognises that there is a ‘critical need’ to improve the national road and rail networks to address road congestion and crowding on railways; to provide safe, expeditious and resilience networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth.
- 3.5.5 Paragraph 2.6 of the NPS NN confirms that the development of the national networks helps to support national and local economic growth, and that ‘improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other’.
- 3.5.6 The Government has concluded that at a strategic level there is a ‘compelling need’ for development on the national networks, as confirmed in paragraph 2.10 of the NPS NN. The same paragraph confirms that ‘The Examining Authority and the SoS should therefore start their assessment of applications for infrastructure covered by this NPS on that basis’.
- 3.5.7 Identifying the need for development on the national road network, paragraph 2.13 of the NPS NN, confirms that the SRN provides critical links between cities and joins up communities, playing a vital role in people’s journeys and drives prosperity by supporting new and existing development, encouraging trade and attracting investment. Paragraph 2.13 also confirms that a well-functioning SRN is ‘critical in enabling safe and reliable journeys and the movement of goods in support of national and regional economies.’
- 3.5.8 Paragraph 2.22 of the NPS NN confirms the importance of improving the road network as without doing so ‘it will be difficult to support further economic development,

employment and housing and this will impede economic growth and reduce people's quality of life. The Government has therefore concluded that at a strategic level there is a compelling need for development of all national road networks.

3.5.9 The Government's policy is of making enhancements to the existing national road network is set out in paragraph 2.23 of the NPS NN as including:

- junction improvements, new slip roads and upgraded technology to address congestion and improve performance and resilience at junctions which are a major source of congestion
- implementing 'smart motorways' to increase capacity and improve performance
- improvements to trunk roads in particular dualling of single carriageway strategic trunk roads and additional lanes on existing dual carriageways to increase capacity and to improve performance and resilience.

3.5.10 The NPS NN sets out that, subject to the detailed policies and protections contained in the NPS and the legal constraints set out in the PA 2008, there is a 'presumption in favour' of granting development consent for national network NSIPs that fall within the need for infrastructure established in the NPS NN.

3.5.11 Paragraph 4.3 of the NPS NN states that: 'in considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and SoS should consider:

- Its potential benefits including the facilitation of economic development, including job creation, housing and environmental improvements and any long-term or wider benefits
- Its potential adverse effects, including any longer-term and cumulative adverse impacts, as well as measures to avoid, reduce or compensate for any adverse impacts.

3.5.12 Table 3.2 illustrates how the Scheme will respond to this identified need by fulfilling the strategic objectives of the NPS NN.

Table 3.2 Response to the NPS NN strategic objectives

| NPS NN Vision and Strategic Objectives (NPS NN Page 9) | Conformity of the Scheme |
|---|--|
| <p>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.</p> | <p>The A47 trunk road forms part of the SRN and provides for a variety of local, medium and long-distance trips between the A1 and the eastern coastline.</p> <p>Section 3.1 of this Case for the Scheme demonstrates the need to increase capacity on the single carriageway between A47 North Tuddenham to Easton to support local economic and housing growth. It also explains the wider SRN role of this junction and its critical role in providing an important link between Norwich and Great Yarmouth with Peterborough, Kings Lynn, the Midlands and the north of England and a succession of villages along the A47 corridor.</p> <p>As well as directly benefiting users of the A47 between North Tuddenham and Easton, the Scheme will also benefit users of the wider A47 route. The A47 dualling will deliver a 'substantial improvement' to the network that will help the A47 better fulfil its strategic role in the national transport network.</p> <p>Section 4.15 of this Case for the Scheme, summarises the overall benefits of the Scheme. It will improve traffic flows; provide more reliable journey times and improve the safety of the route. These improvements will contribute towards the attractiveness of areas along the A47 corridors for business and will help in promoting a competitive regional economy.</p> <p>The Scheme also provides for walking and cycling by incorporating safe, convenient, accessible and attractive routes.</p> |
| <p>Networks with the capacity, connectivity and resilience to support national and local economic activity and facilitate growth and create jobs</p> | <p>Section 4.15 of this Case for the Scheme, summarises the overall benefits of the Scheme. It will improve traffic flows; provide more reliable journey times and improve the safety of the route. These improvements will contribute towards the attractiveness of areas along the A47 corridors for business and will help in promoting a competitive regional economy.</p> <p>Section 5 Economic Case Overview of this Case for the Scheme, demonstrates that business users are the main beneficiaries from the enhanced connectivity and congestion reductions brought about by the Scheme and that there will be an overall, long-term positive impact.</p> |
| <p>Networks which support and improve journey time quality, reliability and safety</p> | <p>The A47 Corridor is around 185km long; approximately 53% of which is single carriageway. The North Tuddenham to Easton section is one of the single carriageway stretches, affecting journey time and journey time reliability on the road.</p> <p>This section of single carriageway has a poor safety record, with the</p> |

| NPS NN Vision and Strategic Objectives (NPS NN Page 9) | Conformity of the Scheme |
|--|---|
| | <p>A47 as a whole having an above average accident severity ratio.</p> <p>The objectives of the Scheme are to improve journey times, improve network resilience and journey time reliability and improve safety. This is enabled through creating a two-lane carriageway and removing at-grade junctions. Quality of journeys will be improved due to less queuing leading to less driver frustration. Section 4.15 of this Case for the Scheme summarises the positive impact of the Scheme on traffic conditions, accidents, network resilience and journey time reliability.</p> <p>Section 4.13 of this Case for the Scheme demonstrates that in total, over a 60-year timeframe, the Scheme’s improvements will save a total of 291 accidents and 47 KSIs (killed or seriously injured).</p> |
| <p>Networks which support the delivery of environmental goals and move to a low carbon economy</p> | <p>Chapters 5 to 15 of ES (TR010038/APP/6.1) assess the impacts and benefits of the Scheme on the environment. Table 6.2, in Section 6.2 of this Case for the Scheme, presents an overview of the impacts and benefits of the Scheme on the environment.</p> <p>ES Chapter 14 Climate (TR010038/APP/6.1) assess the impact of the Scheme and set out mitigation to minimise carbon through design and construction. Efforts to minimise carbon emissions throughout the design and construction of the Scheme at this stage are outlined in accordance with the requirements set out in DMRB LA 114. Recommendations to further reduce carbon emissions through design considerations and recalculation of carbon emissions at later stages of the design process have also been made.</p> |
| <p>Networks which join up our communities and link effectively to each other</p> | <p>Section 5 Economic Case Overview in this Case for the Scheme reports overall beneficial impacts in terms of severance as part of the qualitative social and distributional impact assessment. Overall, the impact is moderate beneficial due to the elderly and other vulnerable groups being able to access key amenities, such as hospitals, GP surgeries and places of worship, easier and safer with reduced walking times.</p> <p>ES Chapter 12 Population and Human Health (TR010038/APP/6.1) has considered impacts on local communities and access to the road network, plus provision of safer routes between communities for cyclists, walkers, horse-riders and vulnerable users.</p> <p>During construction, access along the local road network for local residents and businesses across the study area may be disrupted whilst traffic management measures are in place, resulting in longer journey times and a degree of severance between communities, businesses and their facilities. Mitigation measures</p> |

| NPS NN Vision and Strategic Objectives (NPS NN Page 9) | Conformity of the Scheme |
|--|--|
| | <p>are set out in the EMP (TR010038/APP/7.4), which would be secured through Requirement 4 of the draft DCO (TR010038/APP/3.1).</p> <p>During operation, there would be severance for private property and housing, community land, community assets, development land and businesses in the communities of Great Witchingham, Upper Wensum, Mattishall and Easton. Access to some private properties and businesses may change as a result of the Scheme; e.g. properties along Church Lane, Rotten Row and Hillcrest changes to access would result in a Moderate adverse effect. In some cases access to farm yards and fields will be severed, but new access arrangements have been designed where possible. Users of three footpaths (Hockering FP7, Honingham RB1 and Ringland Lane / Dog Lane crossing) are anticipated to experience significant residual adverse effects as a result of path closures and journey length increases.</p> <p>The Scheme would provide new walker and cyclist facilities, such as between Sandy Lane (east of Hockering) and Easton to provide a continuous link for walkers, cyclists and horse-riders between these points. North to south crossings of the Scheme would be facilitated by the new Mattishall Lane Link Road underbridge, Hall Farm underpass and Honingham church underpass and Easton footbridge.</p> |

4 TRANSPORT CASE FOR THE SCHEME

4.1 Overview of Transport Policy

- 4.1.1 This section outlines the national, regional and local policies that are relevant to the Scheme. Full details of the Scheme's accordance with relevant national and local policies, local transport plans and associated supplementary plans, particularly the National Policy Statement for National Networks (NPS NN), is provided in Section 6 of this Case for the Scheme and in the NPS NN Accordance Tables (TR010038/APP/7.2).

National policy

The National Policy Statement for National Networks

- 4.1.2 The NPS NN sets out the need for, and the Government's policies to deliver development of NSIPs on the national road network in England and also sets out the primary basis for making decisions of development consent for NSIPs in England. The Government recognises in the Appraisal of Sustainability accompanying the NPS NN that some developments may have adverse local impacts on noise, emissions, landscape and visual amenity, biodiversity, cultural heritage and water resources. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locational specific level of the NPS NN. Therefore, while applicants should deliver developments in accordance with government policy and in an environmentally sensitive way, including considering opportunities to deliver environmental benefits, some adverse local effects of development may remain.
- 4.1.3 Outside the NSIP regime, government policy is to bring forward targeted works to address existing environmental problems on the SRN and improve the performance of the network.
- 4.1.4 Where appropriate, mitigation of any unavoidable impacts on the environment will be undertaken as set out in the Environmental Statement (TR010038/APP/6.1) and where possible enhancements will be made.

The National Planning Policy Framework

- 4.1.5 While the overall strategic aims of the National Planning Policy Framework (NPPF) and the NPS are consistent, the NPPF is an important and relevant consideration in decisions on nationally significant infrastructure projects, but only to the extent relevant to that project. The NPS NN provides transport policy which will guide individual development brought under it. It also provides guidance on good scheme design, as well as the treatment of environmental impacts. Both documents seek to achieve sustainable development and recognise that different approaches and measures will be necessary to achieve this.
- 4.1.6 The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development. In this regard there are three interdependent overarching objectives; economic, social and environmental which need to be pursued in mutually supportive ways with the aim of securing net gains across each. Accordingly, the NPPF states a "*presumption in favour of sustainable development*" (NPPF Paragraph 10).

Road Investment Strategy

- 4.1.7 In April 2020, the Department of Transport (DfT) published the Road Investment Strategy 2 (RIS2). The RIS2 sets out the list of schemes that are to be developed by Highways England in the period 2020-2025.
- 4.1.8 Highways England, as the strategic highways company and appointed by the SoS must, in exercising its functions and complying with its legal duties and other obligations, act in a manner which it considers best calculated to, among others:
- minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
 - conform to the principles of sustainable development.
- 4.1.9 RIS2 (pg100¹⁸) introduces the schemes in the East of England committed to in Road Programme 2. RIS 2 (page 101) includes "A47 North Tuddenham to Easton – dualling of the single carriageway section of the A47 between Norwich and Dereham, linking together two existing sections of dual carriageway".

The Strategic Road Network and the Delivery of Sustainable Development (DfT Circular 02/2013)

- 4.1.10 This Circular explains how the Highways Agency (Highways England) will engage with the planning system, communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the SRN.
- 4.1.11 The document states that Highways England will work with local authorities to influence Local Plan decisions that may affect the SRN.

Highways England policy

The Highways England Licence document (2015)

- 4.1.12 The Highways England Licence document (2015) sets out key requirements which must be complied with by the licence holder as well as statutory guidance. In exercising its functions and complying with its legal duties and obligations, the licence holder must act in such a manner which it considers best calculated to:
- ensure the effective operation of the network
 - ensure the maintenance, resilience, renewal, and replacement of the network
 - ensure the improvement, enhancement and long-term development of the network
 - ensure efficiency and value for money
 - protect and improve the safety of the network
 - co-operate with other persons or organisations for the purposes of coordinating day-to-day operations and long-term planning

¹⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf

- minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
- conform to the principles of sustainable development
- comply with section 4.2(g) and its general duty under section 5(2) of the Infrastructure Act 2015 in having regard for the environment
- ensure that protecting and enhancing the environment is embedded into its business decision-making processes and is considered at all levels of operations
- ensure the best practicable environmental outcomes across its activities, while working in the context of sustainable development and delivering value for money
- consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance
- develop solutions that can provide increased environmental benefits over those that the licence holder can achieve alone, where this delivers value for money
- calculate and consider the carbon impact of road projects and factor carbon into design decisions and seek to minimise carbon emissions and other greenhouse gases from its operations
- adapt its network to operate in a changing climate, including assessing, managing and mitigating the potential risks posed by climate change to the operation, maintenance and improvement of the network
- develop approaches to the construction, maintenance and operation of the licence holder's network that are consistent with the government's plans for a low carbon future
- take opportunities to influence road users to reduce the greenhouse gas emissions from their journey choices.

The Highways England Delivery Plan 2020-2025

- 4.1.13 The Highways England Delivery Plan sets out Highways England's long-term plans for the modernisation and renewal of the road network over the five-year period from 2020 to 2025. It provides a brief outline of what Highways England have delivered during the previous five years and sets out a clear programme of activity for the first year, as well as a proposed pipeline of future schemes.
- 4.1.14 In year one, work will be finalized across four schemes to provide dualling and junction upgrades on the A47 between Peterborough and Norwich.
- 4.1.15 Annex B of the Plan sets out the six key performance outcomes agreed with the DfT for this second road period including:
- improving safety for all
 - providing fast and reliable journeys
 - a well-maintained and resilient network
 - delivering better environmental outcomes

- meeting the needs of all users
- achieving efficient delivery.

4.1.16 The Funding Statement (**TR010038/APP/4.2**) presents details of the designated funds for delivery of the Scheme under this plan.

Local transport policy

4.1.17 There are a number of local transport plans which are applicable to the Scheme:

- Norfolk County Council Local Transport Plan, 2011-2026: describes the Council's strategy and policy framework for transport and is used as a guide for investment priorities as well as being considered by other agencies when determining their planning or delivery decisions. The Council is currently refreshing the Local Transport Plan so that it covers the period 2020 to 2036. A consultation of the key priorities of the was held in January and February 2020 as the Council want the plan to reflect the views of local people and stakeholders.
- Norwich Area Transport Strategy, 2004, updated 2013: the transport strategy includes a comprehensive range of improvements that promote sustainable transport and improve traffic flow in and around the city. These measures include delivery of Bus Rapid Transit (BRT) corridors, a comprehensive cycle network (named pedalways), delivery of the Broadland Northway (a 22km dual carriageway to the north of Norwich connecting the A47 via Postwick Junction to the A1067, a network of Park and Ride facilities and a range of projects that improve traffic flow around the city by reducing the general traffic travelling through Norwich that does not have a destination within the city centre. These projects improve journey times for buses and promote sustainable transport methods such as walking and cycling. Norfolk County Council are looking to the future of investment in the network, and want to update the strategy to match the changing needs of the city and Greater Norwich as it continues to grow.
- Greater Norwich Infrastructure Plan, 2019: prepared to help coordinate and manage the delivery of strategic infrastructure to support growth
- the Greater Norwich Food Enterprise Zone (FEZ) ¹⁹ was designated by DEFRA in March 2015. The aim of the FEZ is the development of a flagship, centralised, commercial facility comprising food production, food research, education and ancillary businesses. A local development order (LDO) effectively grants planning permission for an initial period of 15 years (to October 2032). The first occupier is the new 25,000 square feet Condimentum mustard mill.

4.1.18 The conformity of the Scheme with local transport policies is set out in further detail in Section 6 of this Case for the Scheme.

4.1.19 As detailed for the individual policies and in Section 6, it is considered that the Scheme is compliant with national, regional and local policies.

4.1.20 The Scheme supports RIS2 economic objectives and strategic policies in providing transport infrastructure which also facilitates sustainable means of travel through the provision of new and improved walking and cycling routes.

4.1.21 Local planning policies, as discussed in Section 6 of this Case for the Scheme support

¹⁹ https://www.broadland.gov.uk/info/200139/planning_for_future_development/455/local_development_orders_ldos

the implementation of enhancements to the A47 between North Tuddenham and Easton to accommodate future planned growth, tackle congestion and improve road safety, which are consistent with the Scheme objectives.

Policy summary

- 4.1.22 The aims of the Scheme are directly in line with the Government's policies and illustrate the need for the Scheme on a national level. The Government has highlighted the express need for further growth and improvements to the national networks within the NPS NN. The Road Investment Strategies (both 'RIS1 and 'RIS2'), which explore these needs in further detail, support the A47 Scheme as a required improvement to the SRN.
- 4.1.23 The Scheme complies with relevant national planning policy within the NPS NN and NPPF. It will reduce congestion-related delay, improve journey time reliability, increase the overall capacity of the A47 and improve road safety. The Scheme will contribute to making the eastern region more attractive for business and will help in promoting a competitive regional economy.
- 4.1.24 The Scheme supports the objectives of the sub regional and local policy documents in delivering the required and supported improvements to the A47. The Scheme is supported by the local transport plans for Norfolk and the Norwich Planning Area in terms of improving the A47 corridor. The Joint Core Strategy and local development plans for Breckland Council, Broadland District Council and South Norfolk Councils variously acknowledge the A47 North Tuddenham to Easton section of single carriageway requires improvement to dual status to support local demand and growth aspirations on the corridor. The Scheme therefore conforms to the aspirations of the local development plans.
- 4.1.25 The Scheme is also supported by the local transport plans for Norfolk and the Norwich Planning Area in terms of improving the A47 corridor.

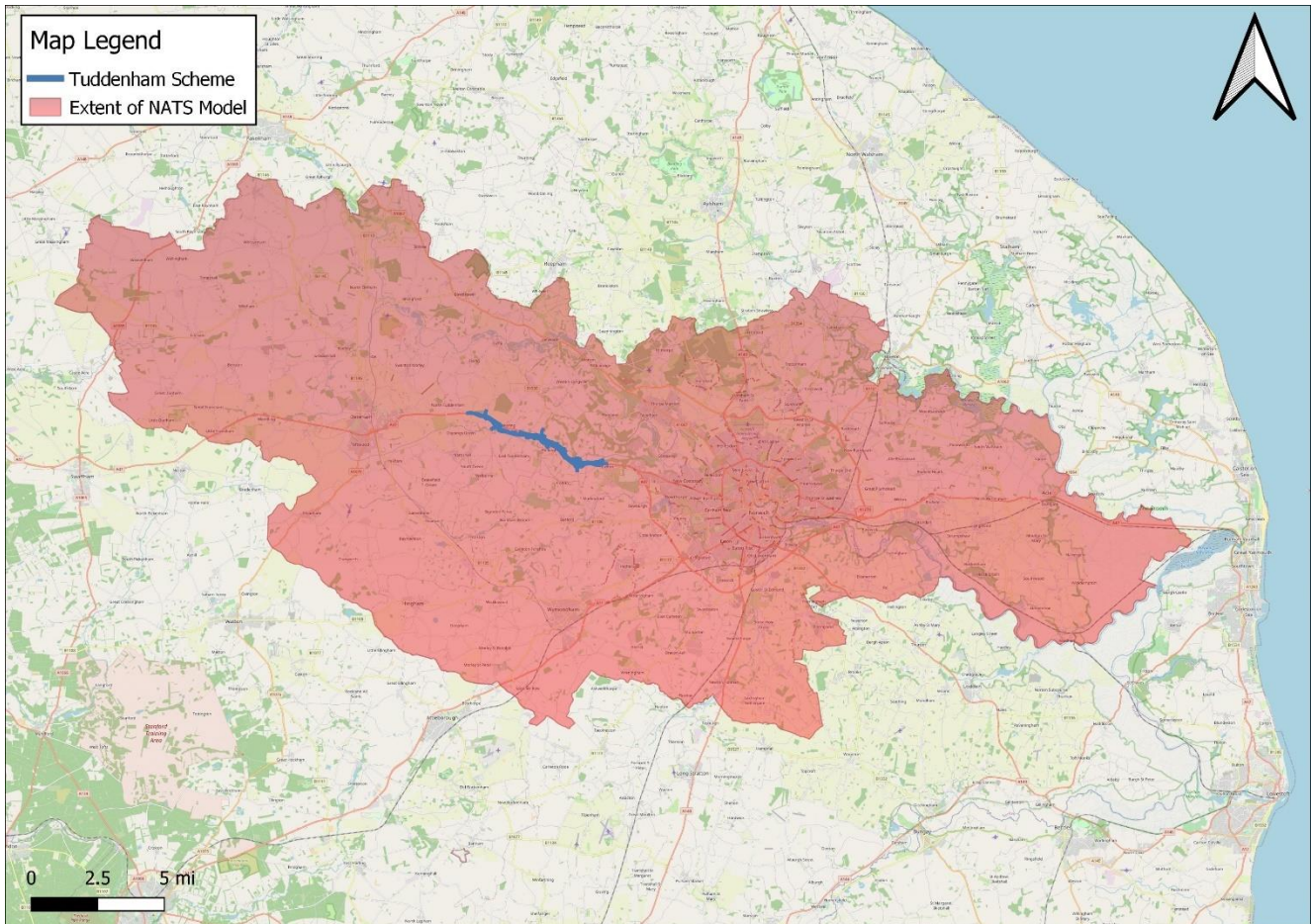
4.2 Baseline Data and Model Development

Introduction

- 4.2.1 This section provides a summary of the A47 North Tuddenham to Easton modelling assessment as well as the supporting baseline data collection. The baseline dataset includes the collection of volumetric traffic count data, network data and vehicle journey time data. This data is used in the model development process to calibrate and validate the baseline providing a stable basis to undertake the future year assessment of the scheme.
- 4.2.2 The framework of the modelling assessment has been developed to enable the comparative analysis of the existing single carriageway section and the proposed dual carriage way improvements against the Scheme objectives.
- 4.2.3 The modelling assessment comprises of a strategic model. The model utilised for the assessment of the scheme is called the Norwich Area Transport Strategy Model (referred to as the NATS Model). The NATS model, utilised for the PCF stage 3 preliminary design work has been developed in line with the DfT's Transport Appraisal Guidance (TAG).
- 4.2.4 Figure 4.1 shows the extent of the NATS model and the location of the Scheme. The NATS model covers all strategic traffic movements across Norwich as well as the wider Breckland, Broadland and South Norfolk area. Within the Scheme's area of

impact the model contains a detailed zoning and network resolution and has been calibrated to a high level of accuracy.

Figure 4.1: Extent of the 2015 NATS model



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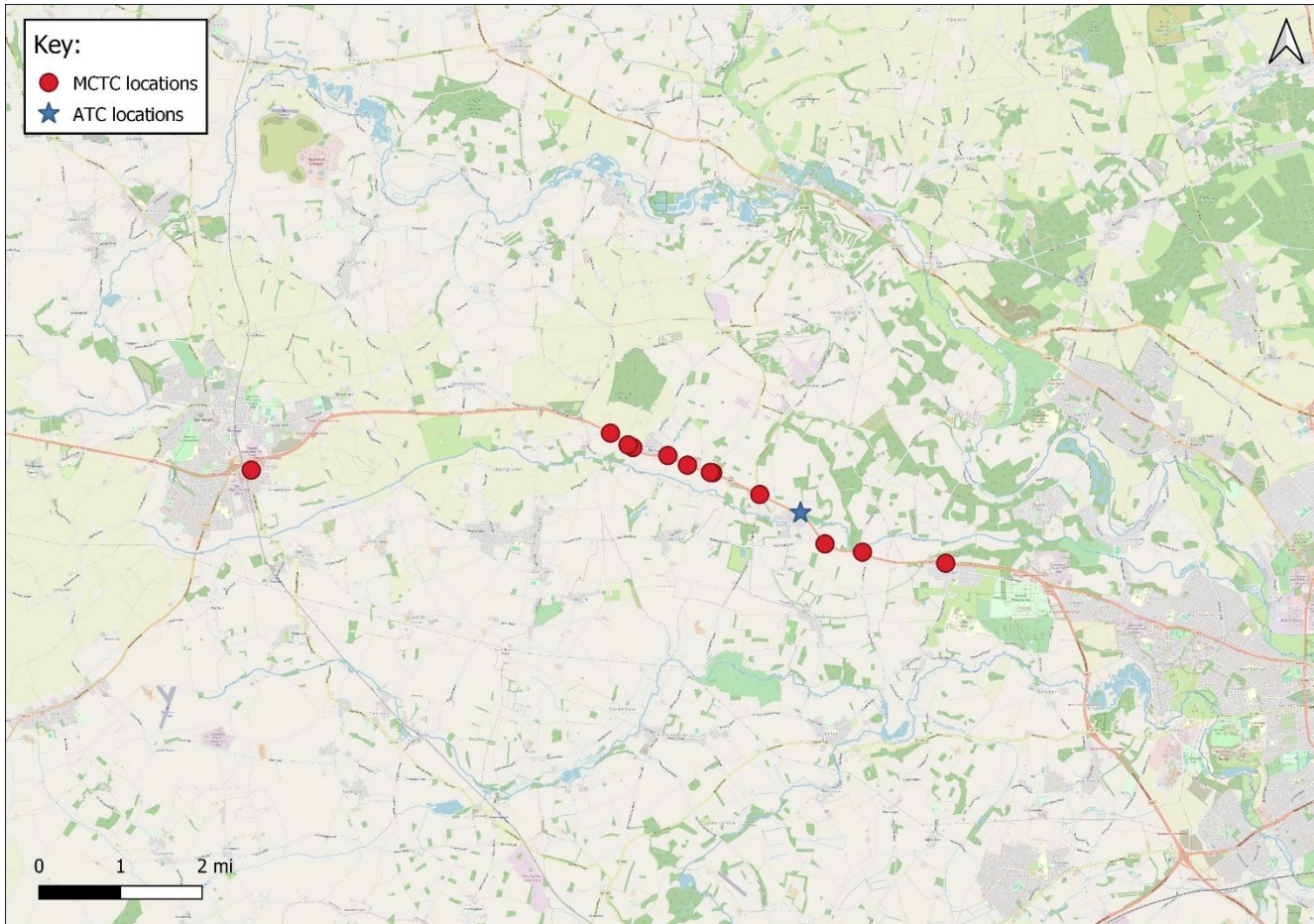
Baseline data collection

Traffic flows

- 4.2.5 A range of traffic surveys have been undertaken along the A47 Scheme section and across the surrounding network in 2015, 2016 and 2019. The traffic surveys in 2015 and 2016 provide the input traffic flow data for the development of the base year strategic highway model whereas the 2019 provides more up to date information on the local network.
- 4.2.6 In June 2015 12-hour Manual Classified Turning Counts (MCTC) were undertaken to observe traffic movements in the local area between North Tuddenham and Easton, shown in Figure 4.2. The MCTC surveys recorded the number of vehicles and their classifications by turning movement. In addition to the MCTCs, as shown in Figure 4.2 an Automated Traffic Count (ATC) was undertaken on the A47, near Honingham.
- 4.2.7 To supplement understand the traffic movements across the wider area, both on the A47 and the surrounding local road network, the 2015 data additional MCTC and ATCs were undertaken during the months of May, June and July 2016. Figure 4.3

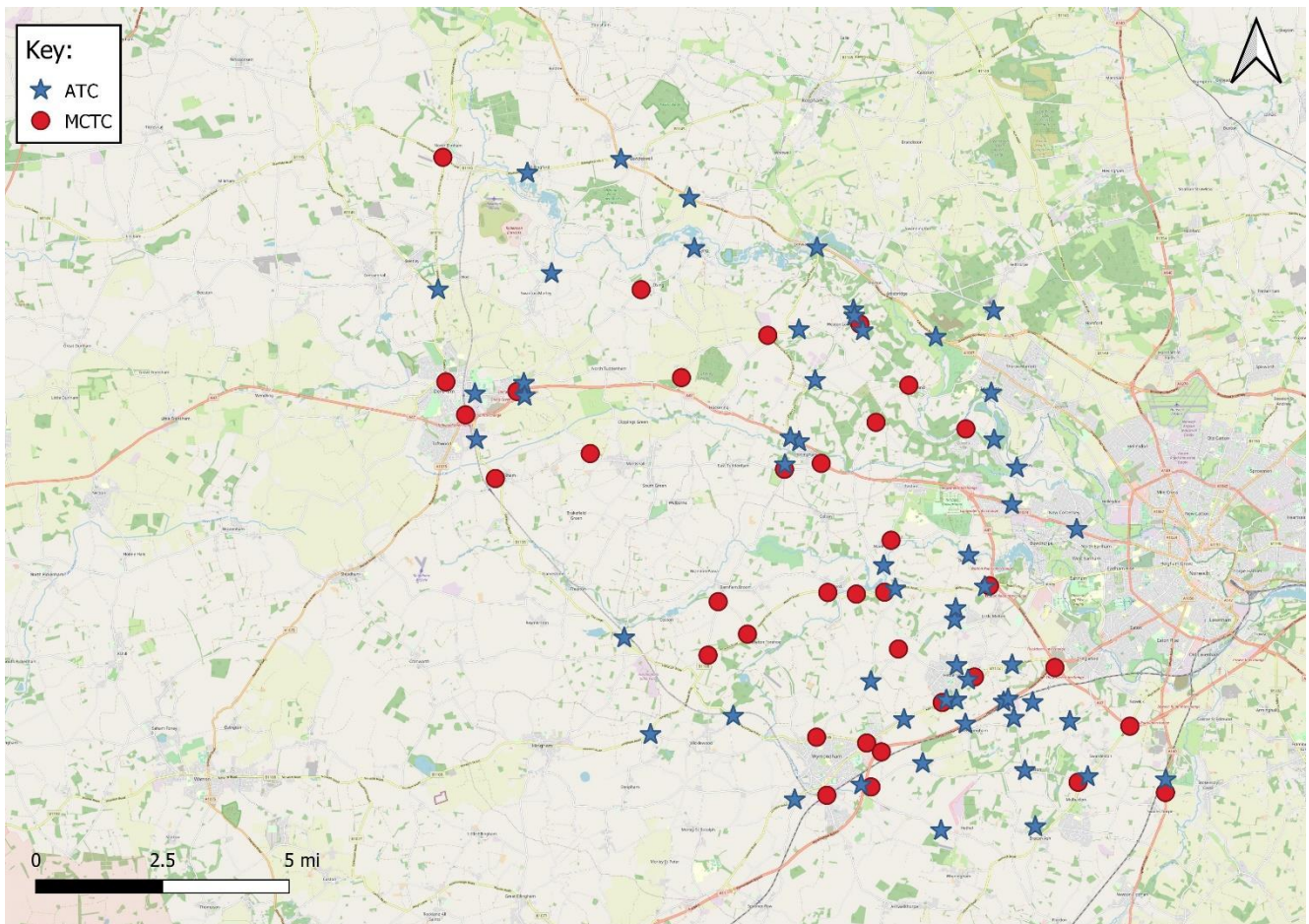
below shows the extent of the 2016 traffic flow data collection. In summary, the 2015 data collection study was focused primarily in the local vicinity of the Scheme, whereas the 2016 data collection covered the wider surrounding area. The ATC surveys were undertaken over a 14-day period, for 12 hours a day collecting traffic flow data in 15 minutes intervals.

Figure 4.2: Location of 2015 traffic survey sites



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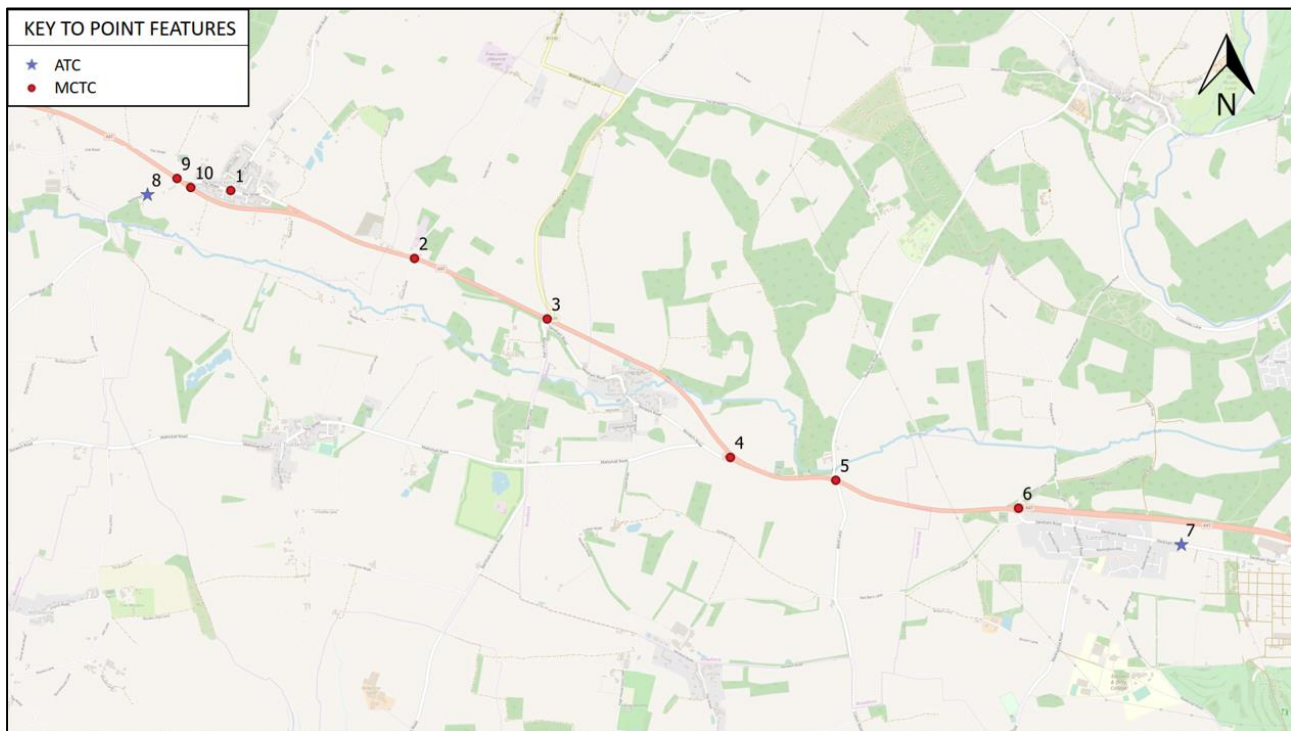
Figure 4.3: Location of 2016 traffic survey sites



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4.2.8 In October 2019, further traffic surveys were undertaken to inform the local network and junction modelling. Figure 4.4 shows the location of the 2019 survey sites, this data exercise involved collecting traffic data on the local roads as well as recollecting data on a number of sites included in 2015 and 2016.

Figure 4.4: Location of 2019 survey sites



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Congestion and queuing

4.2.9 Queuing data was collected as part of the 2015 traffic surveys. During the 2015 data collection exercise queue length surveys were undertaken concurrently with the MCTCs surveys.

Road network and traffic movement data

4.2.10 The Applicant has developed a series of regional traffic models under a consistent framework to support the delivery of the schemes identified in the RIS. The entire SRN and major associated links in England are represented in five strategic models representing the north, the trans-Pennine south or "Northern Powerhouse" area, the midlands, the south-west and the south-east.

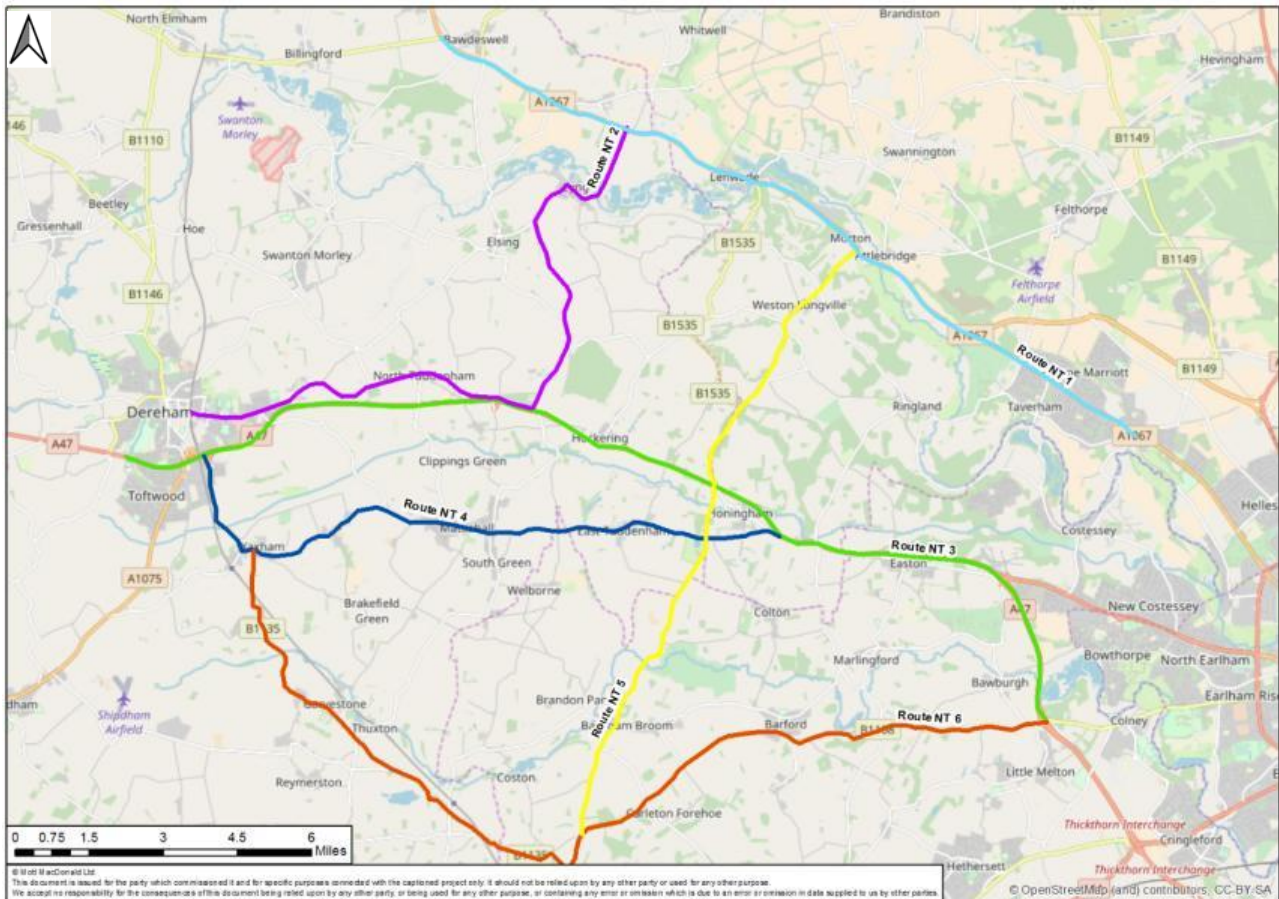
4.2.11 Provisional trip matrices were constructed using mobile phone data. The South East Regional Transport Model (SERTM) models' network and mobile phone prior matrix traffic movement data were therefore adopted in the study to inform the development of the Scheme assessment 2015 base year model.

4.2.12 In addition to SERTM data, Google and TrafficMaster data have been used as data sources for traffic highway network development. Traffic signal data has been sourced from Norfolk County Council.

Journey times

4.2.13 TrafficMaster²⁰ data was obtained for the period October 2014 to September 2015. From this dataset a neutral month was extracted to inform the traffic modelling assessment. WebTRIS²¹ journey times were also utilised in the traffic modelling validation assessment to supplement the TrafficMaster data. WebTRIS data was available along the A47 corridor for neutral months in 2015. Figure 4.5 below shows the journey time routes.

Figure 4.5: TrafficMaster journey time data



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Accidents

4.2.14 Department for Transport Stats19 accident data records have been analysed, over the 2014-2018 period, to identify all reported accidents which have occurred across the scheme impact area. The data set includes details of all recorded slight, serious and fatal accidents across the five-year time period. This information has been adopted to provide total observed accidents as an input to the COBA-LT (Cost-Benefit of Accidents - Light Touch) modelling assessment.

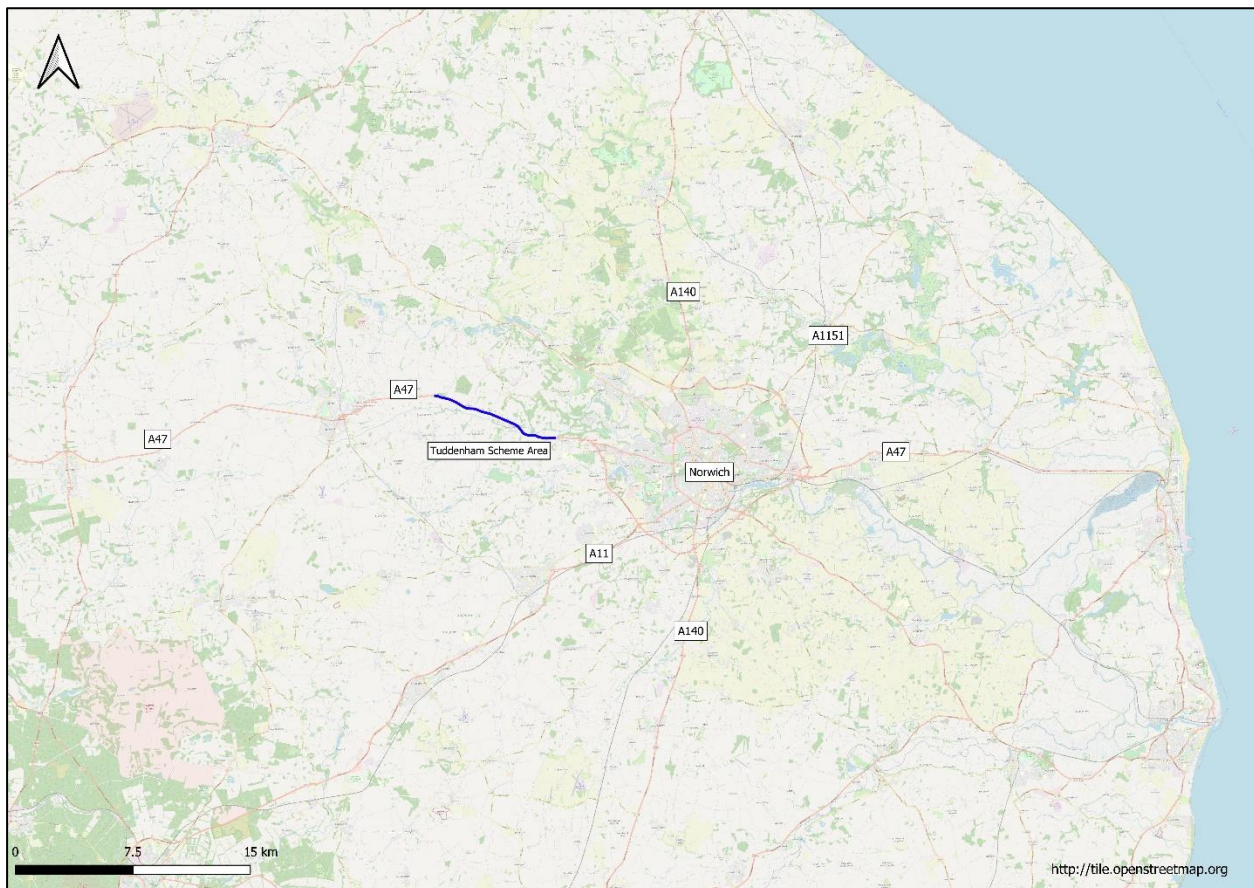
²⁰ Trafficmaster data contains vehicle GPS information sourced and centrally purchased by the Department for Transport <https://www.teletraonavman.co.uk/support/customer-resource/trafficmaster-customer-support>

²¹ WebTRIS is an open data source of traffic data provided by Highways England at <https://webtris.highwaysengland.co.uk/>

The transport network

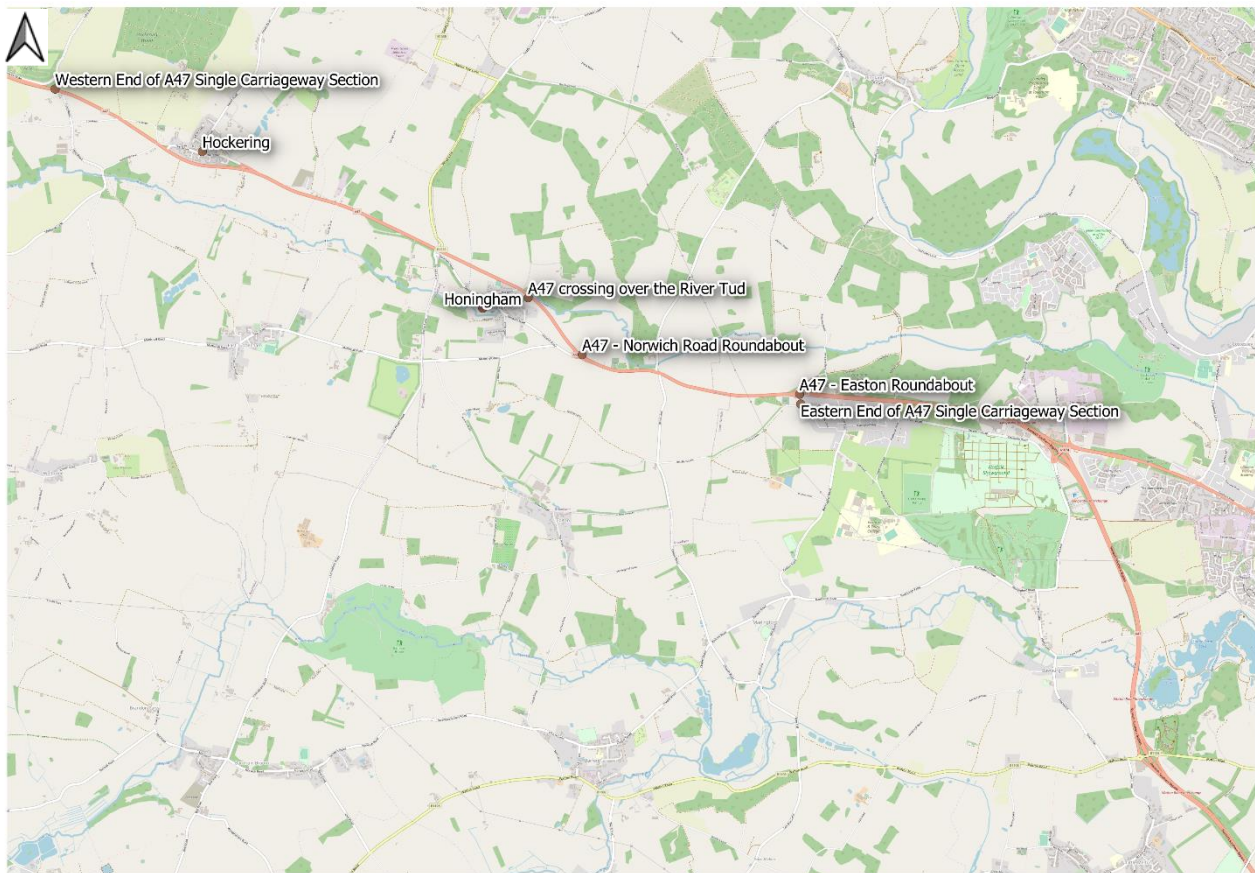
- 4.2.15 The A47 trunk road forms part of the SRN and provide for a variety of local, medium and long-distance trips between the A1 and the eastern coastline. The corridor connects the cities of Norwich (population over 210,000) and Peterborough (population over 180,000), the towns of Wisbech, Kings Lynn, Dereham, Great Yarmouth and Lowestoft and a succession of villages in what is largely a rural area. The route also passes through the Broads National Park.
- 4.2.16 The North Tuddenham to Easton section of the A47 is located 9.6 to 19.3km to the west of Norwich. The 7.9km single carriageway section of the A47 forms a part of the main arterial highway route connecting Norwich to Peterborough. This section of road is therefore an important highway link for both local commuter traffic to and from the west of Norwich as well as providing the main route in the area for longer distance trips across the country travelling east and west. The location of the scheme is shown in Figure 4.6 and Section 3.2 of this Case for the Scheme provides a description of the existing junction.

Figure 4.6: Scheme location



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Figure 4.7: Scheme location – landmarks



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4.3 Overview of the Strategic Modelling

The base year model

4.3.1 The NATS model base year has been calibrated to represent a 2015 base year, utilising the data collected as part of the scheme assessment as well as SERTM network and mobile phone data. Key features of the NATS model include:

- The model contains AM and PM peak hours (08:00 to 09:00 and 17:00 to 18:00) and an IP average hour (10:00 to 16:00) time segments.
- The highway trip purposes represented in the model comprise of 5 user groups: car employer business, car commute, car other, light goods vehicles (LGVs) and heavy goods vehicles (HGVs).

4.3.2 The NATS models' highways component adopts the SATURN²² software package which calculates converged assignment impacts of the scheme. This is supplemented by a public transport component constructed in VISUM²³ software and a variable

²² Simulation and Assignment of Traffic in Urban Road Network (SATURN): <https://saturnsoftware2.co.uk/>

²³ VISUM is a Transport Demand modelling software provided by PTV:
<https://www.ptvgroup.com/en/solutions/products/ptv-visum/>

demand model in DIADEM²⁴ software packages.

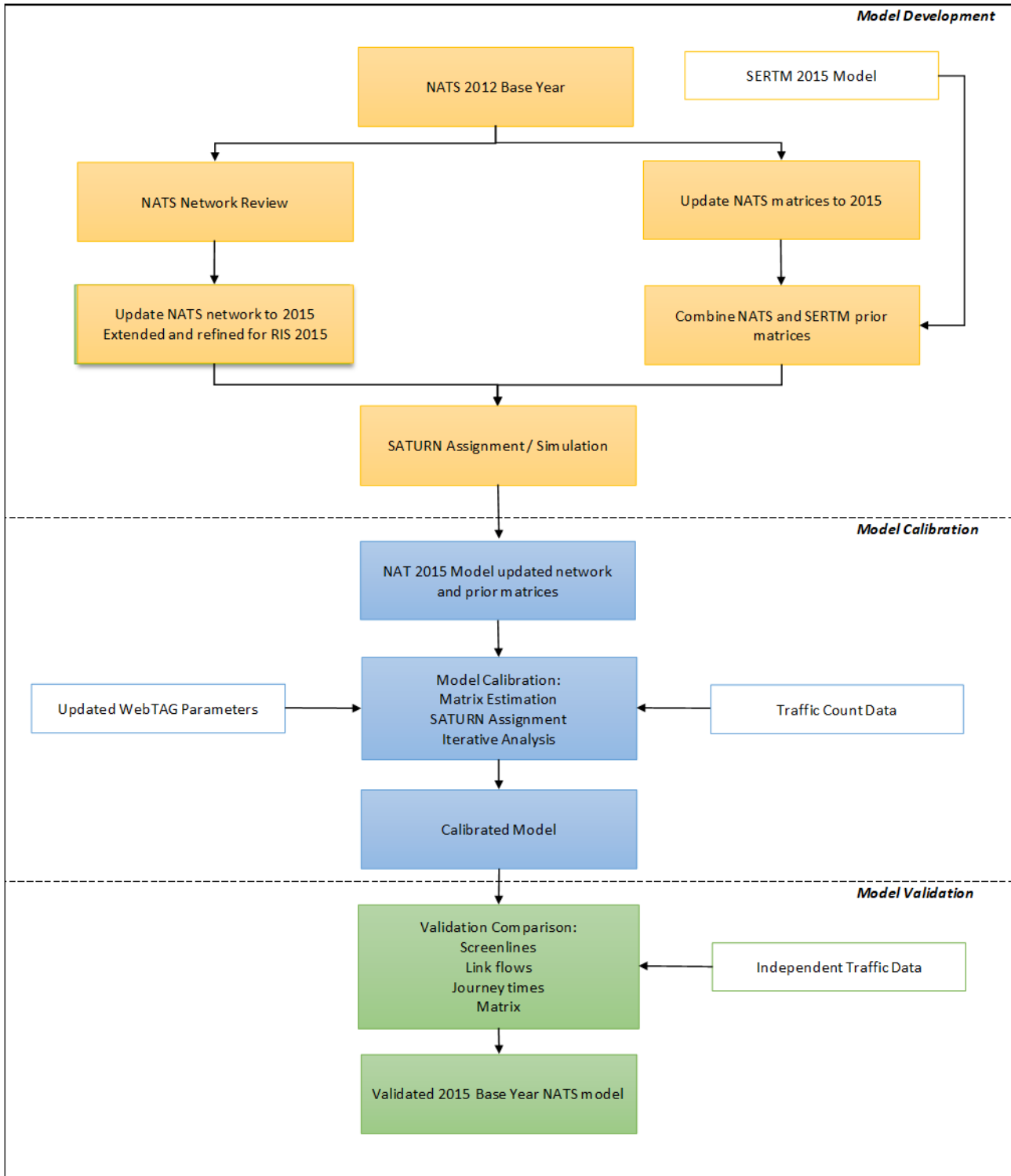
4.3.3 Mobile phone data, from SERTM, is the primary source used for deriving the distribution of trips in the base year prior demand matrices in the schemes impact area. Traffic count data is used to calibrate the model based on a matrix estimation (ME) procedure. The SATURN ME process adjusts the prior trip matrix based on the strategic traffic assignment and the observed count data. This process utilises the data referred to in Section 4 of this Case for the Scheme, and traffic data collect across the wider NATS model study area. A variety of checks were undertaken to ascertain that ME has not altered the integrity and profile of the trip matrix. Subsequent to the ME process, the model has been validated against independent data sets based on the following criteria:

- flows across screenlines
- individual link flows
- journey time comparison
- model convergence.

4.3.4 The base model was developed in accordance with the DfT's TAG Unit M3.1: Highway Assignment Modelling (2020). The strategic base year model development process is outlined in Figure 4.8.

²⁴ Dynamic Integrated Assignment and Demand Modelling is a (DIADEM):
<https://www.gov.uk/government/publications/diadem-software>

Figure 4.8: Strategic base year model development process - overview



4.3.5 In order to complete a fully TAG compliant assessment of the Scheme, the existing NATS model was updated and recalibrated based on up to date survey data. The results of the calibration indicated that the TAG criteria were achieved for link flow calibration and validation. In addition, TAG criteria were also achieved for the journey time validation assessment.

4.3.6 Overall, it is considered that the updated NATS base year model demonstrates a good representation of traffic behaviour in the Scheme study area as well as Norwich and the surrounding wider area. Therefore, the model forms a robust basis for the future year forecast assessment of the Scheme.

The forecast modelling approach

4.3.7 The forecasting approach involves creating initial reference case travel demand forecasts which reflect changes in car ownership, population, employment and other demographic and economic factors. However, traffic growth resulting from other sources, such as changes in generalised costs due to traffic conditions, are not included in the reference case forecasts. These impacts are evaluated through the variable demand model (VDM).

4.3.8 The VDM calculates the increment in demand applied to the reference case forecasts generated by changes in road network congestion. To calculate this increment, the VDM alternates between demand matrix calculations and highway assignment model runs to achieve an appropriate equilibrium between demand and supply.

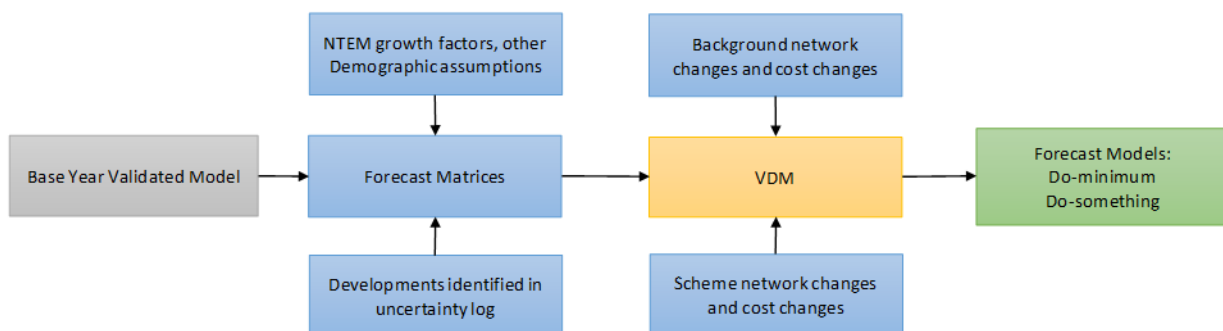
4.3.9 In this iterative process, the VDM calculates the growth in traffic demand across the network, between origin and destination pairs. Based on the origin-destination demand and the available highway network supply capacity, the NATS SATURN assignment model's algorithm calculates the equilibrium traffic flows on individual road links. The underlying principle of this equilibrium, or steady state, is outlined in DfT's TAG Unit M3.1 guidance:

- Traffic arranges itself on networks such that the cost of travel on all routes used between each OD (Origin-Destination) pair is equal to the minimum cost of travel and all unused routes have equal or greater cost.

4.3.10 Based on this approach VDM is applied to derive the demand impacts of both the without-scheme scenario (Do Minimum) as well as the with-scheme scenario (Do Something).

4.3.11 The overall forecasting approach is summarised in the flowchart in Figure 4.9.

Figure 4.9: Forecasting approach



Forecast years

4.3.12 The base year and forecast years are listed as follows:

- 2015 Base Year
- 2025 Opening Year
- 2040 Design Year (15 years after opening).

4.3.13 In both the future year scenarios, 2025 and 2040, a Do Minimum (DM) and a Do Something (DS) network scenario has been modelled. Hence the comparison of the DM and DS scenarios provides the assessment of the schemes impacts in a given forecast year.

Traffic growth forecasts

4.3.14 The traffic forecasts are dependent on household and employment growth, which were derived from both local and national growth forecasts. The local growth forecasts consider the local authority growth projections and the national growth forecasts take wider anticipated growth into account.

4.3.15 The wider area national growth in car trips is derived from the DfT National Trip End Model (NTEM 7.2). This provides demographic projections in employment and population throughout the UK. The change in freight traffic (light and heavy goods vehicles) was derived from the DfT 2018 road traffic forecasts.

4.3.16 The local authority forecasts on development growth are derived from the uncertainty log. The uncertainty log details developments and transport schemes which are both nearby and significant to the model and its planning status. This includes assumptions on local uncertainty, which is dependent on whether developments or other planned transport schemes close to the scheme area are proposed. In addition to identifying each source of uncertainty in the local area, the uncertainty log lists the following information for each source:

- the core assumptions – describing the assumptions that have been made for the core scenario
- the likelihood that the scheme or development will go ahead
- the range of assumptions around each input or parameter and, if possible, information about the distribution.

4.3.17 The core scenario represents the most unbiased and realistic set of assumptions. It is intended to provide a sound basis for decision-making given current evidence. It must be robust and evidence-based taking on board various factors and noting uncertainties affecting travel demand in the future. In accordance with TAG guidance, the uncertainty log includes the management of the uncertainties required for formulating the core scenario.

4.3.18 The definition of each classification of likelihood is summarised in Table 4.1. Where a scheme or land use change is considered “near certain” or “more than likely”, it will be included in the core scenario.

Table 4.1: Uncertainty log – classification of future inputs

| Probability of the Input | Local Authority/Development Scheme | Core Scenario Assumption |
|--|---|---|
| <p>Near Certain: The outcome will happen or there is a high probability that it will happen</p> | <ul style="list-style-type: none"> • Intent announced by the proponent to regulatory agencies • Approved development proposals • Projects under construction | <p>This should form part of the core scenario</p> |
| <p>More than likely: The outcome is likely to happen but there is some uncertainty</p> | <ul style="list-style-type: none"> • Submission of planning or consent application imminent • Development application within the consent process • Projects under construction | <p>This could form part of the core scenario</p> |
| <p>Reasonably Foreseeable: The outcome may happen, but there is significant uncertainty</p> | <ul style="list-style-type: none"> • Identified within a development plan; • Not directly associated with the transport strategy/scheme, but may occur if the strategy/scheme is implemented • Development conditional upon the transport strategy/scheme proceeding • Or, a committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty | <p>These should be excluded from the core scenario but may form part of the alternative scenarios</p> |
| <p>Hypothetical: There is considerable uncertainty whether the outcome will ever happen</p> | <ul style="list-style-type: none"> • Conjecture based upon currently available information • Discussed on a conceptual basis • One of a number of possible inputs in an initial consultation process • Or a policy aspiration | <p>These should be excluded from the core scenario but may form part of the alternative scenarios</p> |

4.3.19 The categorisation and schedule for the potential developments included in the uncertainty log for the North Tuddenham traffic forecasting was agreed in correspondence with Norfolk County Council.

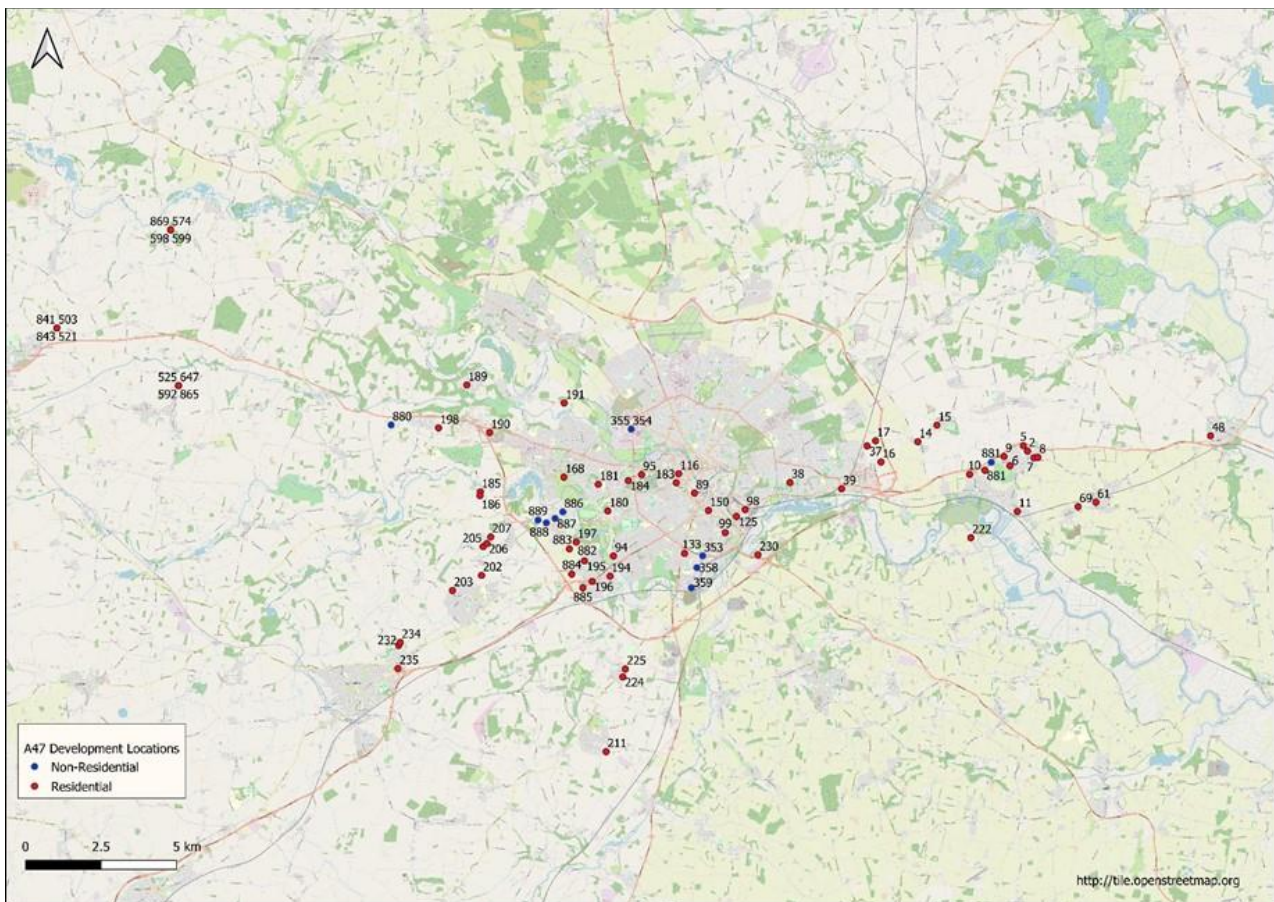
4.3.20 The 'core' scenario traffic growth forecast matrices representing car growth are calculated by spatially allocating development trips from the uncertainty log using trip

rates derived from the NTEM 7.2 data. Public Transport (PT) growth was fully based on NTEM 7.2 growth factors and LGV and HGV growth was derived using DfT RTF 2018 growth factors. A constraining process is then carried out to control the development growth in accordance with the overall growth forecast from the DfT.

Local developments

4.3.21 Following the TAG guidance, developments with the likelihood of at least ‘near certain’ or ‘more than likely’ were included in the forecast estimates. The locations of each development included within the uncertainty log can be seen in Figure 4.10.

Figure 4.10: NATS DM development locations (wider area)



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4.3.22 Table 4.2 and Figure 4.11 outline the local planned developments included in the modelling uncertainty log. The developments identified in the uncertainty log are attributed a status regarding their likelihood. Table 4.2 provides details of the planned developments in the vicinity which are regarded as “near certain” or “more than likely”. Further information relating to the uncertainty log can be found in the section above.

4.3.23 Table 4.2 includes two development sites, a residential development located to the south and east of Easton village as well as the Easton Food Hub, known as a Food Enterprise Park (FEP).

Table 4.2: Local planned developments

| Site Reference | Site name | District | Certainty | Type | Size | | |
|----------------|-----------------------------------|---------------|------------------|--------------------------------------|-------|-------|-----------|
| | | | | | sqm | Other | Unit |
| 198 | Easton: south and east of village | South Norfolk | More than Likely | Residential | | 900 | Dwellings |
| 880 | Food Hub Easton Phase 1 | Broadland | Near Certain | Industrial, Storage and Distribution | 50000 | | Area |

Figure 4.11: Local planned developments



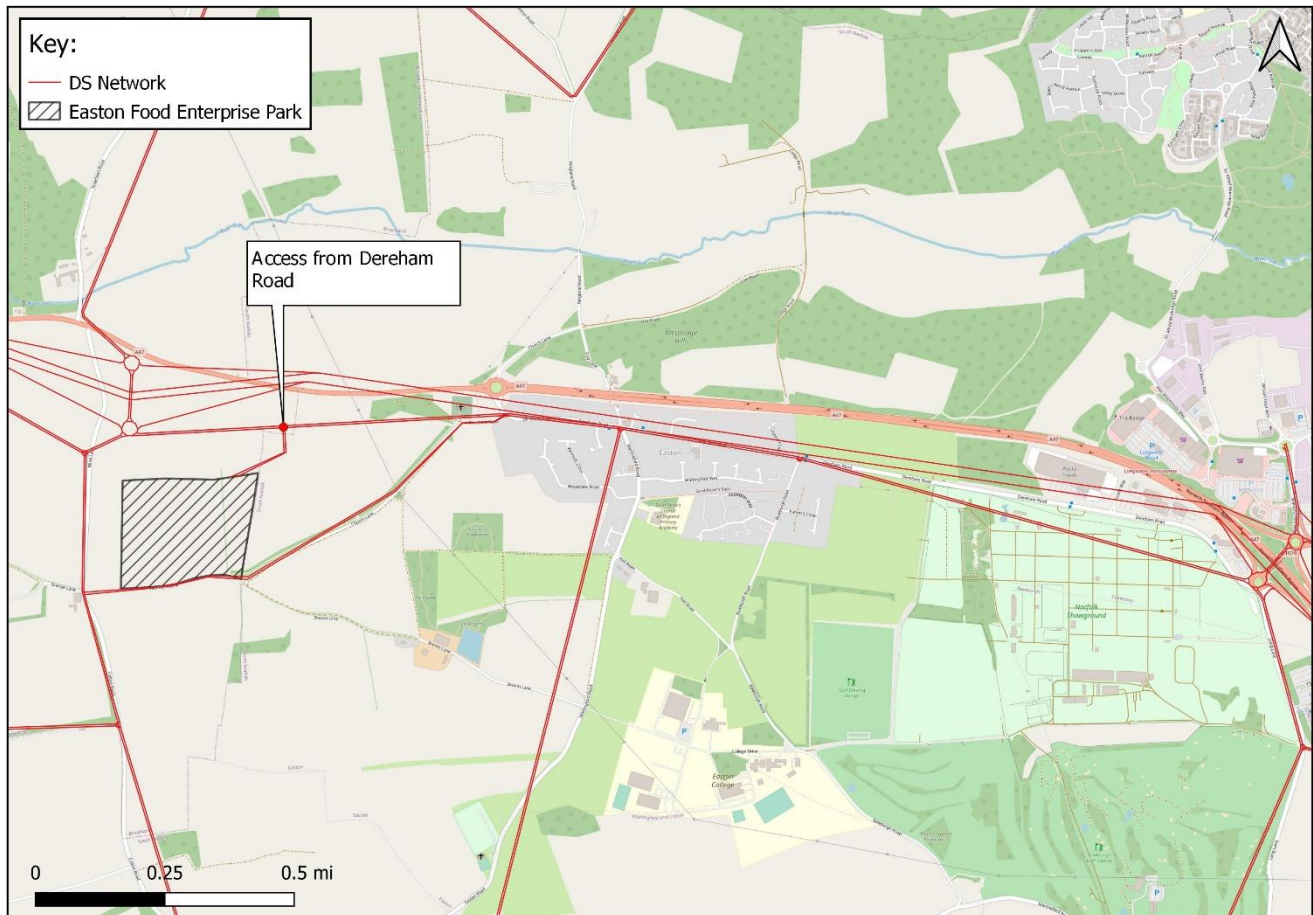
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4.3.24 The Food Enterprise Park represents a major food processing and distribution development site. The Food Enterprise Park is a development site within the Greater Norwich Food Enterprise Zone (FEZ) which is located to the west of Norwich, between Easton and Honingham, just to the south of the A47. The Food Enterprise Park will generate traffic relating to food production, food research, education and ancillary businesses. It is envisaged that, the upgraded A47 scheme will enhance the sites connectivity with the wider strategic road network.

4.3.25 Figure 4.12 below shows the NATS SATURN model's road network in the vicinity of

the Food Enterprise Park in the DS core scenario. From the road network layout, it can be seen that in the DS scenario the site is connected to the extended Dereham road. A47 traffic can therefore access the site via the A47/Norwich Road scheme interchange which connects to Dereham Road.

Figure 4.12: DS Easton Food Enterprise Park access

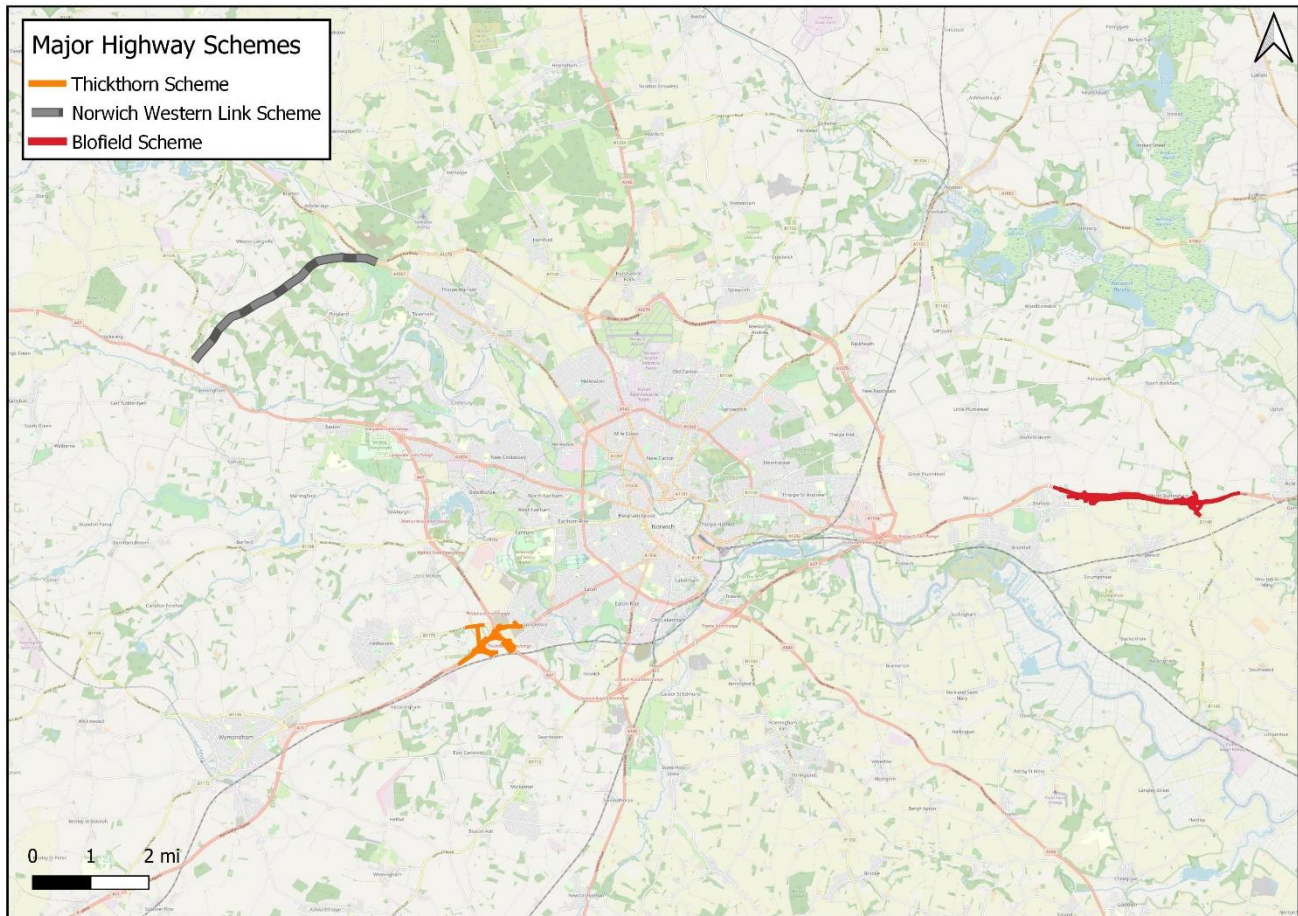


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4.4 Major Highway Schemes and Model Scenarios

- 4.4.1 The uncertainty log contains the significant local authority and Highways England network schemes. Based on TAG guidance, the schemes included in the DM scenario have a likelihood of at least 'near certain' or 'more than likely'.
- 4.4.2 The major highway schemes listed in the uncertainty log as 'near certain' or 'more than likely' include the Norwich Western Link (NWL) as well the 2 RIS schemes: A47 Blofield to North Burlingham dualling and A47/A11 Thickthorn junction improvement. Figure 4.13 shows the location of all identified highway schemes.

Figure 4.13: NATS DM network alterations (wider area)



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- 4.4.3 In July 2019 Norfolk County Council (NCC) announced the preferred route for the NWL, shown in Figure 4.14, with the estimated start of construction in late 2022 and estimated opening year in 2025. The NWL is classified as "near certain" is therefore included in both the DM and DS scenarios.
- 4.4.4 The NWL proposes to provide a new 6.1km dual carriageway road between the western end of the A1270 Broadland Northway (formerly the Northern Distributor Road) and the A47, significantly improving connectivity between these two major roads. Travelling between Weston Longville and Ringland, it will link to the A47 at the new Wood Lane junction near Honingham. The interaction of the Scheme with the NWL is outlined in Section 9 of the Scheme Design Report (**TR010038/APP/7.3**).

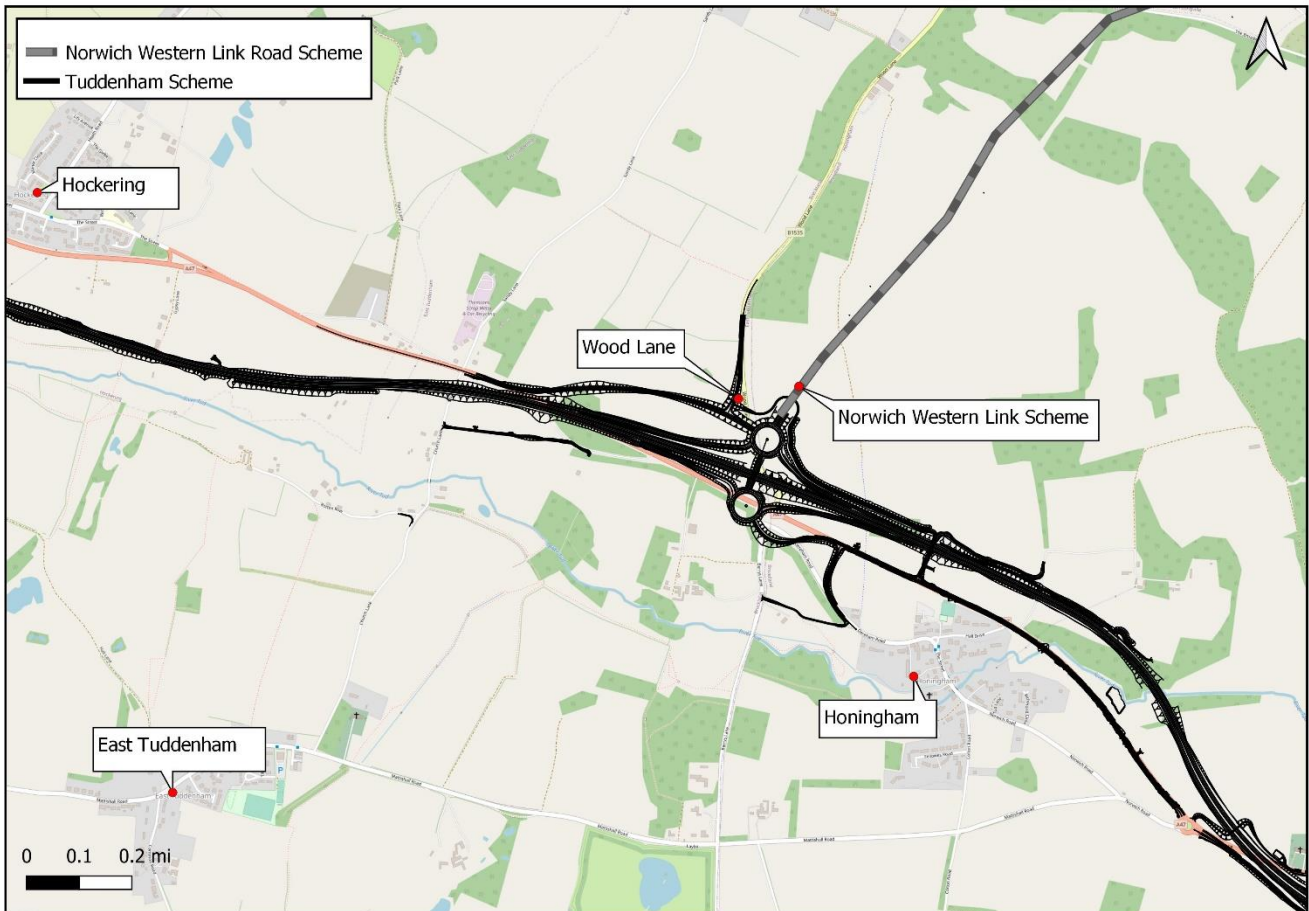
Figure 4.14: NWL alignment in NATS with DS scenario connection at A47/Wood Lane/Berrys Lane



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- 4.4.5 Figure 4.15 below shows the DS junction configuration of the A47/NWL/Wood Lane/Berrys Lane grade-separated interchange. The junction, situated to the west of Honingham, replaces the existing at-grade staggered priority junction which connects the A47 to Wood Lane and Berrys Lane.
- 4.4.6 In the DM scenario, the existing A47/Wood Lane/Berrys Lane staggered T-junction is assumed to be upgraded to an at-grade five arm roundabout with two circulatory lanes, connecting the A47 to the Norwich Western Link. This assumption was made in the absence of any layout plan from Norfolk County Council for the junction connecting the existing single carriageway A47 to the proposed NWL for the DM scenario. Liaison with Norfolk County Council, with respect to the development, modelling and appraisal of the Scheme has been on going throughout the development of the Scheme.

Figure 4.15: DS A47/ NWL /Wood Lane/Berrys Lane grade-separated interchange



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Core scenarios

- 4.4.7 The DM is defined as the core highway network scenario without the A47 North Tuddenham to Easton Scheme intervention, against which the Scheme's impacts changes compared. As defined in the uncertainty log, in the wider area network the Norwich Western Link, Thickthorn and Blofield Schemes improvements are classified as "near certain" and are therefore included.
- 4.4.8 The Scheme included in the DS scenario is the Scheme as outlined in Section 3.4 of this Case for the Scheme. ES Chapter 2 Proposed Scheme (TR010038/APP/6.1) describes the proposed Scheme used in DS scenario.

Table 4.3: DM/DS network assumptions

| Scenario | Appraisal | Schemes Included | | | |
|----------|-----------------|------------------|----------|-----------------|--------------------------------|
| | | Thickthorn | Blofield | North Tuddenham | Other DM Schemes including NWL |
| DM | North Tuddenham | Y | Y | N | Y |
| DS | All | Y | Y | Y | Y |

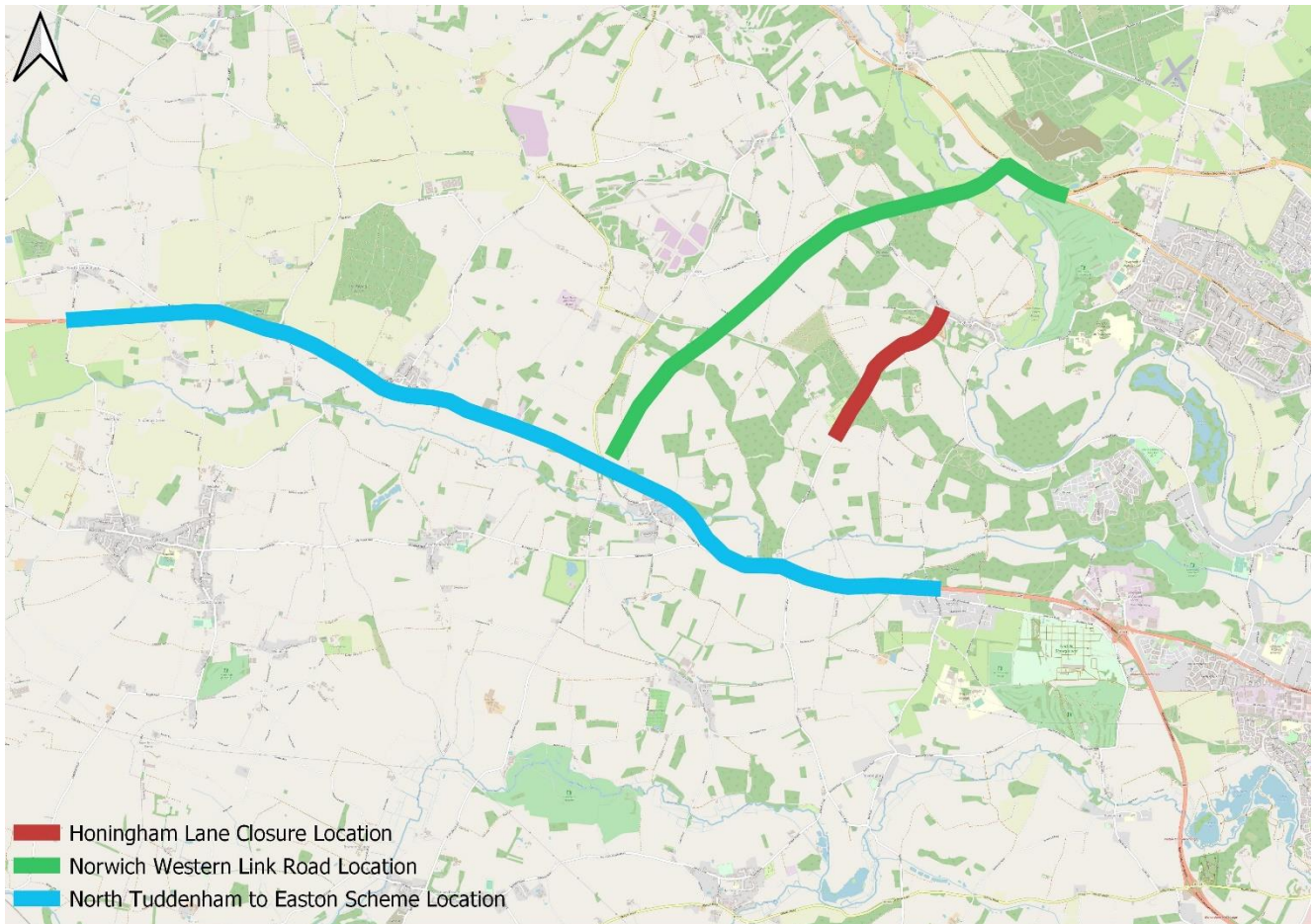
Sensitivity scenarios

4.4.9 A series of sensitivity test scenarios have been undertaken to assess the impact of any revisions to the core scenario assumptions. Of particular note, a sensitivity test has been undertaken to assess the impact of the Scheme without the NWL and with Honingham Lane closed to through traffic movements. The comparison of the without 'NWL' sensitivity test has been undertaken between the following model runs:

- Do-Something (DS0) – Core Scenario: 2025 and 2040
- Do-Something (DS1) - without 'NWL': 2025 and 2040

4.4.10 Table 4.4 provides a summary of the network assumptions considered within the existing core scenario (DS0) and the without 'NWL' test (DS1). Figure 4.16 shows the locations of the Tuddenham scheme, Honingham Lane and the NWL.

Figure 4.16: Location of the Scheme, Honingham Lane and Norwich Western Link Road



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Table 4.4: Sensitivity scenario network assumptions

| Scenario | | Schemes Included | | | | | |
|---------------|-----|------------------|----------|-----------|-----|-----------------------|----------------|
| | | Thickthorn | Blofield | Tuddenham | NWL | Other Non-RIS Schemes | Honingham Lane |
| Core | DS0 | Yes | Yes | Yes | Yes | Yes | Open |
| Without 'NWL' | DS1 | Yes | Yes | Yes | No | Yes | Closed |

4.4.11 Honingham Lane is a local road located approximately 13km to the west of Norwich and connects onto Taverham Road which provides direct access onto the A47. The Tuddenham scheme proposes a new two-tier junction where the A47 passes over the local road intersection of Blind Lane and Taverham Road (Norwich Road junction). The scheme will therefore provide a seamless interchange for traffic travelling through Honingham Lane and Taverham Road to the A47 mainline. However, in addition to the provision of this seamless interchange the scheme also includes the closure of Ringland Road to through traffic.

4.4.12 In comparison of the two schemes (i.e. NWL and Honingham Lane closure), the NWL has a relatively wider and a larger impact. Whereas Honingham Lane provides for a relatively small number of local movements. Therefore, as would be expected, the analysis of the without 'NWL' test focuses on the NWL impacts which predominates the strategic modelling results.

Overview of the Operational Modelling

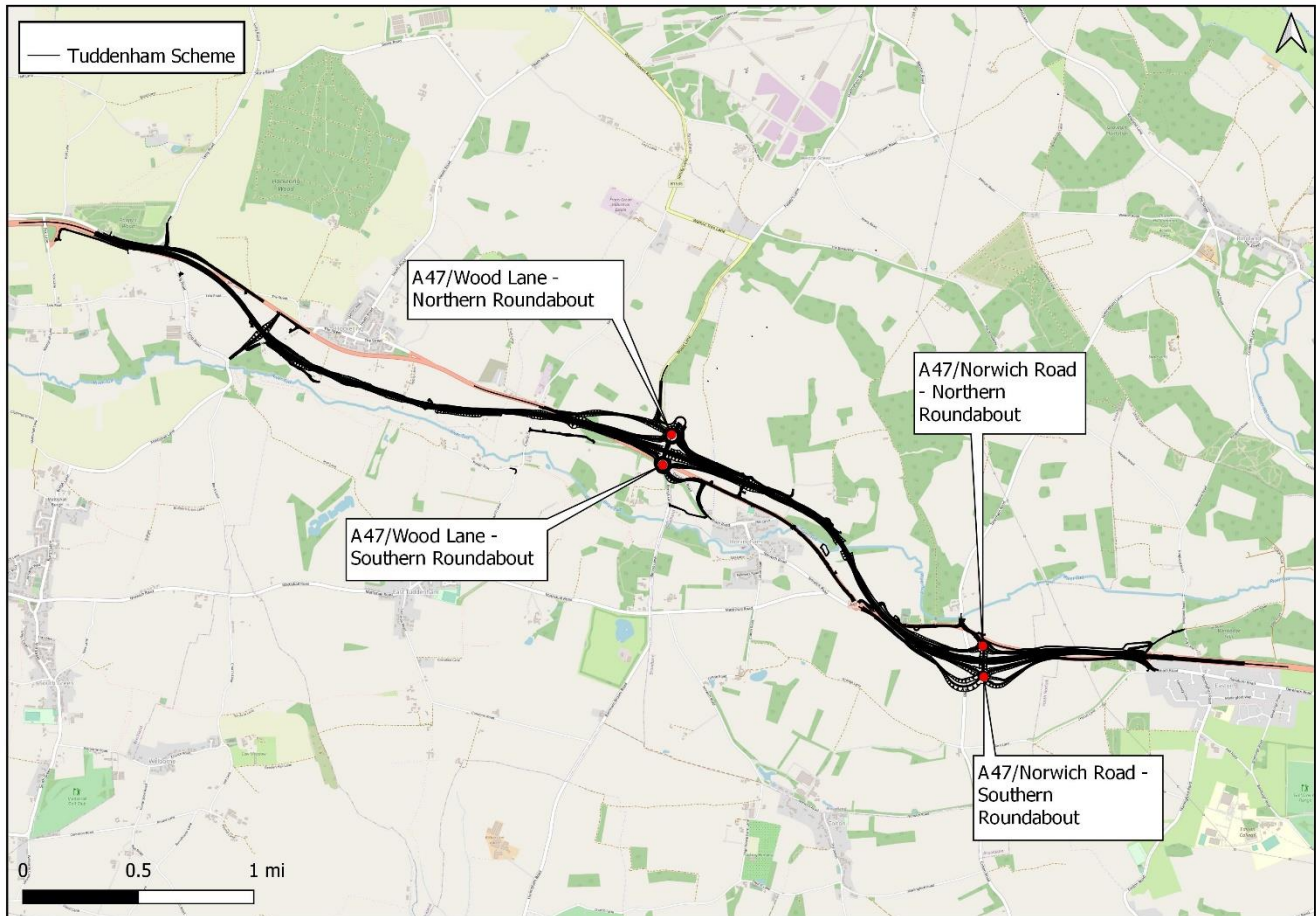
4.4.13 Four ARCADY²⁵ models have been developed to undertake the operational modelling assessment. Figure 4.17 shows the new scheme grade separated junctions, located at Wood Lane and Norwich Road intersections, and highlights the location of the four ARCADY operational models (two ARCADY models for each junction, with one to the north and one to the south of the A47). The scheme includes two new two-tier junctions where the A47 passes over the local roads at the intersections of Berrys Lane with Wood Lane (Wood Lane junction) and Blind Lane with Taverham Road (Norwich Road junction). An ARCADY assessment has been undertaken for the two full grade separated scheme junctions, listed as follows:

- The A47/Wood Lane northern and southern roundabouts
- The A47/Norwich Road northern and southern roundabouts.

²⁵ ARCADY is the acronym for (Assessment of Roundabout Capacity And Delay). This software, produced by the Transport Research Laboratory (UK), models traffic capacity, queues and delays at roundabouts.

<https://trlsoftware.com/products/junction-signal-design/junctions/arcady/>

Figure 4.17: Arcady Junction Model Locations



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4.4.14 Traffic flows forecasts for the detailed junction modelling assessment were derived from the strategic NATS model. The ARCADY assessment has been undertaken for both the AM and PM peak hour time periods (08:00 to 09:00 and 17:00 to 18:00 respectively).

4.5 Annual Average Daily Traffic Flows

4.5.1 The core scenario forecast traffic flows for the North Tuddenham Scheme area are shown in Figure 4.18 at annual average daily traffic (AADT) level to the nearest 100 vehicles for each forecast scenario.

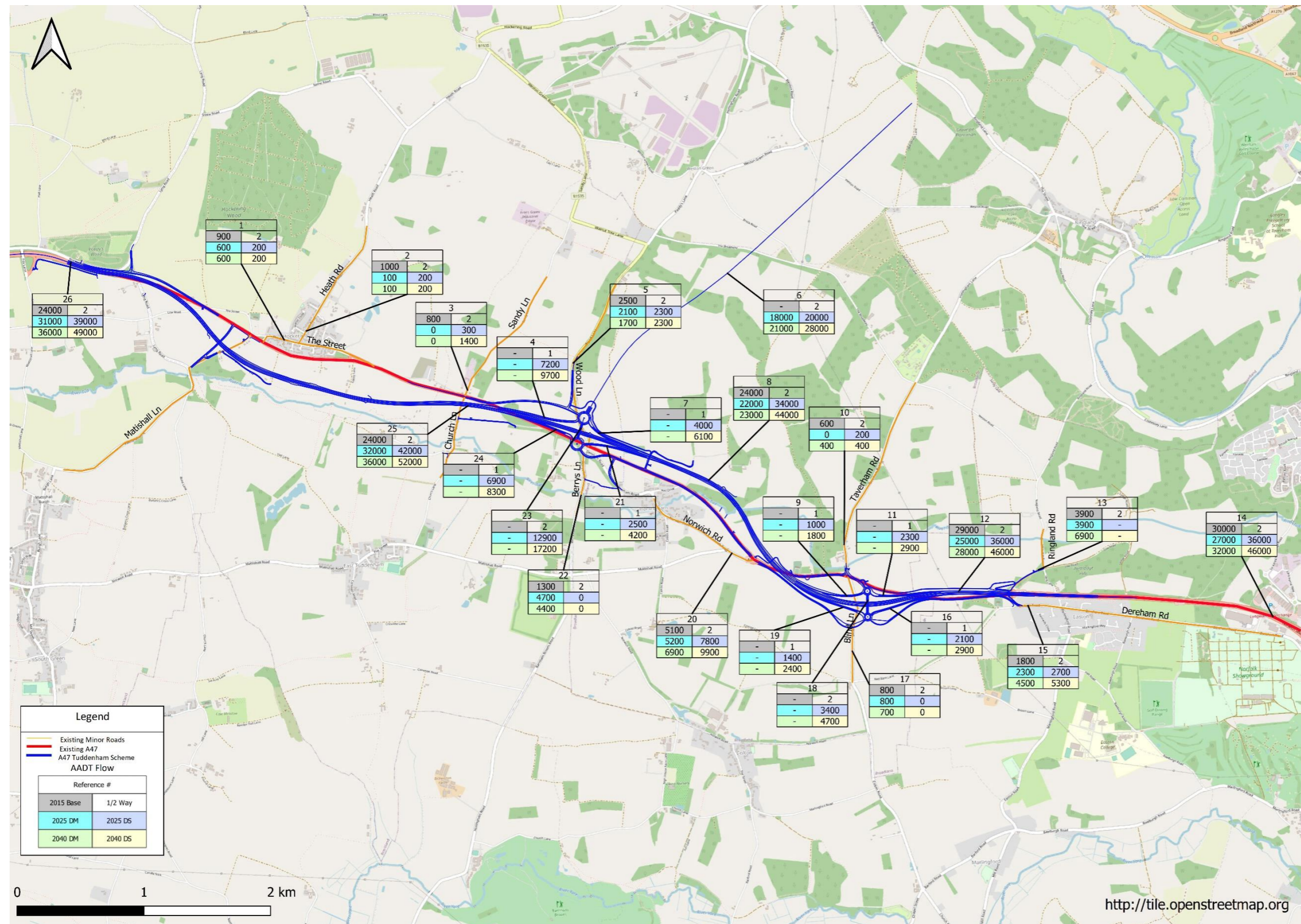
4.5.2 The two-way AADT flows on the A47 to the western extent of the Scheme (Location 25), between Hockering and Honingham, are forecast to increase from 24,000 in the base scenario (2015) to 32,000 in 2025 and 36,000 in the 2040 in the DM scenario. This represents an approximate increase of 33% from 2015 to 2025 DM and a 50% increase from 2015 to 2040 DM.

4.5.3 In the DS scenario AADT Traffic at location 25 is forecast to further increase to 42,000 in 2025 and 52,000 in 2040 in the DS scenario due to the presence of the Scheme. This represents an approximate increase of 31% in 2025 and 44% in 2040 in the DS

compared to the DM.

- 4.5.4 The two-way AADT flows, on the A47 section (Location 8) between the Wood Lane junction and Norwich Road junction, are forecast to decrease from 24,000 in the base scenario to 22,000 in 2025 and 23,000 in 2040 in the DM scenario. This decrease is the result of traffic diverting onto the NWL in the DM scenario.
- 4.5.5 In the DS scenario, AADT flows along this section (Location 8) are forecast to increase to 34,000 in 2025 and 44,000 in 2040 due to the Scheme. This represents an approximate increase of 55% in 2025 and 91% in 2040 in the DS compared to the DM.

Figure 4.18: AADTs in Scheme area – base and core scenario



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4.6 Current Network Performance

Introduction

- 4.6.1 This section of the Case for the Scheme provides an overview of the current operation of the road network. This assessment has been undertaken using local traffic data and the NATS SATURN highway network assignment base year model (2015).
- 4.6.2 This section also establishes the key links, junctions and journey time routes used for the assessment of the Scheme's impacts.

Overview of base year traffic flows and delays

- 4.6.3 The key links for the scheme assessment are the A47 single carriageway sections between North Tuddenham and Easton. The base year modelled traffic flows on the A47 corridor as well as the key locations in the surrounding impact area are shown in Table 4.5. The traffic flows shown are SATURN network link peak hour flows, in passenger car units (PCUs) for the AM and PM peaks. Figure 4.19 shows the locations of the traffic flow assessment.

Figure 4.19: Scheme assessment locations



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4.6.4 The A47 mainline traffic flows, between Norwich Roundabout and Taverham Road, peak at around 1,400-1,500 PCUs per hour. The highest flows in the AM peak are in the eastbound direction. In the PM peak the traffic flows are generally reasonably balanced between both directions, with slightly higher flows in the westbound direction. On the A47 side roads traffic flows range between approximately 0-270 PCUs.

Table 4.5: 2015 Base year traffic flows

| Group | Link | Direction | Peak Hour Flow (PCUs) | |
|--|--|-----------|-----------------------|---------|
| | | | AM Peak | PM Peak |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 1,298 | 1,330 |
| | | WB | 997 | 1,205 |
| | A47 by Hockering | EB | 1,189 | 1,162 |
| | | WB | 997 | 1,205 |
| | A47 between Church Lane and Hockering | EB | 1,193 | 1,164 |
| | | WB | 998 | 1,206 |
| | A47 between Church Lane and Berrys Lane | EB | 1,204 | 1,160 |
| | | WB | 998 | 1,206 |
| | A47 between Wood Lane and Hall Drive | EB | 1,233 | 1,172 |
| | | WB | 992 | 1,187 |
| | A47 between Hall Drive and Norwich Roundabout | EB | 1,233 | 1,172 |
| | | WB | 992 | 1,187 |
| | A47 between Norwich Roundabout and Taverham Road | EB | 1,503 | 1,398 |
| | | WB | 1,170 | 1,400 |
| A47 between Blind Lane and Easton Roundabout | EB | 1,455 | 1,318 | |
| | WB | 1,164 | 1,413 | |
| A47 Side Roads | Wood Lane | SB | 114 | 65 |
| | Berrys Lane | NB | 60 | 54 |
| | Norwich Road approach to roundabout | EB | 273 | 229 |
| | Taverham Road | SB | 1 | 2 |
| | Blind Lane | NB | 33 | 29 |

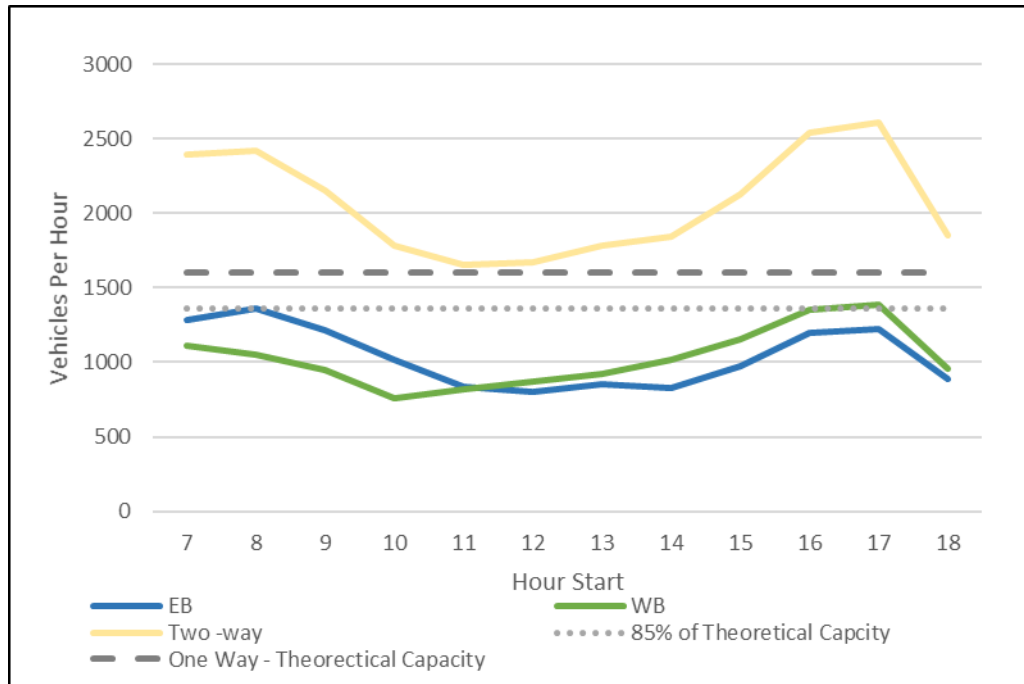
4.6.5 The base year modelled traffic delays along the A47 Scheme section and access roads are shown in Table 4.6. Volume over capacity ratios (V/C %) are also shown in this table. The percentage ratio of (volume of traffic) flow to capacity, is an indicator of the likely performance of a road link. According to DMRB guidance, in general a V/C ratio of about 85% or less is advised. In general terms, traffic delays can be classified as either 'over capacity' queuing delays or transient 'under capacity' delays. Thus, traffic movements which are close to (>85%), or above (100%), their capacity will generate additional queuing delay. Transient delays are also generated when the network is less congested. These transient delays can result from the geometry of the network, the type of junction or even random fluctuations in vehicle arrivals. SATURN therefore calculates the delay for each movement in the network dependent on the traffic flow, the type of road and the type of intersecting junction, hence delays are not calculated as a direct linear relationship with V/C ratios.

Table 4.6: 2015 Base year traffic delay and V/C results

| Group | Link | Direction | VC | | Delay (Min) | |
|--|--|-----------|---------|---------|-------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 79% | 81% | 0.5 | 0.6 |
| | | WB | 61% | 73% | 0.3 | 0.5 |
| | A47 by Hockering | EB | 72% | 71% | 0.3 | 0.3 |
| | | WB | 61% | 73% | 0.2 | 0.3 |
| | A47 between Church Lane and Hockering | EB | 73% | 71% | 0.3 | 0.2 |
| | | WB | 61% | 74% | 0.2 | 0.3 |
| | A47 between Church Lane and Berrys Lane | EB | 73% | 71% | 0.3 | 0.3 |
| | | WB | 61% | 74% | 0.2 | 0.3 |
| | A47 between Wood Lane and Hall Drive | EB | 75% | 71% | 0.0 | 0.0 |
| | | WB | 60% | 72% | 0.0 | 0.0 |
| | A47 between Hall Drive and Norwich Roundabout | EB | 76% | 71% | 0.6 | 0.5 |
| | | WB | 60% | 72% | 0.3 | 0.5 |
| | A47 between Norwich Roundabout and Taverham Road | EB | 94% | 89% | 0.2 | 0.2 |
| | | WB | 71% | 85% | 0.1 | 0.2 |
| A47 between Blind Lane and Easton Roundabout | EB | 89% | 80% | 0.5 | 0.4 | |
| | WB | 71% | 86% | 0.3 | 0.4 | |
| A47 Side Roads | Wood Lane | SB | 32% | 18% | 0.5 | 0.4 |
| | Berrys Lane | NB | 12% | 16% | 0.6 | 1.0 |
| | Norwich Road approach to roundabout | EB | 41% | 44% | 0.1 | 0.2 |
| | Taverham Road | SB | 3% | 6% | 2.0 | 2.0 |
| | Blind Lane | NB | 55% | 46% | 1.5 | 1.4 |

- 4.6.6 The A47 Scheme section is operating just below the available capacity during the AM (94%) and PM peaks (89%) in the eastbound direction. On average vehicles experience up to 0.6 minutes of delay, along each individual A47 single carriageway mainline link, due to traffic congestion.
- 4.6.7 On the side roads delays in the range of approximately 0.5 to 2.0 minutes are seen on Berrys Lane, Wood Lane, Taverham Road and Blind Lane. These delays are resulting from vehicles on the minor roads having to wait for a gap in traffic on the A47 major road.
- 4.6.8 Figure 4.20 shows the base year observed traffic flow profile along the A47 Scheme section, between Blind Lane and Easton roundabout, based on weekday 2019 October MCC data (see Section 4.2 of this Case for the Scheme). The traffic flows shown are hourly total vehicles, whereas the theoretical capacity is an approximate value based on the models calibrated capacity assumption.

Figure 4.20: Observed flow profile – MCC data 2019



4.6.9 Analysis of the observed data indicates that the traffic peak movement in the AM period is in the eastbound direction. Conversely, in the PM period the peak traffic movement is in the westbound direction. However, in the PM peak the variation between eastbound and westbound traffic flow is relatively small when compared to the AM peak variation. Based on this analysis, in both of the AM and PM peaks the A47 observed traffic flow is approximately equal to or greater than the 85% benchmark.

Summary

4.6.10 Traffic modelling analysis indicates that the A47 mainline is operating above the desirable capacity of 85% during the AM and PM peaks (V/C ratio of 89% to 94%). In addition to this, on average vehicles trying to access the A47 from the minor side roads will experience around 0.5 to 2 minutes of delay.

4.7 Future Year Network Performance

Introduction

4.7.1 This section provides an overview of the forecast future year operation of the road network as well as the impacts of the Scheme. Traffic forecasts for 2025 and 2040 have been prepared using the modelling approach outlined in Section 3 of this Case for the Scheme. Using these models and assumptions DM and DS scenarios have been prepared. The comparison of these two scenarios enables the evaluation of the Scheme's impacts.

4.7.2 The DM represents a 'without scheme' scenario, it includes all the changes unrelated to the Scheme which are considered more than likely to be in place prior to the respective future year.

4.7.3 The DS scenario includes the A47 North Tuddenham Scheme. The local development and transport infrastructure assumptions for both scenarios are detailed in Section 3

of this Case for the Scheme.

Do Minimum – Traffic Flows

4.7.4 Table 4.7 and Table 4.8 show the forecast change in traffic flows along the A47 corridor between the base year and 2025, 2040 DM for the AM and PM peak periods.

4.7.5 Overall, there is expected to be an increase in traffic throughout the network across the Norfolk area. This traffic growth is derived from the modelling approach detailed in Section 4.3 of this Case for the Scheme. In summary, the growth in traffic at an individual link level is calculated by the NATS SATURN highway assignment model based on the available road capacity and the total network wide traffic demand.

Table 4.7: 2025 DM and base year (2015) traffic flows

| Group | Link | Direction | 2015 Base Year Peak Hour Flow (PCUs) | | 2025 DM Peak Hour Flow (PCUs) | | % Change vs Base Year | |
|--|---|-----------|--------------------------------------|---------|-------------------------------|---------|-----------------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2025 | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 1,298 | 1,330 | 1,590 | 1,687 | 23% | 27% |
| | | WB | 997 | 1,205 | 1,359 | 1,440 | 36% | 19% |
| | A47 by Hockering | EB | 1,189 | 1,162 | 1,378 | 1,497 | 16% | 29% |
| | | WB | 997 | 1,205 | 1,359 | 1,440 | 36% | 19% |
| | A47 between Church Lane and Hockering | EB | 1,193 | 1,164 | 1,580 | 1,633 | 32% | 40% |
| | | WB | 998 | 1,206 | 1,359 | 1,440 | 36% | 19% |
| | A47 between Church Lane and Berrys Lane | EB | 1,204 | 1,160 | 1,579 | 1,632 | 31% | 41% |
| | | WB | 998 | 1,206 | 1,359 | 1,448 | 36% | 20% |
| | A47 between Wood Lane and Hall Drive | EB | 1,233 | 1,172 | 960 | 907 | -22% | -23% |
| | | WB | 992 | 1,187 | 952 | 1,035 | -4% | -13% |
| | A47 between Hall Drive and Norwich Roundabout | EB | 1,233 | 1,172 | 960 | 907 | -22% | -23% |
| | | WB | 992 | 1,187 | 952 | 1,035 | -4% | -13% |
| A47 between Norwich Roundabout and Taverham Road | EB | 1,503 | 1,398 | 1,232 | 1,085 | -18% | -22% | |
| | WB | 1,170 | 1,400 | 961 | 1,070 | -18% | -24% | |
| A47 between Blind Lane and Easton Roundabout | EB | 1,455 | 1,318 | 1,237 | 1,086 | -15% | -18% | |
| | WB | 1,164 | 1,413 | 972 | 1,097 | -17% | -22% | |
| A47 Side Roads | Wood Lane | SB | 114 | 65 | 55 | 54 | -51% | -17% |
| | Berrys Lane | NB | 60 | 54 | 104 | 66 | 72% | 22% |
| | Norwich Road approach to roundabout | EB | 273 | 229 | 374 | 335 | 37% | 47% |
| | Taverham Road | SB | 1 | 2 | 1 | 2 | -31% | 5% |
| | Blind Lane | NB | 33 | 29 | 21 | 25 | -35% | -15% |
| | NWL | NB | | | 823 | 927 | | |
| | NWL | SB | | | 849 | 847 | | |

Table 4.8: 2040 DM and base year (2015) traffic flows

| Group | Link | Direction | BY Peak Hour Flow (PCUs) | | 2040 DM Peak Hour Flow (PCUs) | | % Change vs BY | |
|--|---|-----------|--------------------------|---------|-------------------------------|---------|----------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2040 | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 1,298 | 1,330 | 1,729 | 1,818 | 33% | 37% |
| | | WB | 997 | 1,205 | 1,446 | 1,452 | 45% | 20% |
| | A47 by Hockering | EB | 1,189 | 1,162 | 1,448 | 1,507 | 22% | 30% |
| | | WB | 997 | 1,205 | 1,446 | 1,452 | 45% | 20% |
| | A47 between Church Lane and Hockering | EB | 1,193 | 1,164 | 1,633 | 1,638 | 37% | 41% |
| | | WB | 998 | 1,206 | 1,446 | 1,452 | 45% | 20% |
| | A47 between Church Lane and Berrys Lane | EB | 1,204 | 1,160 | 1,632 | 1,637 | 36% | 41% |
| | | WB | 998 | 1,206 | 1,446 | 1,459 | 45% | 21% |
| | A47 between Wood Lane and Hall Drive | EB | 1,233 | 1,172 | 908 | 853 | -26% | -27% |
| | | WB | 992 | 1,187 | 995 | 966 | 0% | -19% |
| A47 between Hall Drive and Norwich Roundabout | EB | 1,233 | 1,172 | 908 | 853 | -26% | -27% | |
| | WB | 992 | 1,187 | 995 | 966 | 0% | -19% | |
| A47 between Norwich Roundabout and Taverham Road | EB | 1,503 | 1,398 | 1,233 | 1,151 | -18% | -18% | |
| | WB | 1,170 | 1,400 | 992 | 1,107 | -15% | -21% | |
| A47 between Blind Lane and Easton Roundabout | EB | 1,455 | 1,318 | 1,268 | 1,105 | -13% | -16% | |
| | WB | 1,164 | 1,413 | 1,006 | 1,146 | -14% | -19% | |
| A47 Side Roads | Wood Lane | SB | 114 | 65 | 107 | 96 | -5% | 46% |
| | Berrys Lane | NB | 60 | 54 | 70 | 67 | 15% | 23% |
| | Norwich Road approach to roundabout | EB | 273 | 229 | 474 | 436 | 73% | 91% |
| | Taverham Road | SB | 1 | 2 | 51 | 2 | 5683% | 38% |
| | Blind Lane | NB | 33 | 29 | 16 | 17 | -50% | -42% |
| | NWL | NB | | | 966 | 1,034 | | |
| | NWL | SB | | | 963 | 1,005 | | |

- 4.7.6 Along the A47 mainline scheme section traffic flows, between the western extent of the single carriageway section and the Wood Lane roundabout, increase by around 16% to 41% in 2025 and 20% to 45% in 2040.
- 4.7.7 In total, the modelling results show approximately 830 to 930 and 950 to 1,040 PCUs using the NWL link in 2025 and 2040 respectively.
- 4.7.8 Traffic flows on the A47 mainline between the Wood Lane junction and Easton roundabout, are in general forecast to decrease by around -4% to -27% in 2025 and 2040 in the DM scenario. This decrease is the result of traffic diverting onto the NWL.

Do Minimum – Traffic Delays

- 4.7.9 Table 4.9 and Table 4.10 show the forecast change in traffic delays and V/C ratios along the A47 corridor between the base year and 2025, 2040 DM for the AM and PM peak periods.

Table 4.9: 2025 DM and base year (2015) traffic delay and V/C results

| Group | Link | Direction | BY 2015 | | | | DM | | | |
|--|--|-----------|---------|---------|-------------|---------|---------|---------|-------------|---------|
| | | | V/C | | Delay (Min) | | V/C | | Delay (Min) | |
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2025 | | | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 79% | 81% | 0.5 | 0.6 | 97% | 103% | 0.8 | 1.8 |
| | | WB | 61% | 73% | 0.3 | 0.5 | 83% | 88% | 0.6 | 0.7 |
| | A47 by Hockering | EB | 72% | 71% | 0.3 | 0.3 | 84% | 91% | 0.4 | 0.5 |
| | | WB | 61% | 73% | 0.2 | 0.3 | 83% | 88% | 0.4 | 0.4 |
| | A47 between Church Lane and Hockering | EB | 73% | 71% | 0.3 | 0.2 | 96% | 100% | 0.5 | 0.5 |
| | | WB | 61% | 74% | 0.2 | 0.3 | 83% | 88% | 0.3 | 0.4 |
| | A47 between Church Lane and Berrys Lane | EB | 73% | 71% | 0.3 | 0.3 | 96% | 100% | 0.6 | 0.6 |
| | | WB | 61% | 74% | 0.2 | 0.3 | 83% | 96% | 0.4 | 0.5 |
| | A47 between Wood Lane and Hall Drive | EB | 75% | 71% | 0.0 | 0.0 | 30% | 28% | 0.0 | 0.0 |
| | | WB | 60% | 72% | 0.0 | 0.0 | 91% | 101% | 0.3 | 1.0 |
| | A47 between Hall Drive and Norwich Roundabout | EB | 76% | 71% | 0.6 | 0.5 | 59% | 55% | 0.4 | 0.3 |
| | | WB | 60% | 72% | 0.3 | 0.5 | 58% | 63% | 0.3 | 0.4 |
| | A47 between Norwich Roundabout and Taverham Road | EB | 94% | 89% | 0.2 | 0.2 | 59% | 53% | 0.0 | 0.0 |
| | | WB | 71% | 85% | 0.1 | 0.2 | 59% | 65% | 0.1 | 0.1 |
| A47 between Blind Lane and Easton Roundabout | EB | 89% | 80% | 0.5 | 0.4 | 75% | 66% | 0.3 | 0.2 | |
| | WB | 71% | 86% | 0.3 | 0.4 | 59% | 67% | 0.2 | 0.3 | |
| A47 Side Roads | Wood Lane | SB | 32% | 18% | 0.5 | 0.4 | 41% | 46% | 0.6 | 0.8 |
| | Berrys Lane | NB | 12% | 16% | 0.6 | 1.0 | 102% | 102% | 2.9 | 3.6 |
| | Norwich Road approach to roundabout | EB | 41% | 44% | 0.1 | 0.2 | 48% | 45% | 0.1 | 0.1 |
| | Taverham Road | SB | 3% | 6% | 2.0 | 2.0 | 2% | 4% | 1.5 | 1.4 |
| | Blind Lane | NB | 55% | 46% | 1.5 | 1.4 | 49% | 43% | 1.9 | 1.4 |
| | NWL | NB | | | | | 20% | 23% | 0.0 | 0.0 |
| | NWL | SB | | | | | 98% | 93% | 0.6 | 0.4 |

Table 4.10: 2040 DM and Base Year (2015) traffic delay and V/C results

| Group | Link | Direction | BY 2015 | | | | DM | | | |
|--|--|-----------|----------------------------|---------|-------------|---------|----------------------------|---------|-------------|---------|
| | | | Volume Over Capacity Ratio | | Delay (Min) | | Volume Over Capacity Ratio | | Delay (Min) | |
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2040 | | | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 79% | 81% | 0.5 | 0.6 | 105% | 111% | 2.5 | 4.1 |
| | | WB | 61% | 73% | 0.3 | 0.5 | 88% | 89% | 0.7 | 0.7 |
| | A47 by Hockering | EB | 72% | 71% | 0.3 | 0.3 | 88% | 92% | 0.4 | 0.5 |
| | | WB | 61% | 73% | 0.2 | 0.3 | 88% | 89% | 0.4 | 0.4 |
| | A47 between Church Lane and Hockering | EB | 73% | 71% | 0.3 | 0.2 | 100% | 100% | 0.5 | 0.5 |
| | | WB | 61% | 74% | 0.2 | 0.3 | 88% | 89% | 0.4 | 0.4 |
| | A47 between Church Lane and Berrys Lane | EB | 73% | 71% | 0.3 | 0.3 | 100% | 100% | 0.6 | 0.6 |
| | | WB | 61% | 74% | 0.2 | 0.3 | 88% | 95% | 0.5 | 0.5 |
| | A47 between Wood Lane and Hall Drive | EB | 75% | 71% | 0.0 | 0.0 | 28% | 27% | 0.0 | 0.0 |
| | | WB | 60% | 72% | 0.0 | 0.0 | 103% | 107% | 1.5 | 2.8 |
| | A47 between Hall Drive and Norwich Roundabout | EB | 76% | 71% | 0.6 | 0.5 | 57% | 53% | 0.3 | 0.3 |
| | | WB | 60% | 72% | 0.3 | 0.5 | 61% | 59% | 0.3 | 0.3 |
| | A47 between Norwich Roundabout and Taverham Road | EB | 94% | 89% | 0.2 | 0.2 | 59% | 56% | 0.0 | 0.0 |
| | | WB | 71% | 85% | 0.1 | 0.2 | 60% | 67% | 0.1 | 0.1 |
| A47 between Blind Lane and Easton Roundabout | EB | 89% | 80% | 0.5 | 0.4 | 77% | 67% | 0.3 | 0.3 | |
| | WB | 71% | 86% | 0.3 | 0.4 | 61% | 70% | 0.2 | 0.3 | |
| A47 Side Roads | Wood Lane | SB | 32% | 18% | 0.5 | 0.4 | 90% | 81% | 1.6 | 1.3 |
| | Berrys Lane | NB | 12% | 16% | 0.6 | 1.0 | 104% | 107% | 4.1 | 5.2 |
| | Norwich Road approach to roundabout | EB | 41% | 44% | 0.1 | 0.2 | 61% | 55% | 0.2 | 0.1 |
| | Taverham Road | SB | 3% | 6% | 2.0 | 2.0 | 46% | 6% | 0.8 | 1.4 |
| | Blind Lane | NB | 55% | 46% | 1.5 | 1.4 | 41% | 41% | 2.0 | 1.9 |
| | NWL | NB | | | | | 24% | 25% | 0.0 | 0.0 |
| | NWL | SB | | | | | 107% | 103% | 2.7 | 1.4 |

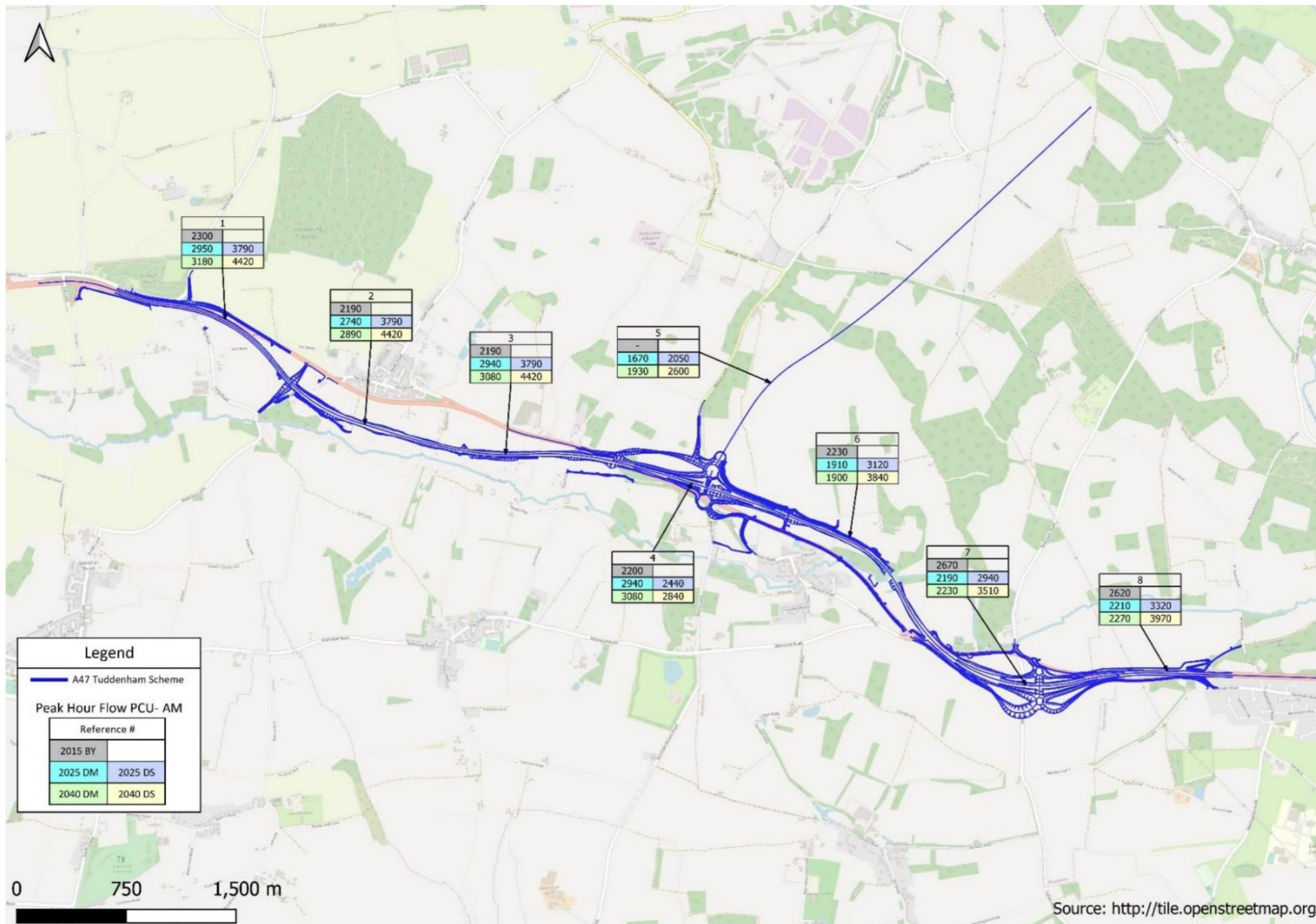
- 4.7.10 The increase in traffic flows along the A47, from the west to the Wood Lane junction, corresponds with the increase in delays and V/C ratios shown in Table 4.9 and Table 4.10. Delays on the A47 in the eastbound direction between Fox Lane and Hockering are forecast to increase up to around 1.8 minutes in 2025 and 4.1 minutes in 2040. Analysis of the DM V/C results across the A47, from Fox Lane to Wood Lane roundabout, (with results increasing up to 103%) indicate that the section is operating over the advisable (85%) capacity in 2025. In the 2040 scenario V/C ratios increase further (with results increasing up to 111%), due to the additional growth in traffic demand.
- 4.7.11 Analysis of the DM results across the A47, from Wood Lane junction to Easton roundabout, in general show a decrease in V/C ratios. Thus, the implementation of the NWL resolves the base year capacity issues along this section.
- 4.7.12 Increases in delay are observed on the Wood Lane (2025: 0.6 to 0.8 minutes, 2040: 1.3 to 1.6 minutes) and Berrys Lane (2025: 2.9 to 3.6 minutes, 2040: 4.1 to 5.2 minutes) side roads in 2025 and 2040. Slight increases in delay can also be seen on Blind Lane, whereas relative decreases are shown on Taverham Road and Norwich Road.

4.8 Impact of the Scheme

Do Something – Traffic Flows

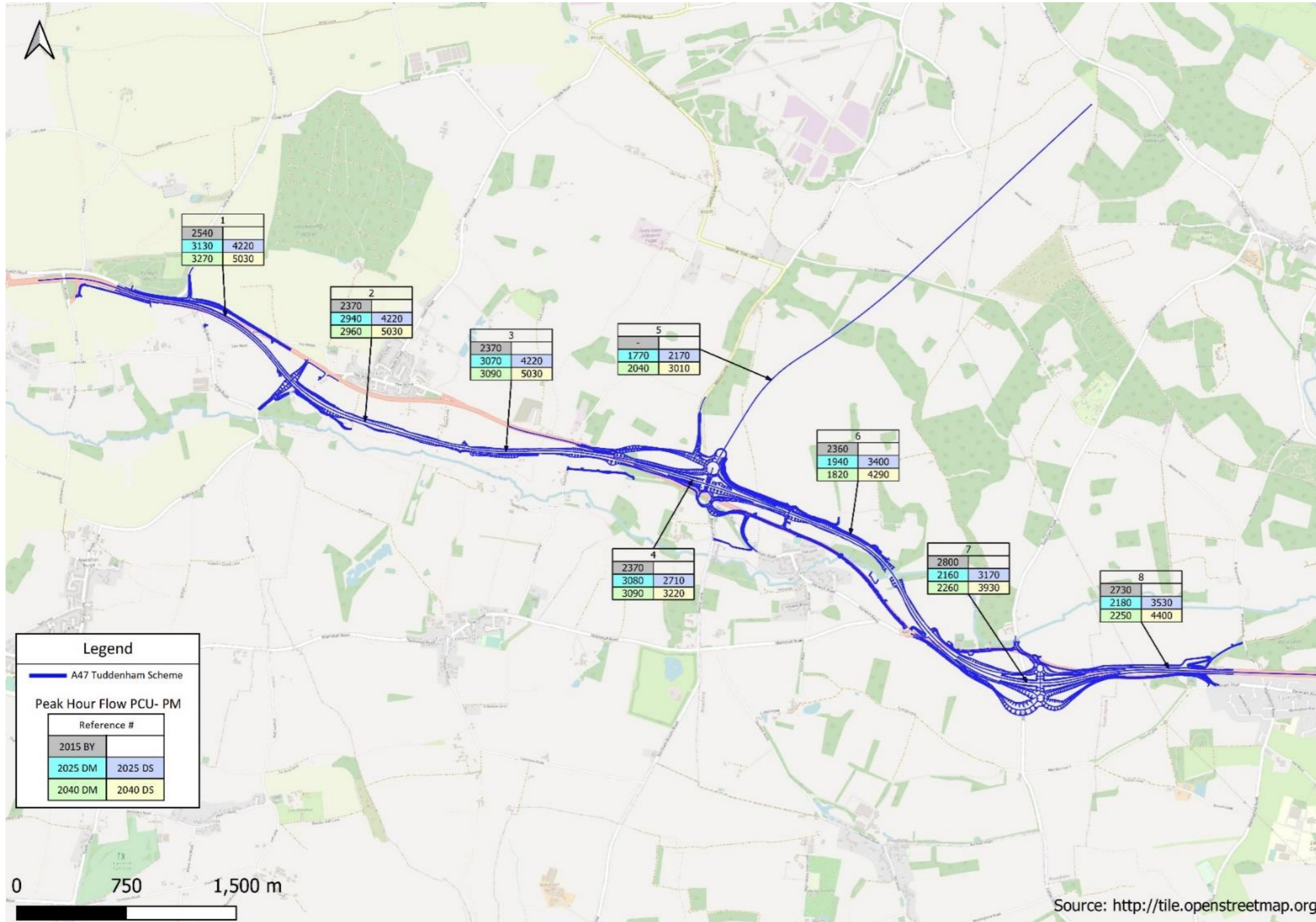
- 4.8.1 Table 4.11 and Table 4.12 show the projected change in traffic flows between the DM and DS scenarios for the AM and PM peak periods in 2025 and 2040. The comparison of these two forecast scenarios shows the impact of the scheme on traffic flows. Figure 4.21 and Figure 4.22 show the A47 and NWL mainline two-way peak hour traffic flows (PCU) to the nearest 10 for each forecast scenario and the 2015 base year.
- 4.8.2 The Scheme is forecast to increase the overall traffic flows across the A47, between Hockering and Easton roundabout, by up to 85% in 2025 and 145% in 2040. In particular, large percentage increases in growth can be seen between Hall Drive and Wood Lane in the westbound direction, due to the increase in capacity provided by the A47/NWL/Wood Lane grade separated interchange

Figure 4.21: Traffic flow in Scheme area – base and core scenario – AM peak (PCU)



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Figure 4.22: Traffic flow in Scheme area – base and core scenario – PM peak (PCU)



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Table 4.11: 2025 DS and DM traffic flows

| Group | Link | Direction | DM Peak Hour Flow (PCUs) | | DS Peak Hour Flow (PCUs) | | % Change vs DM | |
|---------------------|--|-----------|--------------------------|---------|--------------------------|---------|----------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2025 | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 1,590 | 1,687 | 1,940 | 2,177 | 22% | 29% |
| | | WB | 1,359 | 1,440 | 1,851 | 2,040 | 36% | 42% |
| | A47 by Hockering | EB | 1,378 | 1,497 | 1,940 | 2,177 | 41% | 45% |
| | | WB | 1,359 | 1,440 | 1,851 | 2,040 | 36% | 42% |
| | A47 between Church Lane and Hockering | EB | 1,580 | 1,633 | 1,940 | 2,177 | 23% | 33% |
| | | WB | 1,359 | 1,440 | 1,851 | 2,040 | 36% | 42% |
| | A47 between Church Lane and Berrys Lane | EB | 1,579 | 1,632 | 1,297 | 1,318 | -18% | -19% |
| | | WB | 1,359 | 1,448 | 1,139 | 1,395 | -16% | -4% |
| | A47 between Wood Lane and Hall Drive | EB | 960 | 907 | 1,790 | 1,706 | 86% | 88% |
| | | WB | 952 | 1,035 | 1,330 | 1,689 | 40% | 63% |
| | A47 between Norwich Roundabout and Taverham Road | EB | 1,232 | 1,085 | 1,699 | 1,624 | 38% | 50% |
| | | WB | 961 | 1,070 | 1,242 | 1,548 | 29% | 45% |
| | A47 between Blind Lane and Easton Roundabout | EB | 1,237 | 1,086 | 1,951 | 1,787 | 58% | 65% |
| | | WB | 972 | 1,097 | 1,363 | 1,747 | 40% | 59% |
| A47 Side Roads | Wood Lane | SB | 55 | 54 | 58 | 111 | 6% | 104% |
| | Berrys Lane | NB | 104 | 66 | 0 | 0 | -100% | -100% |
| | Norwich Road approach to roundabout | EB | 374 | 335 | 432 | 356 | 16% | 6% |
| | Taverham Road | SB | 1 | 2 | 12 | 15 | 1787% | 705% |
| | Blind Lane | NB | 21 | 25 | 0 | 0 | -100% | -100% |
| | NWL | NB | 823 | 927 | 838 | 1,150 | 2% | 24% |
| | NWL | SB | 849 | 847 | 1,214 | 1,017 | 43% | 20% |

Table 4.12: 2040 DS and DM traffic flows

| Group | Link | Direction | DM Peak Hour Flow (PCUs) | | DS Peak Hour Flow (PCUs) | | % Change vs DM | |
|---------------------|---|-----------|--------------------------|---------|--------------------------|---------|----------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| 2015 Vs 2040 | | | | | | | | |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 1,729 | 1,818 | 2,263 | 2,641 | 31% | 45% |
| | | WB | 1,446 | 1,452 | 2,154 | 2,389 | 49% | 65% |
| | A47 by Hockering | EB | 1,448 | 1,507 | 2,263 | 2,641 | 56% | 75% |
| | | WB | 1,446 | 1,452 | 2,154 | 2,389 | 49% | 65% |
| | A47 between Church Lane and Hockering | EB | 1,633 | 1,638 | 2,263 | 2,641 | 39% | 61% |
| | | WB | 1,446 | 1,452 | 2,154 | 2,389 | 49% | 65% |
| | A47 between Church Lane and Berrys Lane | EB | 1,632 | 1,637 | 1,440 | 1,510 | -12% | -8% |
| | | WB | 1,446 | 1,459 | 1,399 | 1,709 | -3% | 17% |

| Group | Link | Direction | DM Peak Hour Flow (PCUs) | | DS Peak Hour Flow (PCUs) | | % Change vs DM | |
|----------------|--|-----------|--------------------------|---------|--------------------------|---------|----------------|---------|
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| | A47 between Wood Lane and Hall Drive | EB | 908 | 853 | 2,114 | 2,095 | 133% | 145% |
| | | WB | 995 | 966 | 1,724 | 2,191 | 73% | 127% |
| | A47 between Norwich Roundabout and Taverham Road | EB | 1,233 | 1,151 | 1,957 | 1,957 | 59% | 70% |
| | | WB | 992 | 1,107 | 1,549 | 1,971 | 56% | 78% |
| | A47 between Blind Lane and Easton Roundabout | EB | 1,268 | 1,105 | 2,232 | 2,185 | 76% | 98% |
| | | WB | 1,006 | 1,146 | 1,741 | 2,218 | 73% | 94% |
| A47 Side Roads | Wood Lane | SB | 107 | 96 | 64 | 110 | -40% | 15% |
| | Berrys Lane | NB | 70 | 67 | 0 | 0 | -100% | -100% |
| | Norwich Road approach to roundabout | EB | 474 | 436 | 501 | 464 | 6% | 6% |
| | Taverham Road | SB | 51 | 2 | 21 | 21 | -58% | 771% |
| | Blind Lane | NB | 16 | 17 | 0 | 0 | -100% | -100% |
| | NWL | NB | 966 | 1,034 | 1,131 | 1,682 | 17% | 63% |
| | NWL | SB | 963 | 1,005 | 1,467 | 1,323 | 52% | 32% |

Do Something - Traffic Delays

4.8.3 Table 4.13 and Table 4.14 show the link delay and volume over capacity ratios in the DS and DM 2025 and 2040 scenarios. In the DS scenario delays across the A47 scheme section reduce to around 0.1 minutes. Furthermore, due to the additional capacity available from the dual carriageway scheme, V/C ratios decrease to well within the acceptable range of less than 85%. This indicates that the introduction of the Scheme has removed the overcapacity delays across the A47 corridor.

4.8.4 In the DS scenario there are several alterations to the operation of the A47 side roads, the prominent alterations are highlighted in Figure 4.23 and listed below:

- Berrys Lane is closed to through traffic movements between Dereham Road and Mattishall Road
- Blind Lane is closed to through traffic movements between Dereham Road and Red Barn Lane
- two new two-tier junctions are introduced the A47 passes over the local roads at the intersections of Berrys Lane with Wood Lane (Wood Lane junction) and Blind Lane with Taverham Road (Norwich Road junction).

Figure 4.23: DS scenario side road alterations



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Table 4.13: 2025 DS and DM traffic delay and V/C results

| Group | Link | Direction | DM | | | | DS | | | |
|----------------|--|-----------|---------|---------|-------------|---------|---------|---------|-------------|---------|
| | | | V/C | | Delay (Min) | | V/C | | Delay (Min) | |
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 97% | 103% | 0.8 | 1.8 | 50% | 56% | 0.0 | 0.1 |
| | | WB | 83% | 88% | 0.6 | 0.7 | 47% | 52% | 0.0 | 0.1 |
| | A47 by Hockering | EB | 84% | 91% | 0.4 | 0.5 | 50% | 56% | 0.0 | 0.1 |
| | | WB | 83% | 88% | 0.4 | 0.4 | 47% | 52% | 0.0 | 0.1 |
| | A47 between Church Lane and Hockering | EB | 96% | 100% | 0.5 | 0.5 | 50% | 56% | 0.0 | 0.1 |
| | | WB | 83% | 88% | 0.3 | 0.4 | 47% | 52% | 0.0 | 0.1 |
| | A47 between Church Lane and Berrys Lane | EB | 96% | 100% | 0.6 | 0.6 | 38% | 37% | 0.0 | 0.0 |
| | | WB | 83% | 96% | 0.4 | 0.5 | 36% | 43% | 0.0 | 0.0 |
| | A47 between Wood Lane and Hall Drive | EB | 30% | 28% | 0.0 | 0.0 | 46% | 43% | 0.0 | 0.0 |
| | | WB | 91% | 101% | 0.3 | 1.0 | 34% | 43% | 0.0 | 0.0 |
| | A47 between Norwich Roundabout and Taverham Road | EB | 59% | 53% | 0.0 | 0.0 | 46% | 43% | 0.0 | 0.0 |
| | | WB | 59% | 65% | 0.1 | 0.1 | 32% | 41% | 0.0 | 0.0 |
| | A47 between Blind Lane and Easton Roundabout | EB | 75% | 66% | 0.3 | 0.2 | 46% | 42% | 0.0 | 0.0 |
| | | WB | 59% | 67% | 0.2 | 0.3 | 35% | 45% | 0.0 | 0.0 |
| A47 Side Roads | Wood Lane | SB | 41% | 46% | 0.6 | 0.8 | 8% | 16% | 0.0 | 0.1 |
| | Berrys Lane | NB | 102% | 102% | 2.9 | 3.6 | 0% | 0% | 0.1 | 0.1 |
| | Norwich Road approach to roundabout | EB | 48% | 45% | 0.1 | 0.1 | 34% | 28% | 0.1 | 0.1 |
| | Taverham Road | SB | 2% | 4% | 1.5 | 1.4 | 1% | 1% | 0.1 | 0.1 |
| | Blind Lane | NB | 49% | 43% | 1.9 | 1.4 | 0% | 0% | 0.1 | 0.1 |
| | NWL | NB | 20% | 23% | 0.0 | 0.0 | 21% | 28% | 0.0 | 0.0 |
| | NWL | SB | 98% | 93% | 0.6 | 0.4 | 57% | 50% | 0.0 | 0.0 |

Table 4.14: 2040 DS and DM traffic delay and V/C results

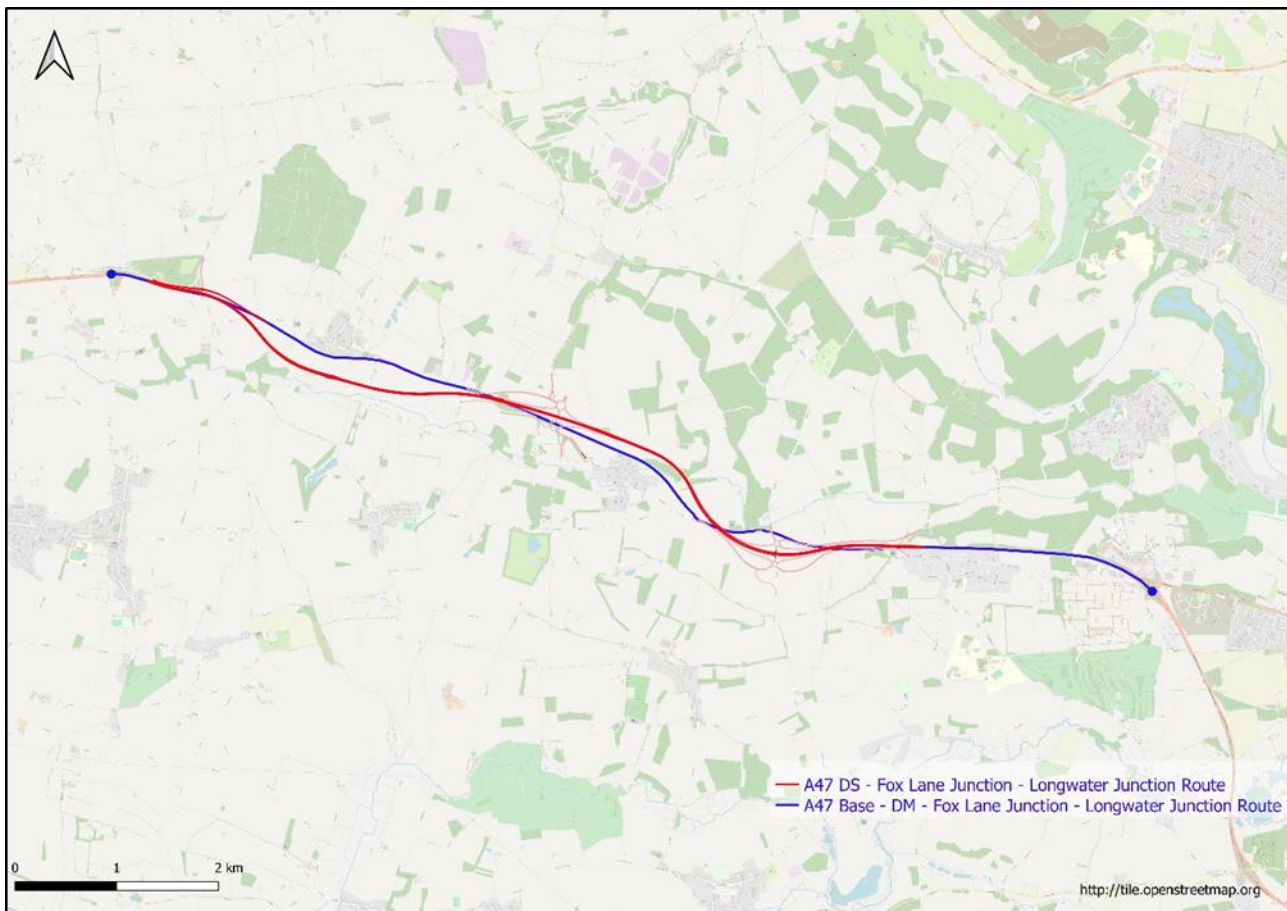
| Group | Link | Direction | DM | | | | DS | | | |
|--|---|-----------|----------------------------|---------|-------------|---------|----------------------------|---------|-------------|---------|
| | | | Volume Over Capacity Ratio | | Delay (Min) | | Volume Over Capacity Ratio | | Delay (Min) | |
| | | | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak | AM Peak | PM Peak |
| A47 Mainline | A47 between Fox Lane and Hockering | EB | 105% | 111% | 2.5 | 4.1 | 58% | 68% | 0.1 | 0.2 |
| | | WB | 88% | 89% | 0.7 | 0.7 | 55% | 61% | 0.1 | 0.1 |
| | A47 by Hockering | EB | 88% | 92% | 0.4 | 0.5 | 58% | 68% | 0.1 | 0.2 |
| | | WB | 88% | 89% | 0.4 | 0.4 | 55% | 61% | 0.1 | 0.1 |
| | A47 between Church Lane and Hockering | EB | 100% | 100% | 0.5 | 0.5 | 58% | 68% | 0.1 | 0.2 |
| | | WB | 88% | 89% | 0.4 | 0.4 | 55% | 61% | 0.1 | 0.1 |
| | A47 between Church Lane and Berrys Lane | EB | 100% | 100% | 0.6 | 0.6 | 45% | 45% | 0.0 | 0.0 |
| | | WB | 88% | 95% | 0.5 | 0.5 | 44% | 53% | 0.0 | 0.0 |
| | A47 between Wood Lane and Hall Drive | EB | 28% | 27% | 0.0 | 0.0 | 54% | 53% | 0.0 | 0.0 |
| | | WB | 103% | 107% | 1.5 | 2.8 | 44% | 56% | 0.0 | 0.0 |
| A47 between Norwich Roundabout and Taverham Road | EB | 59% | 56% | 0.0 | 0.0 | 54% | 53% | 0.0 | 0.0 | |
| | WB | 60% | 67% | 0.1 | 0.1 | 41% | 53% | 0.0 | 0.0 | |
| A47 between Blind Lane and Easton Roundabout | EB | 77% | 67% | 0.3 | 0.3 | 52% | 51% | 0.1 | 0.1 | |
| | WB | 61% | 70% | 0.2 | 0.3 | 44% | 57% | 0.0 | 0.1 | |
| A47 Side Roads | Wood Lane | SB | 90% | 81% | 1.6 | 1.3 | 10% | 18% | 0.1 | 0.1 |
| | Berrys Lane | NB | 104% | 107% | 4.1 | 5.2 | 0% | 0% | 0.1 | 0.1 |
| | Norwich Road approach to roundabout | EB | 61% | 55% | 0.2 | 0.1 | 39% | 37% | 0.1 | 0.1 |
| | Taverham Road | SB | 46% | 6% | 0.8 | 1.4 | 2% | 2% | 0.1 | 0.1 |
| | Blind Lane | NB | 41% | 41% | 2.0 | 1.9 | 0% | 0% | 0.1 | 0.1 |
| | NWL | NB | 24% | 25% | 0.0 | 0.0 | 28% | 41% | 0.0 | 0.0 |
| | NWL | SB | 107% | 103% | 2.7 | 1.4 | 72% | 69% | 0.1 | 0.1 |

- 4.8.5 The comparison of the DM and DS scenarios for the A47 includes the alterations to the local A47 side road network shown in Figure 4.23. The reduction in traffic on Berrys Lane and Blind Lane is therefore due to traffic finding alternative routes in the revised Do-Something network configuration. Traffic growth is also present on the Wood Lane, Taverham Road and Norwich Road side roads. In the Scheme scenario the network upgrades provide additional capacity allowing for traffic growth on these A47 side roads.
- 4.8.6 Delays on the side roads joining the A47 have also been reduced to around 0.1 minutes by the scheme. Delays on Berry Lane, Taverham Road and Wood Lane road have all reduced to negligible levels (approximate delay 0.0 to 0.1 minutes).
- 4.8.7 The Norwich Western Link traffic delays have reduced on the southbound approach arm due to the upgraded A47 junction (2040 DS delays: 0.1 minutes, 2040 DM delays 1.4 to 2.7 minutes).

Overview of journey time routes

- 4.8.8 The section that has been assessed for the Scheme is the section of A47 single carriageway between North Tuddenham and Easton. Analysis of journey time routes across this section capture the change in congestion related delays across the A47 corridor. Thus, the comparison of the DM and DS journey times across these sections highlight the positive benefits of the scheme in terms of relieving congestion. To assess the journey time savings from providing the new dual carriageway, journey time analysis has been carried out between A47 Fox Lane junction to the west and the A47 Longwater junction to the east, as shown in Figure 4.24.

Figure 4.24: Journey time routes on A47 Fox Lane Junction – A47 Longwater Junction



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Journey times

- 4.8.9 To assess the impact of the Scheme on the A47 journey times, analysis has been carried out between the DS, DM and base year scenarios for the two key journey time routes identified above in Figure 4.24. The results are reported in Table 4.15.
- 4.8.10 By 2025, the Scheme is predicted to reduce journey times by approximately 5 minutes for eastbound traffic in the AM peak and 5.5 minutes for westbound traffic in the PM peak between. The journey time savings will increase to 6 minutes in the eastbound direction and 7 minutes in the westbound direction in 2040. The interpeak is also predicted to generate an average of about 3.6 minutes and 4.4 minutes of journey time savings in 2025 and 2040 respectively. Furthermore, across all assessed routes the Do-Something journey times are reduced to levels below the 2015 base year model.
- 4.8.11 In summary, the results clearly show the Scheme will provide substantial journey time savings for both eastbound and westbound traffic movements in both the AM and PM peaks. These journey time savings are a result of upgrading the A47 alignment to dual carriageway, as part of the Scheme's improvements.

Table 4.15: 2015 Base Year, 2025 & 2040 DS and DM journey time comparison (minutes)

| Direction | Scenario | 2025 | | | 2040 | | |
|-----------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | AM | IP | PM | AM | IP | PM |
| A47 WB | 2015 Base | 10.9 | 9.4 | 10.7 | 10.9 | 9.4 | 10.7 |
| | DM | 10.9 | 9.6 | 11.8 | 12.7 | 10.6 | 14.2 |
| | DS | 6.2 | 6.2 | 6.4 | 6.5 | 6.3 | 6.6 |
| | DS - DM | -4.7 | -3.4 | -5.5 | -6.2 | -4.3 | -7.6 |
| | DS - DM % difference | -43% | -35% | -47% | -49% | -41% | -54% |
| A47 EB | 2015 Base | 9.6 | 9.1 | 10.6 | 9.6 | 9.1 | 10.6 |
| | DM | 10.5 | 9.7 | 11.6 | 12 | 10.6 | 13.4 |
| | DS | 6 | 6 | 6.1 | 6.1 | 6 | 6.3 |
| | DS - DM | -4.5 | -3.7 | -5.5 | -5.9 | -4.6 | -7.2 |
| | DS - DM % difference | -43% | -38% | -47% | -49% | -43% | -54% |

Wider network statistics

- 4.8.12 Network wide average speeds have been extracted from the NATS model for the wider area. The average speed statistics represent a weighted average of all trips travelling across the wider network within the specified time periods.
- 4.8.13 The overall average speeds are displayed in Table 4.16. In both 2025 and 2040, there is a relative improvement in network speeds in the DS scenario in the order of 1.6-2.9% in the AM and PM peak periods.
- 4.8.14 Overall, this indicates that the scheme will have a positive impact in terms of improving the operation of the wider network. The global statistics are calculated over the entire NATS study area (Figure 4.1), which contains all of Norwich as well as the wider Broadland and south Norfolk area. Therefore, deriving a network wide increase in average speeds of 1.6-2.9%, from the implementation of the Scheme, is considered to represent a considerable improvement in the overall operation of the network.

Table 4.16: SATURN simulation network overall average speed (km/hr)

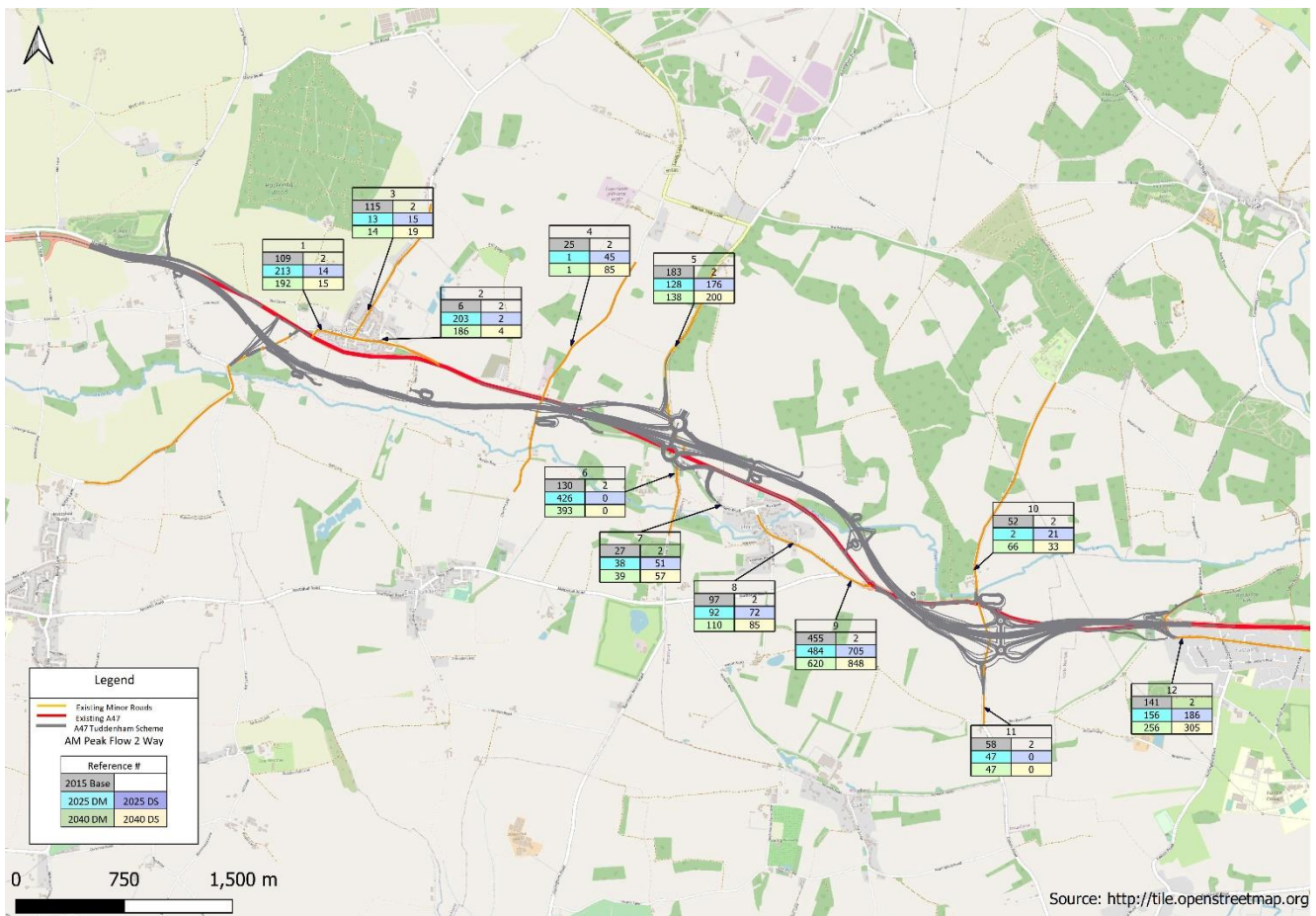
| Scenario | AM | IP | PM |
|--------------------------|------|------|------|
| 2025 DM | 47.6 | 51.1 | 47.1 |
| 2025 DS | 48.6 | 51.9 | 48.3 |
| 2025 DS- DM | 1 | 0.8 | 1.2 |
| 2025 DS- DM % difference | 2.1% | 1.6% | 2.5% |
| 2040 DM | 45 | 50.7 | 44.5 |
| 2040 DS | 46.1 | 51.8 | 45.8 |
| 2040 DS- DM | 1.1 | 1.1 | 1.3 |
| 2040 DS- DM % difference | 2.4% | 2.2% | 2.9% |

Impact of the Scheme on the local road network

- 4.8.15 Figure 4.25 and Figure 4.26 show the local road network two-way peak hour traffic flows (PCU) to the nearest 10 for each forecast scenario. The sites shown in these figures represent the local road network included in the NATS model.
- 4.8.16 The results of the NATs model indicate that the Scheme causes a relatively minor impact on traffic flows across the local road network. In general terms, the Scheme's

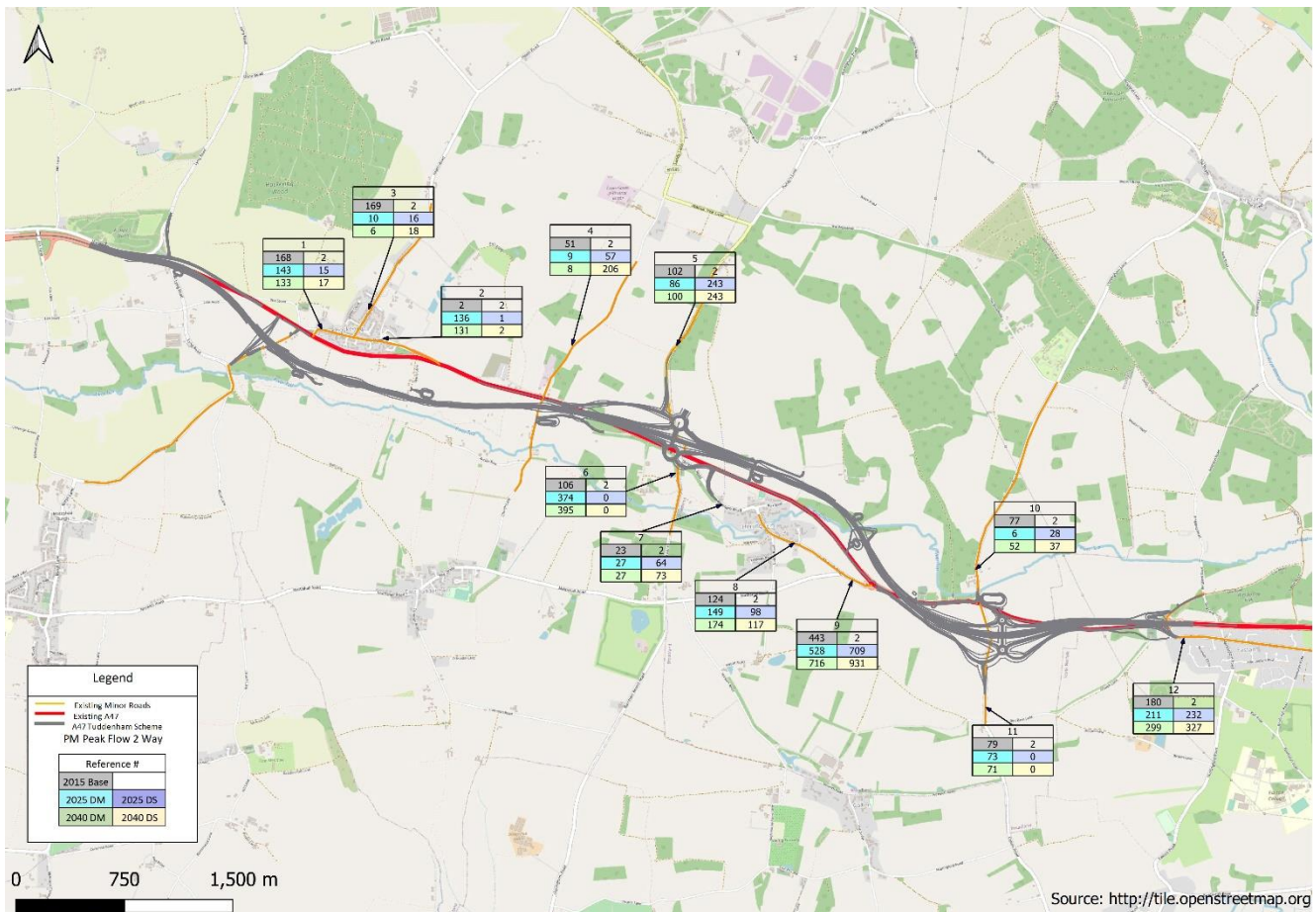
impact causes an increase in traffic on Sandy Lane, Wood Lane and Dereham Road in the range of 0-200 PCUs. Norwich Road (9), experiences the largest traffic flow increase across the local road network of around 200-230 PCUs. Traffic flows along The Street (1 & 2), in Hockering, are forecast to decrease by around 100-200 PCUs. This is due to traffic being diverted on to both the existing A47 single carriageway alignment, which is to be integrated into the local road network by the Scheme, and the Scheme's A47 dual carriageway section. On Berrys Lane (6) traffic flows are forecast to decrease by around 350-400 PCUs, this is due to the closure of the road to through traffic movements.

Figure 4.25: AM peak local traffic flows (PCU 2-way) – base and DM and DS



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Figure 4.26: PM peak local traffic flows (PCU 2-way) – base and DM and DS

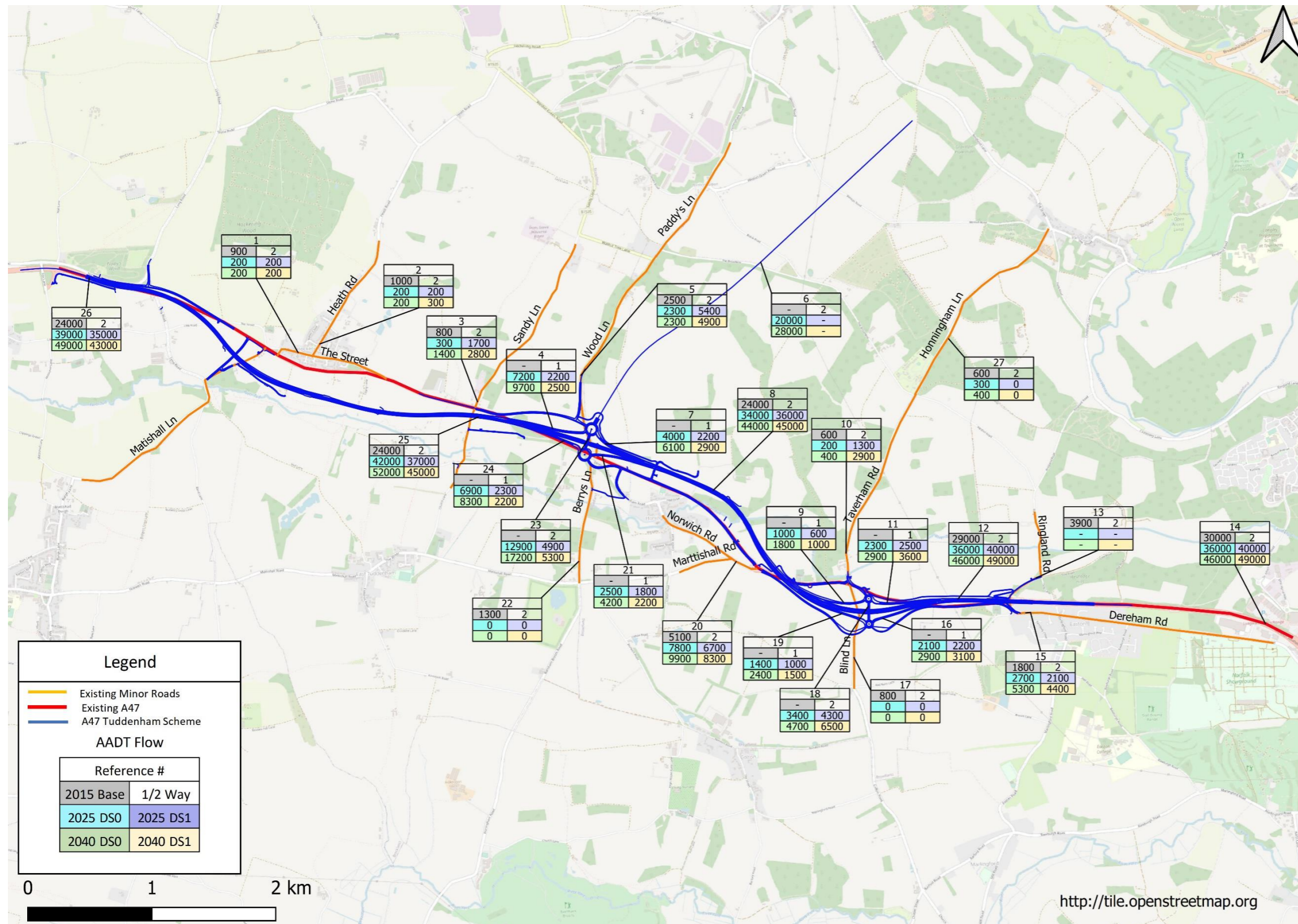


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4.9 Scenario Testing Assessment

- 4.9.1 Figure 4.27 shows the comparison of the annual average daily traffic (AADT) flows, rounded to the nearest 100 vehicles, for the core scenario (DS0) and without 'NWL' test DS scenarios (DS1).
- 4.9.2 Without the provision of the NWL greater volumes of traffic travel along the A47 from Honingham towards Norwich City Centre. The provision of the NWL provides an alternative route between the A47 and the A1067. Without the inclusion of the NWL vehicles travelling to or from the North West are forced to travel between the A47 and the A140 via the lower capacity Dereham Road.
- 4.9.3 On the A47 section (Location 14) between the Easton road junction and the Dereham Road junction, the two-way AADT flows are forecasted to increase without the NWL, from 36,000 in 2025 DS0 to 40,000 in 2025 DS1 and 46,000 2040 DS0 to 49,000 in 2040 DS1. This increase is due to traffic travelling further along the A47 to Norwich in the without NWL test scenario.

Figure 4.27: Core scenario DS (DS0) vs Without 'NWL' test DS (DS1) AADT flow diagram



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- 4.9.4 However, the two-way AADT flows on the A47 to the western extent of the scheme (Location 25), between Hockering and Honingham, are forecasted to decrease without the NWL. The AADTs decrease from 42,000 in 2025 DS0 to 37,000 in 2025 DS1 and 52,000 2040 DS0 to 45,000 in 2040 DS1. This indicates that the NWL will attract additional traffic to the western extent of the A47 scheme single carriageway section in the DS0 scenario. This additional traffic routes along the A47 between Hockering and the Wood lane junction where it connects with the NWL.
- 4.9.5 To assess the journey time savings from providing the new dual carriageway, journey time analysis has been carried out between A47 Fox Lane junction to the west and the A47 Longwater junction to the east as shown in Figure 4.24 above. Table 4.17 shows the comparison of the core scenario and the without 'NWL' test journey time results.
- 4.9.6 In summary, in the DS1 scenario the journey times across the A47 corridor are approximately the same as the DS0 (core scenario).

Table 4.17: Without 'NWL' Test Journey Times: DM1 and DS1 (Minutes)

| Route/Direction | Scenario | 2025 | | | 2040 | | |
|-----------------|------------------|------------|------------|------------|------------|------------|------------|
| | | AM | IP | PM | AM | IP | PM |
| EB | DS0 | 6.2 | 6.2 | 6.4 | 6.5 | 6.3 | 6.6 |
| | DS1 | 6.4 | 6.3 | 6.5 | 6.5 | 6.4 | 6.8 |
| | DS1 – DS0 | 0.2 | 0.1 | 0.1 | 0 | 0.1 | 0.2 |
| WB | DS0 | 6 | 6 | 6.1 | 6.1 | 6 | 6.3 |
| | DS1 | 6.2 | 6.2 | 6.3 | 6.3 | 6.2 | 6.4 |
| | DS1 – DS0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |

4.10 Operational Modelling Assessment

- 4.10.1 Tables 4.18 to 4.21 show the results of the ARCADY junction operational assessment for both the AM and PM 2040 DS scenarios. The Ratio of Flow to Capacity (RFC) and maximum queue length from ARCADY are the two primary measures of junction-arm performance for a roundabout. An RFC value below 0.85 indicates that the arm will operate within its capacity constraints. The tables also show the Maximum Queue length (Max Q, in PCUs) results to provide a secondary assessment of the junction's operation.
- 4.10.2 In summary, analysis of the ARCADY results clearly shows that all four junctions are operating well within capacity with minimal queuing. This indicates that in the 2040 design year the grade separated scheme junctions are operating satisfactorily.

Table 4.18: A47/Wood Lane Junction northern roundabout results

| Arm | AM | | PM | |
|----------------------------------|------|-------|------|-------|
| | RFC | Max Q | RFC | Max Q |
| Roundabout Link Road (S) | 0.33 | 0.5 | 0.51 | 1 |
| Eastbound diverge slip road (SW) | 0.42 | 0.8 | 0.65 | 1.9 |
| A47 Link Road (NW) | 0.25 | 0.3 | 0.51 | 1 |
| Norwich Western Link | 0.69 | 2.3 | 0.65 | 1.9 |

Table 4.19: A47/Wood Lane Junction southern roundabout results

| Arm | AM | | PM | |
|---------------------------------|------|-------|------|-------|
| | RFC | Max Q | RFC | Max Q |
| Roundabout Link Road (N) | 0.57 | 1.4 | 0.54 | 1.2 |
| Westbound diverge slip road (E) | 0.22 | 0.3 | 0.32 | 0.5 |
| Dereham Rd (SE) | 0.2 | 0.3 | 0.29 | 0.4 |

Table 4.20: A47/Norwich Road Junction northern roundabout results

| Arm | AM | | PM | |
|-----------------------|------|-------|------|-------|
| | RFC | Max Q | RFC | Max Q |
| Underbridge Link Road | 0.18 | 0.2 | 0.15 | 0.2 |
| EB Diverge Slip | 0.09 | 0.1 | 0.08 | 0.1 |
| Link to Church Farm | 0.02 | 0 | 0.02 | 0 |

Table 4.21: A47/Norwich Road Junction southern roundabout results

| Arm | AM | | PM | |
|---|------|-------|------|-------|
| | RFC | Max Q | RFC | Max Q |
| Underbridge Link Road | 0.11 | 0.1 | 0.1 | 0.1 |
| WB Diverge Slip | 0.11 | 0.1 | 0.15 | 0.2 |
| Link to Existing A47 and Dereham Road, Easton | 0.16 | 0.2 | 0.23 | 0.3 |
| Link to Honingham | 0.17 | 0.2 | 0.12 | 0.1 |

4.11 Impact on Network Resilience and Journey Time Reliability

- 4.11.1 Resilience is defined as the capacity to recover quickly. Therefore, network resilience is the ability of the road network to be able to deal and recover quickly from events. This is closely linked to reliability. The term reliability refers to variation in journey times that are unable to be predicted (journey time variability, or JTV). Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects which travellers are assumed to be aware of.
- 4.11.2 The implementation of the A47 North Tuddenham dualling scheme will generate reliability benefits as dual carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability. It can then be concluded that the improved reliability of the A47 as a result of dualling will also then lead to increased network resilience.
- 4.11.3 Journey time reliability analysis has been undertaken to assess the economic impacts of the Scheme. The economic assessment of the Scheme is outlined in Section 5 of this Case for the Scheme. This analysis shows that the scheme will generate a positive journey time reliability improvement benefit of around £6.86m.

4.12 Summary of Scheme Impacts

- 4.12.1 Implementation of the Scheme will improve the capacity of the A47 by providing dual carriageway between North Tuddenham and Easton. Observed data, between Blind Lane and Easton, indicates that this section of the A47 acts as a bottleneck. Analysis of the base year model indicates that in 2015 traffic flows were approaching the reasonable capacity limitations of the road and that delays are present across the A47 corridor (Table 4.6).
- 4.12.2 The NATS traffic model analysis shows that strategic traffic growth, as well as local traffic from the villages of Easton, Honingham and Hockering, will cause an increase in peak hour traffic flows of around 10% to 45% between Fox Lane and Wood Lane (Tables 4.7 and 4.8). The traffic growth will result in increased delays across this section of the A47 (Table 4.9 and Table 4.10).
- 4.12.3 The results of the modelling assessment show that the Scheme improves the overall operation of the network (Table 4.16) as well as improving A47 peak hour journey times (approximately 35% to 54% depending on direction and time period, see Table 4.15). Based on the strategic modelling assessments the scheme will remove all the single carriageway overcapacity delays (Tables 4.13 and 4.14).
- 4.12.4 The NWL link is included in the DM 2025 and 2040 assessments. In the DM scenario delays are present on the Wood Lane, Berrys Lane and NWL side roads. These delays are reduced to minimal levels in the DS scenario (Tables 4.15 and 4.16).
- 4.12.5 The Scheme therefore provides additional capacity to the highway network, improves travel times and encourages economic growth across the region. A sizeable residential development and a food enterprise park, located in the vicinity of the village of Easton, are identified in the scheme's uncertainty log. The improvements to the capacity of the A47 between North Tuddenham and Easton will support these developments. Furthermore, the A47 Scheme will provide additional capacity to support strategic traffic growth across the A47 corridor linking Norwich to Peterborough.
- 4.12.6 In terms of operational traffic impacts on the highway network, the junction model results clearly show that all the assessed scheme roundabouts are performing well within capacity. This indicates that in the 2040 design year the grade separated Scheme junctions are operating satisfactorily.

4.13 Road Safety

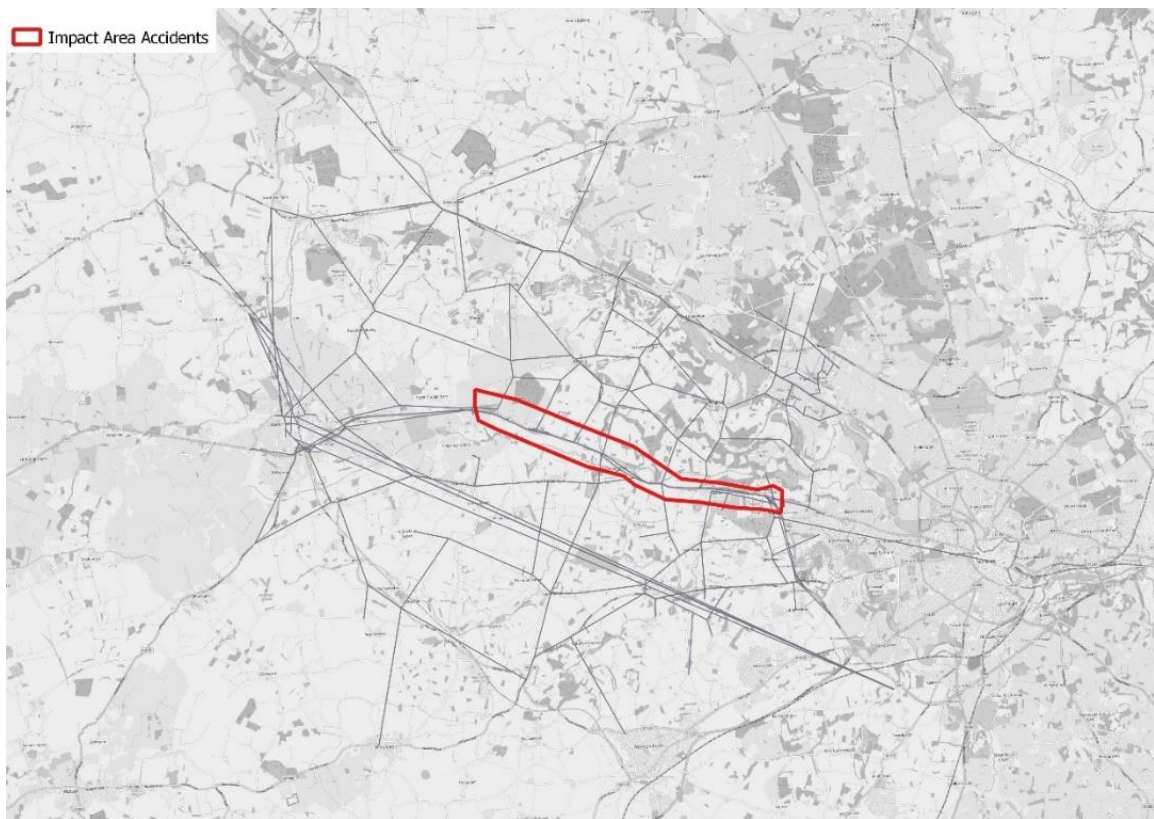
- 4.13.1 This section outlines the existing situation based on the recorded accident data in the vicinity of the Scheme, as well as the forecast impact of the Scheme. The DfT's COBAL-T²⁶ modelling tool has been used to assess the forecast impact of the Scheme on accidents.
- 4.13.2 The DfT COBAL-T software is used to calculate the impact of the Scheme, in terms of the number of accidents and the number of casualties, by comparing the DM and DS scenarios. This section details the underlying STATS-19 accident data used in the development of the model as well as the results of the assessment.

²⁶ COBAL-T (COst and Benefit to Accidents – Light Touch) is a computer program developed by the DfT to undertake the analysis of the impact on accidents as part of economic appraisal for a road scheme: <https://www.gov.uk/government/publications/cobalt-software-and-user-manuals>

Scheme impact area

- 4.13.3 The COBA-LT model study area is shown in Figure 4.28. The model study area is based on a sub area, or cordon, of the NATS model. The cordoned network used within the assessment contains all of the principal roads in the wider highway network in the vicinity of the Scheme.
- 4.13.4 In addition to the study area, a Scheme impact corridor of approximately 11km in length along the A47 was identified to the west of Norwich (represented by the red box in Figure 4.28). Within this Scheme impact area observed data was analysed to assess the accidents records on the local road network. The observed data analysis was used to inform the impact area baseline accidents in the COBA-LT model. Outside of the Scheme impact area, default DfT COBA-LT accident rates were adopted.

Figure 4.28: COBA-LT road network



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Observed accident data

4.13.5 The five-year 2014-2018 collision data, derived from STATS-19 accident records, was analysed to derive the total number of accidents on the links in the Scheme impact area, shown in Figure 4.28.

4.13.6 The severity of casualties was based on the default COBA-LT values for each link type. The observed accidents by accident type are summarised in Table 4.22. The locations and years of the observed accidents are shown in Figure 4.29.

Figure 4.29: Impact area/scheme links and junction observed accidents between 2014 and 2018

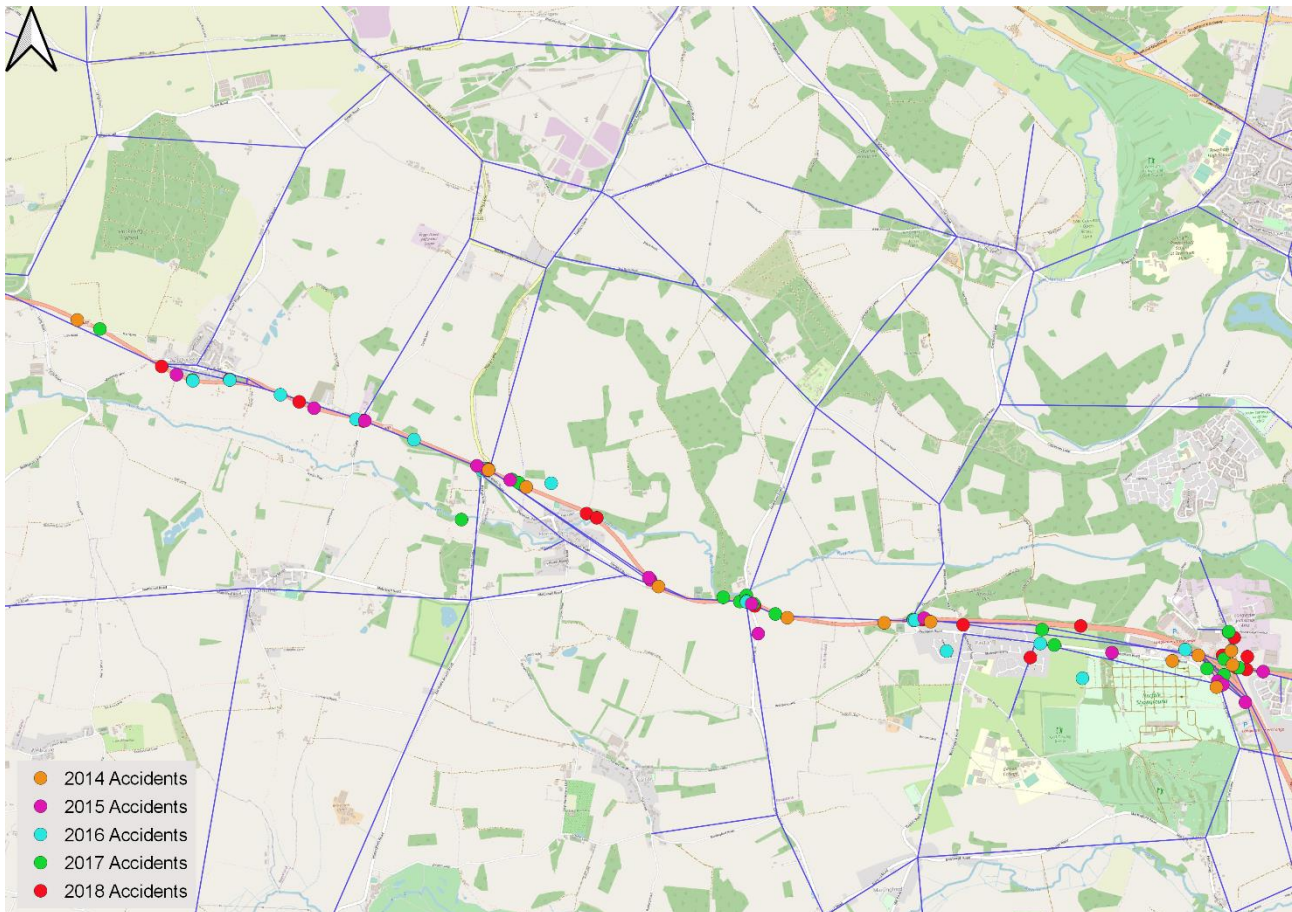


Table 4.22: Locally observed accidents

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | Total |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Fatal | 0 | 0 | 0 | 1 | 1 | 2 |
| Serious | 2 | 3 | 2 | 4 | 3 | 14 |
| Slight | 13 | 16 | 10 | 20 | 18 | 76 |
| Total | 15 | 19 | 12 | 24 | 22 | 92 |

Accidents analysis

4.13.7 The Scheme is designed to generate a reduction in accidents by upgrading the A47 to dual carriageway. The Scheme will also generate road safety benefits from the new two-tier grade separate junctions, which remove the intersections between the A47

mainline and the Berrys Lane, Wood Lane, Blind Lane and Taverham Road side roads. Furthermore, the Scheme removes the A47 mainline intersections with the Norwich Road and Easton roundabouts. Therefore, the removal of these intersections improves road safety by reducing the number of conflicting movements across the A47 corridor.

- 4.13.8 The economic appraisal of the Scheme's accident benefits, derived from the COBA-LT modelling assessment, is outlined in Section 5 of this Case for the Scheme. A summary of the accident savings and economic benefits is presented in Tables 4.23 and 4.24.

Table 4.23: Predicted accident reductions

| Scenario | DM | DS | Savings |
|--------------|--------------|-------------|------------|
| Fatal | 70 | 66 | 4 |
| Serious | 965 | 922 | 44 |
| Slight | 8723 | 8479 | 243 |
| Total | 9757 | 9467 | 291 |
| KSI | 1,035 | 987 | 47 |

Table 4.24: Predicted casualty reductions and benefits

| Accident Results | Without Scheme | With Scheme | Total Savings |
|-------------------|----------------|-------------|---------------|
| Accident cost, £m | £305.93 | £294.45 | £11.48 |

- 4.13.9 The results of the COBA-LT analysis (Table 4.23) indicate in total around 291 accidents, including 44 serious accidents and 4 fatal accidents, are saved by the scheme over the analysis period. Total accident benefits generated by the scheme over the same period amount to about £11.48m of economic benefits.

Summary

- 4.13.10 In summary, the COBA-LT analysis demonstrates that the Scheme improves road safety by reducing the numbers of accidents and consequently the number of casualties. The Scheme improves safety along the A47 by providing upgraded dual carriageway alignment and improved grade separated junctions. In total, over a 60-year timeframe the Scheme's improvements will save a total of 291 accidents and 47 KSIs (killed or seriously injured) (Table 4.23).

4.14 Walking, Cycling and Horse-riding Assessment

Introduction

- 4.14.1 Minimising the impacts of the Scheme on walkers, cyclists and horse-riders (WCH) is an integral part of scheme design and this has been achieved by maintaining connectivity and incorporating both new and improved facilities to enhance existing networks. The proposed WCH strategy aligns with the wider objectives of the Scheme and with local transport policy objectives in respect of the development of an accessible and integrated network which provides safer routes between local communities and promotes the use of active travel modes.

- 4.14.2 In developing the WCH strategy, consultation was undertaken with relevant officers at Norfolk County Council to ensure that accessibility issues local to the Scheme were clearly understood. Account was also taken of the concerns expressed by the Norwich Cycling Campaign on the emerging WCH strategy that was taken to public consultation. The existing WCH facilities to be removed by the Scheme are to be replaced with enhanced facilities that better reflect the accessibility needs of the area.
- 4.14.3 This section of the Case for the Scheme provides an overview of the existing WCH facilities in the vicinity of A47 between North Tuddenham and Easton and accessibility issues in the area. It also provides an overview of the WCH facilities to be provided as part of the Scheme.

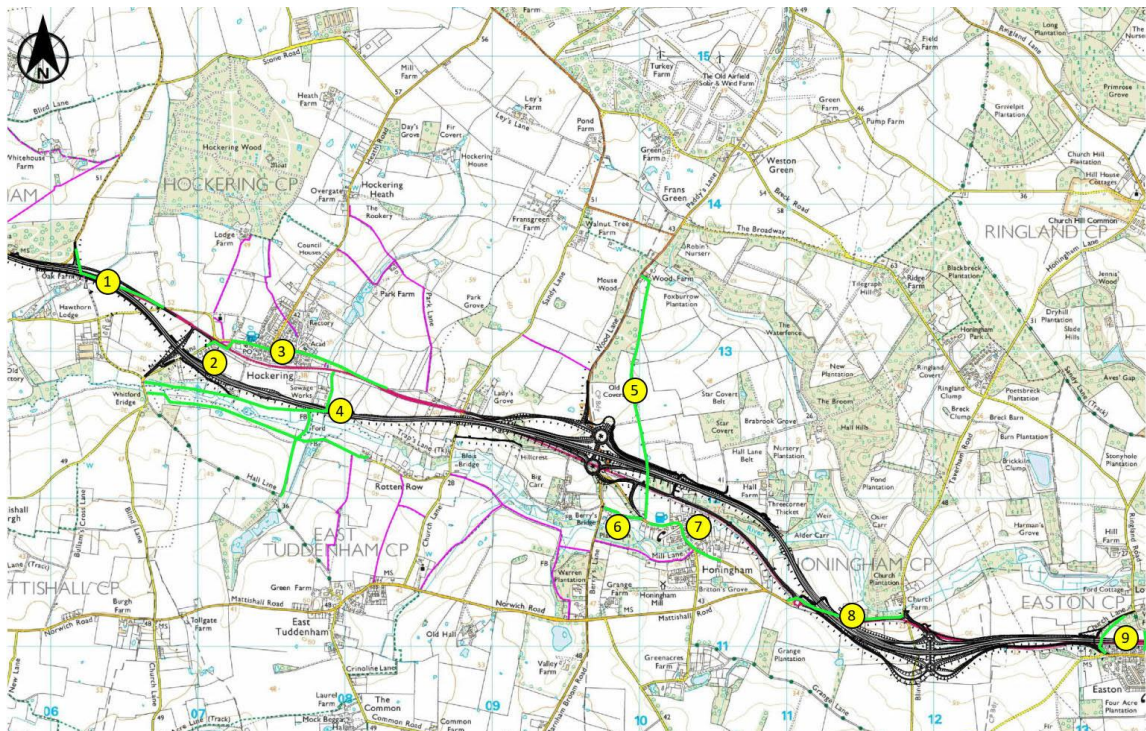
Baseline data

- 4.14.4 A number of WCH routes are present in the vicinity of the Scheme. These routes provide an important means of access to community assets and connectivity to destinations in the local area. These routes are summarised in Table 4.24 and shown in Figure 4.30.

Table 4.24: Existing WCH routes

| Reference | Description |
|-----------|---|
| 1 | Combined footway/cycleway between Main Road/Lyng Road and The Street to the west of Hockering |
| 2 | Footways leading between Mattishall Lane and Hockering and crossing the A47 via a pedestrian island |
| 3 | Footways on both frontages through Hockering village as far as Meadow View, with the footway on the northern frontage extending to Park Lane to the east of Hockering |
| 4 | Hockering FP7 leading from the A47 near Hockering that connects to other PRoW to the south including Hockering FP8 and East Tuddenham FP9 at the River Tud |
| 5 | Restricted Byway Honingham RB1 that runs from Dereham Road west of Honingham to Wood Lane crossing the A47 via an uncontrolled at-grade crossing point |
| 6 | Footpath Honingham FP3 that connects Berrys Lane with Dereham Road |
| 7 | Footways through Honingham |
| 8 | Footway between Norwich Road roundabout, east of Honingham and Taverham Road which passes St Andrew's Church |
| 9 | Footways and at grade crossings of the A47 at the western end of Easton between Dereham Road and Church Lane and between Ringland Lane and Dog Lane |

Figure 4.30: Existing WCH routes



- 4.14.5 Surveys of usage were undertaken at nine locations including WCH routes in the immediate vicinity of the A47 and at a number of junctions with the A47. The surveys were carried out between 7am and 7pm for 14 consecutive days between Monday 13th July and Sunday 26th July 2020 using CCTV video cameras. As such, the surveys provided representative information on weekday and weekend day WCH activity.
- 4.14.6 The surveys confirmed that there are five locations where WCH users predominantly cross the A47. These are between:
- Low Road and The Street
 - Mattishall Lane and Hockering
 - Berrys Lane and Wood Lane
 - Taverham Road and Blind Lane
 - Ringland Lane and Dog Lane.
- 4.14.7 Crossing movements between Low Road and The Street and between Mattishall Lane and Hockering comprised a mix of walkers and cyclists. Crossing movements between Berrys Lane and Wood Lane and between Taverham Road and Blind Lane comprised predominantly cyclist movements. Walkers comprised the predominant movements across the A47 via Ringland Lane, which is known as Dog Lane north of the A47. Overall, a noticeable, albeit modest volume of WCH users were recorded crossing the A47 at these locations.
- 4.14.8 The surveys also recorded low usage of footpath Hockering FP7 at Gypsy Lane and Restricted Byway Honingham RB1, which may be partly due to the severance effect of the A47.
- 4.14.9 The level of usage of the existing facilities was taken into account when identifying the WCH strategy for the Scheme.

- 4.14.10 As indicated, consultation was undertaken with relevant officers from Norfolk County Council, namely the PRow officers and Active Travel officer. The key issues raised as part of these discussions have been investigated as part of the design process and, where deemed practicable, WCH facilities have been incorporated into the Scheme to improve connectivity for WCH users. Engagement with NCC is on-going and the current position on matters including WCH will be reflected in a SoCG.

Impact of the Scheme

- 4.14.11 The Scheme would result in the permanent diversion of four WCH routes and the permanent closure of others.
- 4.14.12 The Scheme would require the permanent diversion of the shared footway/cycleway linking between Main Road/Lyng Road and The Street so that it follows the new side road alignment between these points.
- 4.14.13 The Scheme would provide a realigned Mattishall Lane under the A47. The realigned route would include a combined footway/cycleway that would provide a new WCH route to the PRow footpath Hockering FP8 and footpath East Tuddenham FP9 at the River Tud since footpath Hockering FP7 which links to these PRow at the River Tud to the east would be severed by the Scheme. The severance of Hockering FP7 is required as there is no ability to provide an underpass or overbridge at this point without significant design issues for the Scheme.
- 4.14.14 Hockering FP8 is also affected by the Scheme and would be diverted to run at the base of the embankment of the new A47 alignment to maintain a link with Hockering FP7 to the south of the Scheme that would be retained.
- 4.14.15 The Scheme would provide new WCH facilities between Sandy Lane (east of Hockering) and Easton to provide a continuous link for WCH users between these points. The new facilities to be provided and the facilities to be replaced are summarised below:
- A new cycle track would be provided along the new side road between Sandy Lane (to the east of Hockering) and the proposed Wood Lane roundabout.
 - A new cycle track would be provided between the Wood Lane Roundabout and Honingham that would, in part, form the diversion route for PRow Honingham RB1. This new route would pass around the stub of the future NWL route and beneath the new A47 alignment at the proposed Hall Lane underpass.
 - A new cycle track would be provided on the northern frontage of downgraded A47 at Honingham, between the realigned Dereham Road in the west and the existing roundabout at Norwich Road in the east.
 - A new cycle track would be provided on the new alignment of Dereham Road to provide a connection to the proposed upgraded Honingham FP3, which would become a bridleway.
 - Honingham FP3 would be upgraded to bridleway status and diverted onto an improved track alongside the existing footpath alignment and suitable for cyclists to use. This improvement would allow a link between Berrys Lane and Wood Lane via Dereham Road, the Hall Lane underpass and associated WCH facilities.

- A new cycle track would be provided to the east of Honingham between the Norwich Road Roundabout and St Andrew's Church. This proposed facility would pass beneath the new A47 alignment on a traffic free route and replace the existing provision that would be removed as part of the scheme.
- Improvement of the existing footway between St Andrew's Church and Taverham Road to provide a combined footway/cycleway along the existing A47 alignment to be downgraded.
- A new combined cycle track would be provided to the north of the new A47 alignment between Taverham Road and Ringland Road.
- A new bridge (Easton footbridge) suitable for walkers and cyclists would be provided between Dereham Road and Church Lane at Easton which would replace the existing at-grade crossings of the A47 at the Easton roundabout and at Ringland Lane/Dog Lane that would be removed.

4.14.16 In addition, the Scheme would stop up and abandon PRow Hockering FP12 that currently serves no purpose for WCH users and is no longer required.

Summary

4.14.17 In summary, the Scheme would provide new WCH facilities to mitigate the impacts of the A47 improvements and improve accessibility for users in the local area generally, thereby supporting the promotion of active travel modes. As such, the Scheme would have a positive impact on WCH provision.

4.15 Conclusions

4.15.1 In conclusion, the Scheme fulfils its objectives by providing capacity, relieving congestion, improving journey times and supporting economic growth.

4.15.2 The modelling analysis indicates that the forecast local and regional traffic growth will cause a significant increase in delays along the A47 as well as on the local side road network. The Scheme, however, provides the required capacity improvements to allow for the forecast traffic growth.

4.15.3 In terms of operational traffic impacts on the highway network, the ARCADY modelling assessments show the Scheme is operating successfully with 2040 forecast demand. The junction improvements provided by the Scheme generate benefits with respect to congestion relief as well as road safety. Further information on the Scheme's journey time reliability, environmental and economic impacts can be found in Section 5 of this Case for the Scheme.

4.15.4 In summary, it is considered that the Scheme achieves the following objectives:

- provides additional capacity and improved journey times to encourage housing and economic growth in the local area as well as across the A47 corridor linking Norwich to Peterborough
- provides additional capacity along the A47 and reduces delays on the connected side roads of Wood Lane, Berrys Lane and Taverham as well as the NWL. This encourages growth in the local area from the Easton residential and food enterprise park developments, as well as providing capacity for future regional traffic growth up to 2040

- improves accessibility for local communities by reducing congestion along the A47 corridors. The Scheme also improves connectivity for local traffic movements by integrating the existing A47 alignment into the local road network
- improves safety operational issues by reducing congestion along the A47 and by converting at-grade junctions to grade separated junctions
- ARCADY modelling shows that all four Scheme roundabout junctions are operating well within capacity
- a significant reduction in road traffic congestion in that journey times in the 2040 DS scenario are less than the 2015 base year
- improvements for cyclists, walkers and other vulnerable users as a result of new cycling and walking infrastructure.

5 ECONOMIC CASE OVERVIEW

5.1 Introduction

5.1.1 This Section of the Case for the Scheme outlines the economic assessment of the Scheme. It presents the expected benefits and dis-benefits associated with the Scheme and sets out overall value for money. It estimates the economic worth of the Scheme, by comparing the benefits to users against the costs of procuring the Scheme. It does this by comparing economic costs and benefits of the Scheme against the equivalent costs and benefits without the Scheme.

5.2 Overview of Economic Assessment and Methodology

5.2.1 The economic assessment of the Scheme has been based on a 60-year appraisal period in accordance with DfT guidelines. A Benefit to Cost Ratio (BCR) is calculated from the economic assessment by comparing the Scheme cost to the benefits of the Scheme over this period.

5.2.2 As stated in the DfT's Value for Money Framework, the benefits appraised for the Scheme have been categorised as:

- established monetised impacts
- evolving monetised impacts
- indicative monetised impacts
- non-monetised impacts.

5.2.3 The benefits of the Scheme are calculated from a number of sources, including:

- user benefits during normal operation (savings relating to travel times and VOC) have been assessed using Transport User Benefit Appraisal (TUBA)
- user disbenefits during construction have also been assessed using TUBA
- accident savings have been forecast using Cost and Benefit to Accidents – Light Touch (COBA-LT)

5.2.4 In addition, estimates have been made of the monetised greenhouse gas, air quality and noise impacts and supplementary assessments have been undertaken to quantify benefits due to Journey Time Reliability (JTR) and Wider Economic Impacts (WEIs).

5.2.5 Qualitative and quantitative assessments on the social and distributional impacts resulting from the Scheme has also been carried out in full.

5.2.6 The costs of the Scheme used in the assessment comprise the scheme construction costs provided by the Applicants Commercial team.

5.2.7 Maintenance costs were taken from the July 2019 Cost and Benefit Analysis (COBA) manual default values.

5.2.8 The main economic assumptions are based on the May 2019 Transport Appraisal Guidance (TAG) Databook, which at the time of writing was the latest version.

5.2.9 In line with DfT recommendations and uncertainty of forecasting the future, scenario analysis has been undertaken supplemented with sensitivity tests. The economic appraisal has been undertaken for the core scenario as this is viewed as the 'most likely' future scenario.

- 5.2.10 In assessing the value for money of this scheme, two sensitivity tests have been undertaken to include both high and low growth traffic scenarios in accordance with TAG. The low growth scenario undertaken should allow for uncertainties in the future national trends, such as GDP growth, fuel prices, etc which may result in a reduction of traffic demand. Therefore, under the low growth scenario, which potentially could act as a proxy for uncertainties such as the impact of COVID-19, this scheme still represents medium value for money.
- 5.2.11 Further sensitivity testing will be undertaken, upon the release of the latest Department for Transport, TAG in line with normal process.
- 5.2.12 All benefits and costs were calculated in monetary terms and expressed as present values (PV) in discounted 2010 prices. This enables direct economic comparison with other schemes which may have very different timescales.
- 5.2.13 The results of the economic appraisal for the Scheme are summarised in Table 5-1. The table includes the results of the appraisal of the core scenario.

Table 5-1: Summary of economic assessment results – Core scenario, £ millions

| | | Cost / Benefits | |
|--|----------------------------------|-----------------------------------|---------------|
| Benefits | Consumer Commuting User Benefits | Travel Time | £68.14 |
| | | Vehicle Operating Costs (VOC) | -£7.01 |
| | | Construction Delays | -£4.91 |
| | | Net Consumer User Benefits | £56.22 |
| | Consumer Other User Benefits | Travel Time | £98.10 |
| | | Vehicle Operating Costs (VOC) | -£35.37 |
| | | Construction Delays | -£3.85 |
| | | Net Consumer User Benefits | £58.89 |
| | Consumer Business User Benefits | Travel Time | £80.61 |
| | | Vehicle Operating Costs (VOC) | £7.28 |
| | | Construction Delays | -£4.72 |
| | | Net Business User Benefits | £83.17 |
| | Accidents Benefits | | £11.48 |
| | Indirect Tax Revenues | | £21.62 |
| Noise | | -£1.42 | |
| Air Quality | | £2.45 | |
| Greenhouse Gases (Carbon) | | -£21.61 | |
| Total Level 1 Present Value Benefit (PVB) | | £211.80 | |

| | | Cost / Benefits |
|---|---|-----------------|
| Costs | Operating and Maintenance Costs | £0.58 |
| | Investment Costs (including capital costs of Maintenance) | £122.30 |
| | Total Present Value Cost (PVC) | £122.88 |
| Level 1 NPV | | £87.92 |
| Level 1 Benefit Cost Ratio (BCR) | | 1.7 |
| | | |
| Benefits Level 2 | Journey Time Reliability (JTR) | £6.86 |
| | Wider Economic Impacts (WEIs) | £48.92 |
| | Total Level 2 Present Value Benefit (PVB) | £55.78 |
| Adjusted PVB (Level 1 + Level 2) | | £266.58 |
| Costs | Total Present Value Cost (PVC) | £122.88 |
| Adjusted Net Present Value (NPV) (Level 1 + Level 2) | | £143.70 |
| Adjusted BCR (Level 1 + Level 2) | | 2.2 |

5.3 Monetised Benefits

Economic benefits

- 5.3.1 Overall, the Scheme is forecast to produce user benefits of £211.8 million (PV) over the 60-year appraisal period. These benefits are comprised of travel time savings of £246.9 million and vehicle operating cost disbenefits of -£35.1 million. Due to the Scheme generating reductions in congestion, greater time benefits are experienced but at the expense of higher fuel consumption due to increased vehicle speeds.
- 5.3.2 The Scheme results in an overall reduction of fatal, serious and slight accidents and casualties. The monetary savings in terms of accidents is approximately £11.5 million over the 60-year appraisal period.
- 5.3.3 Construction of the Scheme generates some disbenefits from journey delays. The estimated impact amounts to approximately -£13.5 million, but temporary traffic management solutions presented are expected to keep disruption to a minimum.

Environmental benefits

- 5.3.4 Greenhouse gas disbenefits over the 60-year appraisal period have been calculated to total -£21.6 million.
- 5.3.5 Air quality benefits have also been calculated over the 60-year appraisal period and amount to £2.5 million.
- 5.3.6 The impact on noise as a result of the Scheme is also anticipated to be negative. The PV of noise benefits over 60 years is -£1.42 million.

Additional economic benefits

- 5.3.7 Journey Time Reliability (JTR) impacts were calculated for the Scheme. The Scheme generates JTR benefits of £6.9 million. It should be noted that these benefits are only incorporated in the Adjusted BCR.
- 5.3.8 The monetised value for the total wider economic impacts is about £48.9 million, with the majority of these benefits being derived from the agglomeration assessment. The agglomeration assessment is an element of the wider economic assessment required to be carried out under the DfT's TAG Unit A2.1 – Wider Economic Impacts Appraisal guidance document (dated May 2018). This is part of how the DfT assesses the economic case for transport schemes. The resulting figure is a measure of the economic benefits (externalities) that accrue indirectly as a result of improving transport connections between clustered (agglomerated) settlements.
- 5.3.9 The result of the agglomeration assessment for the Scheme suggests that business users are the main beneficiaries from the enhanced connectivity and congestion reductions brought about by the Scheme and that there will be an overall, long-term positive impact. Similar to JTR these benefits are only incorporated in the Adjusted BCR.

5.4 Non-Monetised Benefits

Social and distributional impacts

- 5.4.1 The Social Impacts (SI)²⁷ of the Scheme have been assessed, either quantitatively or qualitatively, for accidents, physical activity, security, severance, journey quality, option and non-use values, accessibility and personal affordability.
- 5.4.2 Table 5-2 provides a concise summary of the findings and results of the Social Impacts Appraisal undertaken for each indicator.

Table 5-2: Social impacts summary

| Indicator | Assessment | Conclusion |
|-------------------|--|---------------------|
| Accidents | £11.5m in benefits are generated through accident savings. | Moderate beneficial |
| Physical activity | The scheme is an inter-urban road scheme and so is not anticipated to impact active mode provision, nor discourage the use of active modes. Therefore, the impact on physical activity will be negligible. | Neutral |
| Security | Site perimeters, entrances and exits, lighting and landscaping are assessed as having a medium to high importance and moderate beneficial impact. All other indicators are of lesser importance and have a neutral impact. | Moderate beneficial |

²⁷ Social impacts (SIs) cover the human experience of the transport system and its impact on social factors that are not considered as part of economic or environmental impacts.

| Indicator | Assessment | Conclusion |
|---------------------------|---|-------------------|
| Severance | There is a positive impact on a significant proportion of the population, however there is also a large negative impact for those accessing places of worship, education facilities and leisure facilities. This large negative impact outweighs the positive impacts experienced. | Neutral |
| Journey quality | The majority of journey quality impacts are related to public transport and so have been assessed as neutral. Traveller's frustration and traveller's fear of potential accidents have been assessed as moderate beneficial due to their impact on car users. | Slight beneficial |
| Option and non-use values | Public transport is not affected by the scheme, therefore there is no significant impact on option and non-use values. | Neutral |
| Accessibility | The Scheme is not anticipated to impact on the level of accessibility for any particular social group to access the services they require. Changes in the cost or provision of public transport will not result from the scheme. | Neutral |
| Personal affordability | All sectors within the study area generate disbenefits in personal affordability in relation to their population proportion. The most deprived sector (making up 11% of the total population) receives the largest amount of disbenefits across the entire study area, suggesting that the lower income groups here are disproportionately impacted. It should however be noted that it is purely Vehicle Operating Cost (VOC) driving these impacts as opposed to changes to road charges and fares. | Slight adverse |

5.4.3 Distributional impacts consider how the impacts of a Scheme vary across different social groups. Distributional impacts (DI) of the Scheme have been assessed, either quantitatively or qualitatively for their impact on users in terms of:

- **Noise and air quality** – noise and air quality impacts are likely to occur where a Scheme results in changes to traffic flows or speeds or where the physical gap between people and traffic is altered.
- **Accidents** - any change to the road network can affect the number of accidents that occur. Groups that are particularly vulnerable to increases in risk of accidents include children, the elderly, young males and motorcyclists. There is also a strong link between deprivation and road accidents.
- **Security** – there are potential impacts (in personal security terms) from making changes to the transport system and these can raise specific concerns for women, young people, older people, people with disabilities and black and minority ethnic communities.
- **Severance** – consideration is given to how groups such as children, people without access to a car, older people, people with disabilities and parents with

pushchairs are impacted by severance. These groups often experience longer journey times or are often required to use pedestrian routes that are inappropriate and difficult to use.

- **Accessibility** - public transport accessibility for different groups to access employment, services and social networks.
- **Personal affordability** - changes in transport costs could have disproportionate impacts on vulnerable groups due to their reliance on available, accessible and affordable transport options.

5.4.4 Table 5-3 provides a summary of the Distributional Impacts Appraisal undertaken for each indicator.

Table 5-3: Distributional impacts summary

| Indicator | Assessment | Conclusion |
|---------------|---|---------------------|
| User Benefits | The spread of benefits is concentrated to Index of Multiple Deprivation (IMD) deciles 5 and 6 due to the high proportion of the population falling within these IMD deciles, however all other IMD deciles with population present will not be adversely affected by the Scheme. | Moderate beneficial |
| Noise | IMD decile 3 experiences a greater number of net winners when considering both long term and short-term receptors. Whereas IMD decile 4 experiences a greater number of net losers when considering both long term and short-term receptors. Noise changes at schools, care homes and day centres are expected to deteriorate with a greater number of receptors experiencing worsening noise levels. | Moderate adverse |
| Air Quality | The majority of receptors are predicted to have worsening air quality as a result of the scheme. Receptors in the more deprived income deciles 1 and 2 have a smaller number of receptors but are expected to be adversely impacted. The impact of air quality changes on schools is anticipated to be negligible. | Moderate adverse |
| Accidents | All vulnerable groups and users considered see no significant change in the expected number of accidents. All vulnerable groups do experience changes in accidents/casualties, but this is still only a small proportion of the total that have been assessed. | Neutral |
| Security | All vulnerable groups and users will experience benefits as a result of improved site perimeters, entrances, exits, lighting and landscaping. The spread of benefits is good, meaning that no particular group or users is adversely affected. | Slight beneficial |

| Indicator | Assessment | Conclusion |
|---------------|---|---------------------|
| Severance | There are a significant number of amenities in the areas surrounding the Scheme. Considering the social group concentrations within the study area there is a large proportion of older people. Due to the increased capacity of the A47 mainline and the reduced traffic levels on the local road network, the elderly are able to access key amenities such as hospitals, GP surgeries and places of worship easier and safer with reduced walking times. The rest of the vulnerable groups within the study area are also expected to benefit from the Scheme in the same way but not of the same magnitude. | Moderate beneficial |
| Accessibility | No assessment undertaken. The Scheme itself is not expected to have any significant impacts on public transport accessibility so this was scoped out of the assessment. | n/a |
| Affordability | All sectors within the study area generate disbenefits in personal affordability in relation to their population proportion. The most deprived sector (making up 11% of the total population) receives the largest amount of disbenefits across the entire study area, suggesting that the lower income groups here are disproportionately impacted. It should however be noted that it is purely VOC driving these impacts as opposed to changes to road charges and fares. | Slight adverse |

5.5 Value for Money

- 5.5.1 As can be seen in Table 5.3 the level 1 benefits for the Scheme generate a Present Value Benefit (PVB) of £211.8 million.
- 5.5.2 The total Scheme costs are £122.9 million (PV) with an assumption that none of the costs will be funded from developer contributions. The construction cost figure was correct at the time of compiling this report and may be refined as the detailed design progresses. Any significant changes in cost may require the BCR calculations to be reviewed.
- 5.5.3 With consideration of the effects of delays during construction, accident benefits, indirect taxation benefits, monetised environmental impacts and maintenance costs, **the initial BCR is 1.7 which represents 'medium' Value for Money (VfM).**
- 5.5.4 The Scheme is also forecast to generate wider economic impacts and journey time reliability benefits. The value for the total wider economic impacts is about £48.9 million, whilst for journey time reliability it is £6.9 million.
- 5.5.5 Inclusion of journey time reliability benefits and wider economic impacts gives **an adjusted BCR of 2.2. This also represents 'high' VfM.**

6 CONFORMITY WITH PLANNING POLICY AND TRANSPORT PLANS

6.1 National Planning and Government's Transport Policy

6.1.1 This Section of the Case for the Scheme provides an overview of the Scheme's compliance with national planning policy and infrastructure delivery strategies and plans.

6.1.2 As set out by the Planning Act 2008 (PA), the primary policy consideration for a NSIP highway scheme is the National Policy Statement for National Networks 2015 (NPS NN). Section 104 of the PA 2008 requires the SoS to determine an application for an NSIP in accordance with a relevant National Policy Statement (NPS) except in a limited number of specified circumstances.

6.1.3 In addition to the NPS NN, there are other key policy documents that may also be important and relevant matters to which the SoS will have regard. These are set out in this section of the Case for the Scheme, as they demonstrate the Government's continued commitment to invest in the SRN and include:

- National Planning Policy Framework 2019
- Road Investment Strategy 2015 to 2020 (RIS1) and 2020 to 2025 (RIS2)
- The Strategic Road Network and the Delivery of Sustainable Development (DfT Circular 02/2013).

6.1.4 This section of the Case for the Scheme also provides an overview of the Scheme's compliance with relevant sub-regional and local planning policies.

6.2 National Policy

National Policy Statement for National Networks (January 2015)

6.2.1 National Policy Statements are produced by the relevant government body and provide policy on specific aspects of national infrastructure. They clarify how the infrastructure:

- contributes to sustainable development
- takes account of the mitigation of, and adaptation to, climate change
- demonstrates how objectives have been integrated with other government policies
- details how actual and projected capacity and demand have been taken into account
- considers relevant issues in relation to safety or technology
- looks at circumstances where it would be particularly important to address the adverse impacts of development.

6.2.2 On 14 January 2015, the government designated the NPS NN. This statement sets out the Government's vision and policy specifically regarding the strategic road and rail network.

6.2.3 As the Scheme meets the criteria for a NSIP and will be subject to the DCO process

the application will be judged primarily against the NPS NN, according to the decision-making framework set out in the PA 2008.

6.2.4 The NPS NN sets out the need for NSIPs on the national road and rail networks in England, and the Government's policy to deliver these projects.

6.2.5 Paragraph 1.2 of the NPS NN states that:

“The Secretary of State will use this NPS as the primary basis for making decisions on development consent applications for national networks nationally significant infrastructure projects in England. Under Section 104 of the Planning Act the Secretary of State must decide an application for a national networks nationally significant infrastructure project in accordance with this NPS unless he/she is satisfied that to do so would:

- Lead to the UK being in breach of its international obligations;
- Be unlawful;
- Lead to the Secretary of State being in breach of any duty imposed by or under any legislation;
- Result in adverse impacts of the development outweighing its *benefits*; or
- Be contrary to legislation about how the decisions are to be taken”.

6.2.6 The NPS NN is not scheme specific and does not set out a programme of road schemes, but instead deals with road and rail networks and strategic rail freight interchanges. It also sets out the principles by which applications for road and rail schemes should be assessed.

6.2.7 Section 2 of the NPS NN sets out the need for development of the national networks, the Government's policy and strategic vision and objectives.

6.2.8 Paragraph 2.2 of the NPS NN states that: “There is a critical need to improve the national networks to address road congestion and crowding on railways to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth”.

6.2.9 Paragraph 2.10 states the Government has concluded that, at a strategic level there is a compelling need for development of the national networks. It further states that the Examining Authority and the SoS should start their assessment of applications for infrastructure covered by the NPS NN on that basis.

6.2.10 There is an assumption within the NPS NN that significant improvements to the road network will be necessary in order to support the Government's vision for the national networks. Paragraph 2.21 sets out a range of alternatives to major improvements to the network including Maintenance and Asset Management, Demand Management and Modal Shift. However, it is concluded that at a strategic level there is a compelling need for development of the national road network.

6.2.11 Paragraph 2.22 states that without improving the road network, including its performance, it will be difficult to support further economic development and this will impede economic growth and reduce people's quality of life. The Government has therefore concluded that, at a strategic level, there is a compelling need for development of the national road network.

- 6.2.12 The Scheme comprises an essential part of a wider package of proposals for the A47 corridor to transform connectivity to and from the East of England, as described in the Roads Investment Strategy, the Transport Investment Strategy, the National Infrastructure Delivery Plan, and the Highways England Delivery Plan. The Scheme therefore helps to address the compelling and strategic need for development, identified in the NPS NN.
- 6.2.13 Compliance of the Scheme's objectives with the vision and strategic objectives, contained within Section 2 (page 9) of the NPS NN, is set out in Section 3 of this Case for the Scheme (Table 3.1).
- 6.2.14 Paragraph 3.1 of the NPS NN states that the need for development of the national networks, and the Government's policy for addressing that need, must be seen in the context of the Government's wider policies on economic performance, environment, safety, technology, sustainable transport and accessibility, as well as journey reliability and the experience of road users.
- 6.2.15 The Scheme directly addresses the Government's wider strategic policy objectives, whilst specifically addressing the historic problems in connectivity to the east. A description of these issues and the need for the Scheme is provided in Section 3 of this Case for the Scheme. The Scheme fulfils this long-established need, and delivers benefits in terms of resolving local transport, economic, environmental and heritage concerns and the Government's recognised national commitment to improving the SRN.
- 6.2.16 The NPS NN states that the assessment of the Scheme should consider the balance of potential benefits and adverse impacts (paragraph 4.3). Benefits to be considered include the facilitation of economic development, job creation, housing and environmental improvement, and any longer-term or wider benefits. Assessment of adverse impacts should include longer-term and cumulative adverse impacts, as well as planned mitigation of these impacts.
- 6.2.17 The NPS NN requires environmental, safety, economic and social impacts should be considered at a national, regional and local level. The information provided will be proportionate to the development (paragraph 4.4). The Scheme has been subject to a transport assessment (see Section 4 of this Case for the Scheme), economic assessment (see Section 5 of this Case for the Scheme) and an ES (**TR010038/APP/6.1**).
- 6.2.18 The Scheme has been subject to a rigorous options appraisal process. A summary of the options considered and the appraisal process has been provided in Section 2 of this Case for the Scheme. Further detail is provided in the Scheme Assessment Report²⁸.
- 6.2.19 Section 5 of NPS NN gives guidance for decision making relating to impacts on environment, habitat, landscape, accessibility and existing infrastructure. The assessment of effects on environment, habitat, landscape, accessibility and existing infrastructure is provided in the ES (**TR010038/APP/6.1 to 6.4**). The ES provides the detail to demonstrate compliance with many of the requirements of the NPS NN, as illustrated in Table 6.1.

²⁸ https://highwaysengland.citizenspace.com/he/a47-north-tuddenham-to-easton-february/supporting_documents/A47%20North%20Tuddenham%20to%20Easton%20Scheme%20Assessment%20Report%20SAR.pdf

Table 6.2: Summary of significant environmental effects

| ES Chapter | NPS NN paragraphs |
|---|---|
| ES Chapter 5 Air Quality | <ul style="list-style-type: none"> • 5.6 to 5.15 • 5.82 to 5.89 |
| ES Chapter 6 Cultural Heritage | <ul style="list-style-type: none"> • 5.124 to 5.138 |
| ES Chapter 7 Landscape and Visual | <ul style="list-style-type: none"> • 5.144 to 5.184 5.82 to 5.89 |
| ES Chapter 8 Biodiversity | <ul style="list-style-type: none"> • 5.20 to 5.38 |
| ES Chapter 9 Geology and Soils | <ul style="list-style-type: none"> • 5.117 to 5.118 |
| ES Chapter 10 Material Assets and Waste | <ul style="list-style-type: none"> • 5.42 to 5.44 |
| ES Chapter 11 Noise and Vibration | <ul style="list-style-type: none"> • 5.186 to 5.200 |
| ES Chapter 12 Population and Human Health | <ul style="list-style-type: none"> • 4.81 to 4.82 5.82 to 5.89 |
| ES Chapter 13 Road Drainage and the Water Environment | <ul style="list-style-type: none"> • 5.90 to 5.115 • 5.203 to 5.205 • 5.220 to 5.231 • 5.165 to 5.184 |
| ES Chapter 14 Climate | <ul style="list-style-type: none"> • 5.17 to 5.19 |
| ES Chapter 15 Cumulative Effects | <ul style="list-style-type: none"> • 4.15 to 4.17 |

- 6.2.20 Table 6.2 below summarises the significant environmental effects during construction and operation as presented in Chapters 5 to 15 of the ES (**TR010038/APP/6.1**). The NPS NN Accordance Tables (**TR010038/APP/7.2**) provide a summary of these effects and the wide-ranging benefits to demonstrate compliance with the requirements of the NPS NN. Several NPS NN paragraphs recommend the Secretary of State does not grant development without reasonable justification. Those associated with significant residual effects in Table 6.2 are considered in Section 7 of this Case for the Scheme.
- 6.2.21 The NPS NN Accordance Tables (**TR010038/APP/7.2**) provide a more detailed summary of these effects and the wide-ranging benefits of the Scheme. In each case, it can be concluded that the selection of the Scheme from an assessment of reasonable alternatives together with the proposed mitigation will avoid, reduce or minimise potential adverse impacts.

Table 6.2: Summary of significant environmental effects

| Topic | Assessment of Significant Environmental Effects | |
|-------------------------------------|---|--|
| | Construction | Operation |
| Air Quality (ES Chapter 5) | <p>Construction activities are programmed to last less than two years and potential impacts will be mitigated and managed through good practice during construction. It is unlikely there will be a significant effect from construction activity or traffic on air quality or on the UK's ability to comply with the Air Quality Directive and these were therefore screened out of the detailed assessment.</p> | <p>During operation the Scheme is expected to cause both adverse and beneficial effects on emission concentrations at sensitive human and ecological receptors.</p> <p>The assessment concluded that these effects will not be significant.</p> <p>Furthermore, the operation of the Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality.</p> <p>With no significant effects predicted, no mitigation is required.</p> |
| Cultural Heritage (ES Chapter 6) | <p>A programme of archaeological recording and publishing is proposed prior to construction to mitigate any potential unavoidable impact on archaeological remains. Mitigation will be delivered through the Environment Management Plan which requires preparation and implementation of a heritage mitigation strategy called a Detailed Heritage Written Scheme of Investigation (DHWSI) agreed with and monitored by the relevant SEBs. The EMP commitments will be secured by a requirement in the DCO (TR010038/APP/3.1). Significant (moderate) beneficial effects during construction have been identified as a result of protection and conservation actions on two milestones</p> | <p>Permanent residual adverse effects, from construction and operation, on the setting of Listed Buildings:</p> <ul style="list-style-type: none"> • St Peter's Church (Grade I) - Moderate • St Andrew's Church (Grade II*) - Large • Church Farm House (Grade II) - Slight • Berry Hall (Grade II) - Slight <p>Slight adverse impact on Honingham Park non-designated historic park and garden. No significant effects on the historic landscape.</p> <p>Slight beneficial effects during operation on Listed Buildings due to moving the carriageway of the A47 further away:</p> <ul style="list-style-type: none"> • St Michaels Church, Grade I • Manor Farmhouse, Grade II • Manor House, Grade II • Yew Tree Farmhouse, Grade II |

| Topic | Assessment of Significant Environmental Effects | |
|--|--|---|
| | Construction | Operation |
| | (MNF62796 and MNF62797). | |
| Landscape and Visual (ES Chapter 7) | <p><u>Landscape</u> Adverse effects on landscape features would be not significant while there would be significant adverse effects on landscape character associated with removal of, and change to, existing vegetation and land use.</p> <p><u>Visual</u> Some receptors would be subject to significant adverse visual effects associated with views of construction activities. However, in the context of the 9km Scheme, a relatively limited number of residential receptors would experience significant visual effects. The largest construction effects on viewpoints are associated with locations in closest proximity to the construction activities, particularly residential receptors and users of footpaths.</p> | <p><u>Landscape</u> There are no landscape designations (statutory or local) associated within the Scheme study area or affected by the Scheme.</p> <p>Landscape features would not be significantly affected, but at year 1 there would be a significant adverse effect on landscape character, in particular around the river corridors, from the residual loss of vegetation and prominence of Scheme infrastructure. By year 15 of operation, with the establishment of the Scheme landscape planting would reduce the landscape character impacts to not significant.</p> <p><u>Visual</u> At year 1 there would be significant adverse effect on some visual receptors, broadly similar to those identified during construction and prior to the establishment of proposed mitigation. By year 15 of operation the establishment of Scheme planting would contribute to screening and landscape integration resulting. Most visual effects for receptors would reduce to not significant at year 15, but four properties would retain a moderate adverse (significant) effect.</p> <p>Overall, when combining both landscape and visual effects in accordance with DMRB LA 107, this assessment concludes the Scheme would not result in a significant residual effect on landscape and visual amenity.</p> |
| Biodiversity (ES Chapter 8) | Mitigation measures will avoid or reduce adverse construction effects through measures such as: replacing lost habitat; timing of construction works | No significant residual effect, either directly or indirectly, on designated sites or protected species including protected species water vole, great crested newt and badger. |

| Topic | Assessment of Significant Environmental Effects | |
|-------|--|---|
| | Construction | Operation |
| | <p>to avoid the most sensitive times of year; and landscape planting and pollution control measures to prevent damage and degradation to habitats. The EMP (TR010038/APP/7.4) details the good practice environmental measures that would be implemented to protect biodiversity during construction, why they are required, who is responsible for delivering them and details any ongoing maintenance and monitoring arrangements. The EMP is secured through Requirement 4 to the draft DCO (TR010038/APP/3.1). Protected species licences and mitigation (incl. increased habitat) will be agreed with Natural England to manage loss of bat roosts, water vole, great crested newt and badger to achieve a neutral residual effect.</p> | <p>Priority habitats of intact hedgerows, deciduous woodland and coastal and floodplain grazing marsh will have direct impacts. Indirect impacts will occur on lowland fens, traditional orchards, coastal and floodplain grazing marsh, ponds, rivers, deciduous woodland and hedgerows. Following mitigation there will be a moderate adverse residual effect on hedgerows, deciduous woodland, and grazing marsh as a result of the long maturity period for planting; though grasslands and ponds will have a slight beneficial effect.</p> <p>There will be a slight adverse residual effect on breeding birds, barn owls and wintering birds due to the time lag between loss of habitat and the remediated habitats reaching maturity. However, the residual effect on barn owl would be moderate adverse until landowners have been identified and agreements are in place to install suitable nest boxes; thereafter the residual effect will decrease to slight adverse. Bats have a significant large adverse residual effect overall, due to the time lag between loss of habitat and the remediated habitats reaching maturity which could lead to loss of foraging and commuting habitat and traffic mortality and also due to the presence of rare bats leading to a national level of importance in the area. Landscape planting is proposed to mitigate the loss of foraging habitats, shield habitat and roosts from disturbance and act as 'stepping stones' between suitable roosting and foraging habitat. Hop-overs and targeted planting at underpasses and overpasses have been designed to encourage use by bats to maintain connectivity and raise flight height above the carriageway. Measures to manage loss and disturbance of bat habitats plus create</p> |

| Topic | Assessment of Significant Environmental Effects | |
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| | Construction | Operation |
| | | <p>new crossing points will be monitored and managed through the EMP (TR0100038/APP/7.4).</p> <p>A neutral residual effect is anticipated for all other biodiversity resources.</p> |
| <p>Geology and Soils (ES Chapter 9)</p> | <p>The Scheme will result in the permanent and temporary loss of approximately 18.9 hectares (ha) of Grade 2 (very good quality), 32.2 ha of Grade 3a (good quality) and 6.2 ha of 3b (moderate quality) agricultural land, plus <1ha of Grade 4 (poor quality). Areas of Grade 2 and Grade 3a agricultural land are considered to be best and most versatile (BMV) agricultural land (i.e. land that can best deliver future crops for food and non-food uses).</p> <p>A Soil Management Plan, as part of the environmental management plan (TR010038/APP/7.4), will be developed to help preserve land quality on the temporary land take areas and to make effective reuse of the soils taken from the areas of permanent land take.</p> <p>Therefore, the long-term residual effects on agricultural soils would be limited to the area of agricultural land permanently lost.</p> <p>With only minor evidence of contamination from historical activities, no special remedial activities are recommended. There is low risk of construction activities mobilising contaminants within the underlying soils or introducing contaminants which may potentially harm human health or environmental receptors, such as the River Tud.</p> <p>Mitigation measures in the Environmental Management Plan (EMP) (TR010037/APP/7.4) would be secured through Requirement 4 of the draft DCO (TR010037/APP/3.1).</p> | |
| <p>Material Assets & Waste (ES Chapter 10)</p> | <p>Design, mitigation and enhancement measures will be implemented during construction and controlled through the Environmental Management Plan (TR010037/APP/7.4), secured through Requirement 4 of the draft DCO (TR010037/APP/3.1).</p> <p>Overall, the recycled content of the materials would be over the 31% regional target and over 70% of the waste generated will be re-used or recycled. The Scheme would not cause a 1%</p> | <p>Significant environmental effects from the use of material assets and generation of waste during operational activities are not predicted due to limited material use and waste generation from infrequent maintenance activities.</p> <p>The ES Appendix 10.4 Mineral Impact Assessment (TR010037/APP/6.2), concludes it is not anticipated that any mineral safeguarding sites will be sterilised.</p> |

| Topic | Assessment of Significant Environmental Effects | |
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| | Construction | Operation |
| | reduction or alteration in the region's landfill capacity. The residual effects will be not significant. | |
| Noise and Vibration (ES Chapter 11) | <p>During construction, noise assessment concluded that, with the application of best practice construction methods and temporary noise barriers, potential significant effects are unlikely at the vast majority of receptors. A significant temporary noise effect is predicted as potentially occurring as a result of the drainage basin works adjacent to Acorn Barn, depending on the duration of the actual works.</p> <p>With the application of best practice construction methods and vibration monitoring, the Scheme is unlikely to give rise to any potential significant construction vibration effects. A construction traffic assessment concluded that potential significant effects are unlikely.</p> <p>The mitigation measures are set out in the EMP (TR010038/APP/7.4) and secured by Requirement 4 to the Draft DCO (TR010040/APP/3.1).</p> | <p>Embedded noise mitigation measures included in the Scheme design comprise of a low noise surface along the proposed A47 dual carriageway, plus four noise barriers/fences.</p> <p>At the operational stage there will be a number of significant residual traffic noise effects, both adverse and beneficial, amongst the 1,877 noise sensitive receptors considered.</p> <p>Significant beneficial noise effects are predicted at:</p> <ul style="list-style-type: none"> • Noise Important Area 5200 • Three receptors in Hockering (outside of NIA 5200) • Two receptors on Ringland Road • Two receptors on The Broadway • Three PRowS: Hockering FP3, FP10 and FP11, <p>Significant adverse noise effects are predicted at:</p> <ul style="list-style-type: none"> • Eighty-three receptors in Lyng or on Lyng Road (north of the A47) • Two receptors on Church Lane, East Tuddenham • Six receptors on Mattishall Lane • Hall Farm and Hall Farm Cottages • Church of Saint Andrew, Honingham • Hockering Nursery and Newgate, Gypsy Lane, Hockering • Seven PRowS: Hockering FP8, FP7, East Tuddenham FP9, Honingham RB1, Lyng RB1, RB12 and FP17 |

| Topic | Assessment of Significant Environmental Effects | |
|---|---|---|
| | Construction | Operation |
| | | Noise mitigation measures embedded in the Scheme design comprise low noise surface along the A47 dual carriageway and noise barriers/fences. No significant effects are expected at the remaining Noise Important Areas (5201, 5202 and 6287), but the Scheme is predicted to provide an enhancement at Noise Important Area 5202. |
| Population and Human Health (ES Chapter 12) | <p>Overall, impacts on population and human health will be mainly non-significant once the Scheme is operational. Significant impacts on land use and accessibility include: temporary and permanent land-take from agricultural land holdings; temporary disruption as a result of road closures and traffic management during the construction phase; temporary and permanent diversions to Public Rights of Way; land take from a small part of a consecrated field adjacent to St Peter's Church; and permanent changes in community severance and in access to private and business properties.</p> <p>Beneficial effects would be experienced by walkers and cyclists travelling along the new footways and cycleways, lower traffic levels and slower speeds on the existing A47 and the provision of safe crossing points.</p> <p>There will be some adverse amenity effects for human health, specifically in terms of noise and dust during construction and noise during operation which would be mitigated through measures in the EMP (TR010038/APP/7.4). With regards proposed development land within the Food Enterprise Zone, this is discussed in the Scheme Design Report (TR010038/APP/7.3).</p> | |
| Population and Human Health (ES Chapter 12) | <p>During construction, access along the local road network for local residents and businesses will be disrupted whilst traffic management measures are in place. This may result in longer journey times and a degree of temporary severance between communities, businesses and their facilities.</p> <p>Agricultural holdings within the red line boundary would experience some degree of disruption to farming operations. Construction activities are predicted to</p> | <p>The Scheme is expected to reduce congestion and improve journey times, compared with the existing A47. During operation, there are likely to be changes in severance for private property and housing, community land, community assets, development land and businesses in the communities of Great Witchingham, Upper Wensum, Mattishall and Easton. Access to some private properties and businesses may change as a result of the Scheme. A change to access for properties along Church Lane, Rotten Row, Hillcrest and Riverside Farm Holidays apartment rental would result in a Moderate</p> |

| Topic | Assessment of Significant Environmental Effects | |
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| | Construction | Operation |
| | <p>result in some adverse amenity effects for human health, specifically in terms of noise, dust and visual intrusion.</p> <p>The contractor will be required to put in place mitigation measures to minimise these effects. The measures would be delivered through the EMP (TR010038/APP/7.4), secured through the draft DCO (TR010038/APP/3.1).</p> | <p>adverse effect from increased journey lengths.</p> <p>Three agricultural holdings may incur permanent significant adverse effects upon the viability of the holdings. This is due to permanent land take of high quality, arable land. The Applicant is liaising with these landowners regarding compensation for any loss.</p> <p>Permanent land take from a small area of consecrated land owned by St Peter's Church in Easton would result in a Moderate adverse significant effect, due to the permanent loss of land with limited alternative facilities within the area. Users of three footpaths (Hockering FP7, Honingham RB1 and Ringland Lane / Dog Lane crossing) are anticipated to experience significant residual adverse effects as a result of path closures and associated diversions to alternative connection requiring journey length increases. However, beneficial effects would be experienced by walkers and cyclists travelling along the new footways and cycle tracks, with lower traffic levels and slower speeds on the existing A47 and the provision of safe crossing points to the new A47. A new cycle track will be provided along a section of the Scheme and safe crossings are being provided to the east of Honingham roundabout and in the location of the existing Easton roundabout. This would improve connectivity between Hockering and Easton for walkers and cyclists. A new crossing of the Scheme would be facilitated by the Mattishall Lane underbridge.</p> <p>With regards proposed development land, the Scheme does not directly affect land designated for the Food Enterprise Zone. This interaction is discussed in the Scheme Design Report (TR010038/APP/7.3).</p> |

| Topic | Assessment of Significant Environmental Effects | |
|---|---|---|
| | Construction | Operation |
| Road Drainage and the Water Environment (ES Chapter 13) | <p>No significant adverse effects are predicted during construction subject to the mitigation measures included in the Environmental Management Plan (TR010040/APP/7.7), secured by Requirement 4 to the Draft DCO (TR01004/APP/3.1) and the Scheme design.</p> | <p>The Scheme would discharge to the River Tud and its tributaries. There would be no significant adverse residual impacts on the water environment through measures embedded in the design and the implementation of mitigation measures in the EMP (TR010038/APP/7.4). Runoff shall be attenuated to a 1 in 100 year event (including an allowance for climate change) using oversized pipes and vegetated detention basins. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance.</p> <p>Fluvial flood risk impacts associated with the River Tud Crossing are minimised by design including the provision of flood compensatory storage due to the loss of floodplain storage as a result of the bridge abutments. There are no adverse flood risk impacts associated with the Newgate House Culvert (Hockering tributary). Both the River Tud Crossing and Newgate House Culvert are designed for a 1 in 100-year plus 65% climate change allowance peak flood level with at least 600mm freeboard. At the Oak Farm tributary, the throttling of flood flows by the existing A47 culvert is maintained by the West Culvert Extension and the New West Culvert with no risk to flood-sensitive receptors.</p> <p>The Scheme will not affect the ability of the River Tud, River Wensum and River Yare to remain compliant with the</p> |

| Topic | Assessment of Significant Environmental Effects | |
|------------------------------------|---|--|
| | Construction | Operation |
| | | requirements of the Water Framework Directive (WFD) nor prevent future attainment of WFD water body targets. |
| Climate (ES Chapter 14) | <p>The assessment considered the Scheme's effect on climate (i.e. increases in carbon emissions) as well as the potential vulnerability of the Scheme to climate change (i.e. the resilience of Scheme assets to projected changes in climate).</p> <p>In accordance with DMRB LA 114, carbon emissions associated with the Scheme have been provided in the context of published UK carbon budgets. These budgets currently extend until 2032 and can be compared with 26% of the emissions increase associated with the Scheme. The remaining 74% of the increase in carbon emissions will occur after 2032 (the end of the last currently published UK carbon budget). Efforts to minimise carbon emissions throughout the design and construction of the Scheme at this stage are outlined in accordance with the requirements set out in DMRB LA 114. Recommendations to further reduce carbon emissions through design considerations and recalculation of carbon emissions at later stages of the design process have also been made.</p> <p>The vulnerability of Scheme assets to projected changes in climate during operation has been assessed, and the Scheme has been deemed resilient to the current projections.</p> | |
| Cumulative Effects (ES Chapter 15) | <p>As a result of the residual effects of the Scheme, as a single project there is potential for significant cumulative effects for some receptors at Low Road, Mattishall Lane, Hill View, Sandy Lane, Church Lane and Rotten Row. There is also potential for significant cumulative effects to occur at St Andrew's Church, Oak Farm and Hall Farm.</p> <p>Best standard practice construction approaches in combination with community liaison will help to mitigate the cumulative impact of the effects. A planting design to mitigate visual impacts by screening the property views is presented in the Environmental Masterplan (TR010038/APP/6.8).</p> <p>The assessment of noise and vibration of the Scheme combined with the Norwich Western Link has identified additional (beneficial and adverse) significant effects.</p> <p>The residual effects during the construction and operational phases of the Scheme with all of the other developments are not anticipated to contribute beyond that of the effects identified in the preceding environmental chapters.</p> | |

National Planning Policy Framework 2019

6.2.22 The National Planning Policy Framework (NPPF) sets out the government's national planning policies for England and how it expects these to be applied strategically in the development plan system and in the management of development. The revised

NPPF, published February 2019, replaces the second Framework published in July 2018.

- 6.2.23 The NPPF is explicit about the role of NPS being the primary decision-making document for NSIP under the PA 2008. Paragraph 5 of the NPPF states: *“The Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework).”*
- 6.2.24 Paragraph 1.17 of the NPS NN states that the overall strategic aims of the NPS NN and NPPF are consistent. Paragraph 1.18 goes on to say that the NPPF will be an important and relevant consideration *“but only to the extent relevant to [the] project”*. Therefore, it is necessary to consider the extent of any such relevance and compliance with the policies that it contains.
- 6.2.25 The NPPF confirms that the purpose of the planning system is to contribute to the achievement of sustainable development (paragraph 7), and that a presumption in favour of sustainable development lies at the heart of the NPPF (paragraph 10).
- 6.2.26 Paragraph 8 of the NPPF confirms that sustainable development is to be achieved by three overarching objectives: economic, social and environmental. These objectives are interdependent and need to be pursued in mutually supportive ways.
- 6.2.27 With regards to promoting sustainable transport, Chapter 9 of the NPPF states that transport issues should be considered from the earliest stages of plan-making and development proposals, so that opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised and the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account. This should include appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains (paragraph 102).
- 6.2.28 Paragraph 104 states that planning policies should: *“Be prepared with the active involvement of local highways authorities, other transport infrastructure providers and operators and neighbouring councils, so that strategies and investments for supporting sustainable transport and development patterns are aligned; and identify and protect, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice and realise opportunities for large scale development;’ they should also provide for any large scale transport facilities that need to be located in the area, and the infrastructure and wider development required to support their operation, expansion and contribution to the wider economy. In doing so they should take into account whether such development is likely to be a nationally significant infrastructure project and any relevant national policy statements.”*
- 6.2.29 Paragraph 148 states that the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

- 6.2.30 Paragraph 150 states that new development should be planned for in ways that:
“avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards.”
- 6.2.31 With regards to the need to adapt to climate change, the environmental effects of the Scheme have been robustly assessed. One of its objectives is to protect the environment by minimising adverse impacts and, where possible, improve the environmental effects of transport on those living along the route of the new and existing road. This will be achieved through design, reducing any impacts on the natural and built environment. ES Chapter 14 Climate (**TR010038/APP/6.1**) considers the Scheme’s effect on climate (i.e. increases in carbon emissions) as well as the vulnerability of the Scheme assets to projected changes in climate during operation. The latest UK Climate Projections have been used and the Scheme has been deemed resilient. Therefore, no significant effects as a result of climate change are anticipated.
- 6.2.32 The Scheme would improve the quality of the SRN in the east by improving connectivity, reliability, safety and resilience on the A47 between North Tuddenham and Easton. The Scheme supports the NPPF economic objective and strategic policy in making adequate provision for transport infrastructure and supporting future economic growth. The Scheme therefore accords with the key aims of the NPPF by providing improved infrastructure to support economic growth.

Road Investment Strategy RIS1 and RIS2

- 6.2.33 The DfT’s RISs define a national programme of improvements to the SRN.
- 6.2.34 **The Road Investment Strategy 2015 to 2020 (RIS1)** introduces long-term strategic planning and funding for the SRN, underpinned by a significant increase in investment in the SRN. It is the ambition of Highways England to substantially modernise the SRN within 25 years. This vision for improvement of the SRN is outlined in more detail through the Performance Specification and Key Performance Indicators (KPI’s) related to: the environment; cyclists, walkers and other vulnerable users; efficiency; network condition; road safety; user satisfaction; traffic flow; and economic growth.
- 6.2.35 The RIS1 stated that 127 major schemes would be undertaken over the course of the first Road Period (2015 to 2020), in order to deliver benefits quickly. The A47 North Tuddenham to Easton was listed as a Committed Scheme in the Strategy, detailed as *“dualling of the single carriageway section of the A47 between Norwich and Dereham, linking together two existing sections of dual carriageway.”*
- 6.2.36 In the longer term up to 2040, Highways England look to achieve an upgraded network which makes use of the latest technology in line with KPIs and in order to fulfil the Performance Specification. (February 2015).
- 6.2.37 **Road Investment Strategy 2: 2020 to 2025 (‘RIS2’)** sets a long-term strategic vision for the network and specifies the performance standards Highways England must meet; lists planned enhancement schemes that are expected to be built; and the funding that will be made available during the Second Road Period (RP2), covering

the financial years 2020/21 to 2024/25.

- 6.2.38 The A47 North Tuddenham to Easton is committed for RP2 within the list of schemes to be developed by Highways England over the period covered by RIS2. This categorisation means that construction of the Scheme is expected to start with enabling works in Autumn 2022 with main works starting early 2023. Funding to deliver the schemes named in RIS2 is committed on the assumption that they continue to demonstrate a strong business case and secure the necessary planning consents.
- 6.2.39 Highways England, as the strategic highways company appointed by the SoS must, in exercising its functions and complying with its legal duties and other obligations, act in a manner which it considers best calculated to, among others:
- minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
 - conform to the principles of sustainable development.

The Strategic Road Network and the Delivery of Sustainable Development (DfT Circular 02/2013)

- 6.2.40 This Circular explains how Highways England will engage with the planning system, communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the SRN.
- 6.2.41 The document states that Highways England will work with local authorities to influence Local Plan decisions that may affect the SRN.

Highways England Delivery Plan and Strategic Business Plans

Highways England Strategic Business Plan 2020-2025

- 6.2.42 The Applicant is responsible for planning the long-term future and development of the SRN including its maintenance, operation and improvement.
- 6.2.43 The Strategic Business Plan 2020-2025 was published in March 2020 and responds to and aligns with the government's RIS2. It provides the high-level direction for every part of Highways England for the second road period (2020 to 2025), setting the outcomes Highways England will work to deliver and the strategic priorities for the business. This SBP includes similar KPIs as agreed with the DfT, Transport Focus and the Office of Rail and Road. The framework reflects how the following six outcomes will be delivered:
- improving safety for all
 - providing fast and reliable journeys
 - a well-maintained and resilient network
 - delivering better environmental outcomes
 - meeting the needs of all users
 - achieving efficient delivery.
- 6.2.44 These outcomes respond to and align with government's priorities, as set out in RIS2: a network that supports the economy; a greener network; a safer and more reliable

network; a more integrated network; and a smarter network.

Highways England Delivery Plan, 2020-2025

6.2.45 The Highways England Delivery Plan 2020-2025 responds to RIS2 and provides details of how investment will be delivered over the five years. It also discusses how Highways England approach efficiency and risk management. Annex B includes a performance framework, which brings together all the delivery aims for the second road period. The A47 North Tuddenham to Easton is listed as an enhancement scheme for which works are anticipated to start in 2022/23.

National Infrastructure Strategy, November 2020

6.2.46 HM Treasury, advised by the National Infrastructure Commission, presented the National Infrastructure Strategy to Parliament in November 2020. It sets out the government's plans to deliver a radical improvement to the UK's infrastructure system delivering projects better, greener and faster, underpinned by high levels of government investment. It aims to:

- boost growth and productivity across the whole of the UK, levelling up and strengthening the Union
- put the UK on the path to meeting its net zero emissions target by 2050
- support private investment
- accelerate and improve delivery.

6.2.47 The foundational role of high-quality infrastructure in relation to economic growth is emphasised, particularly in current times in the UK's recovery from the COVID-19 pandemic. The 2020 Spending Review pledges £27 billion in 2021 to develop the economic infrastructure sectors, including transport. Further, it states, "*continuing to progress the UK's ambitious infrastructure plans in all parts of the country is vital to the recovery of the construction sector, and the economy as a whole*".

Summary

6.2.48 The Scheme complies with national planning policy identified above in that the Government has highlighted the express need for further growth and improvements to the national networks within the NPS NN and the recently published National Infrastructure Strategy.

6.2.49 The Scheme as submitted will improve safety, journey times and network resilience along this section of the A47. Measures taken to minimise potential significant adverse effects and maximise benefits on the environment and local communities to comply with the NPS NN are discussed, with justification provided for any unavoidable residual significant effects.

6.2.50 The DfT's RIS supports the Scheme as a required improvement to the network. The Highways England Delivery Plan, built on the HE Strategic Business Plan, lists the A47 North Tuddenham to Easton as a committed enhancement scheme within the second road period.

6.2.51 The Applicant has engaged with the planning system, communities and the development industry to ensure the delivery of sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the SRN in line with the requirements of Circular 2/2013.

6.2 Sub-regional Policy

New Anglia Local Enterprise Partnership (LEP) Norfolk and Suffolk Unlimited Economic Strategy, 2017

- 6.2.52 The Economic Strategy produced by the New Anglia LEP in November 2017 is based on the Strategic Economic Plan 2014 and provides a plan for growth in Norfolk and Suffolk²⁹. This is a shared endeavour between businesses, education providers, local councils, the voluntary and community sector and is led by New Anglia LEP. It outlines ambitious plans for future growth across Norfolk and Suffolk.
- 6.2.53 The Strategy sets out to address the regions' shortfalls and growth opportunities, demonstrating housing and employment commitments and potential growth locations with reference to specific improvements on the SRN.
- 6.2.54 Improvements to the A47 are identified as key to improve the region's internal connectivity and links to wider markets. The document states *"We are committed to securing the full dualling of this major artery between East Anglia to the Midlands, which would unlock growth along its route, including significant commercial and housing developments as well as improve job opportunities in locations."*
- 6.2.55 In May 2019, a Norfolk and Suffolk Economic Strategy Progress Report was produced by the LEP which provides an overview of progress being made since the Norfolk and Suffolk Economic Strategy was published in November 2017.
- 6.2.56 It sets indicators for the area to deliver and measure progress towards the LEP's goals and ambitions using eight economic indicators, Gross Value Added (GVA), jobs, businesses, housing, median wage, employment rate and skills.
- 6.2.57 The results show that there has been low to moderate GVA growth, and the growth in GVA per hour worked in Norfolk and Suffolk was strong against both the national average and comparator LEP areas. However, Norfolk and Suffolk have seen depressed wage growth, in real terms, over the past two years.
- 6.2.58 Norfolk and Suffolk have however seen particularly strong levels of growth in the employment rate over the past decade. The Economic Strategy sets a qualitative target of maintaining a consistently higher employment rate than the national average. Though this exceeds the indicator target of 0.5% growth in both 2016 (2.03%) and 2017 (0.52%) there was a net slowing of business growth and rate of housing completions. Norfolk and Suffolk improved the skills base at a faster rate in 2017 than the national average and all of the comparator LEP area.

New Anglia LEP Integrated Transport Strategy, 2018

- 6.2.59 In May 2018, the New Anglia LEP produced An Integrated Transport Strategy for Norfolk And Suffolk which highlighted the congestion in, amongst others, the critical east-west growth corridor along the A47 from Lowestoft and Great Yarmouth to King's Lynn. The strategy aims to *"Ensure a resilient SRN that is agile to future opportunities, the timely delivery of already committed schemes and certainty that the A47 amongst others would feature prominently in future Roads Investment Strategies by strengthening relationships with Highways England"*.

²⁹ https://newanglia.co.uk/wp-content/uploads/2020/03/New-Anglia_Norfolk-Suffolk-Unlimited_Economic-Strategy-Brochure-1-1.pdf

- 6.2.60 The strategy discusses the A47 Alliance, a “successful lobbying group which is pushing for full dualling of the A47 between Peterborough and Lowestoft. The dualling of the A47 has cross-party, cross-county support and in 2014, the government awarded a £300m funding package for dualling and junction improvement schemes along the A47. The A47 Alliance brings together the Chambers of Commerce, local authorities, LEPs and MPs along the route and is also supported by other stakeholders including the RAC, Eastern Daily Press and local businesses. The Eastern Daily Press, Norfolk Chamber of Commerce and Norfolk County Council are currently spearheading the ‘Just Dual It’ campaign to push government to invest further in the A47 and get a commitment for full dualling of the A47 by 2030.”
- 6.2.61 The Scheme is therefore supported by the Local Enterprise Partnership which see the improvements to the A47 as a key to economic prosperity.

New Anglia Norfolk and Suffolk Limited, Draft Local Industrial Strategy, 2020

- 6.2.62 The Draft Local Industrial Strategy has been adopted by local partners. It has been submitted to Government and awaits approval. It reflects the opportunities and needs of Norfolk and Suffolk’s growing economy and how it will respond in a fast-changing world. It has a strong local partnership with a track record of delivery and shows how Norfolk and Suffolk will continue to collaborate across disciplines and boundaries to provide new solutions and the infrastructure that its communities and businesses need.
- 6.2.63 Norfolk and Suffolk are at the forefront of tackling the challenges and opportunities of climate change and the document identifies that ‘Clean Growth’ sits at the heart of the Local Industrial Strategy. The area’s major strengths in energy generation and usage, and high-tech sustainable agri-food, present major opportunities. The Strategy sets out specific actions that will drive productivity and growth across the economy as a whole. Improvements to the A47 are mentioned and it is stated that Committed improvements to date through the RIS will deliver significant benefits, but additional investment on the A47 could further drive growth opportunities for Norfolk and Suffolk.

The A47 Alliance

- 6.2.64 The A47 Alliance brings together the business community, local authorities, MPs and stakeholders along the whole of the trunk road route between Peterborough and Lowestoft. The Alliance states that they are working together to make the case for improvements and to secure the investment required to make it happen.
- 6.2.65 The A47 Alliance is calling on the Government to commit funding to fully dual the A47 by 2030 and specifically to prioritise upgrading sections from single to dual carriageway by 2025.
- 6.2.66 A number of technical papers supporting the case for improvements are on the A47 Alliance website. In 2019 the Alliance produced its latest brochure: *The A47 Investing in East-West Success* which details why in their opinion getting the A47 fully dualled is vital to the East of England’s businesses and economic growth.

Summary

- 6.2.67 There is a strong drive in the Norfolk and Suffolk Regions for sustained economic transformation and growth to build upon the area’s strong employment rate and its

specific strengths in energy generation and usage, and hi-tech sustainable agri food. The development of the trunk road network is seen as key to economic delivery – jobs, business and housing, including access to Enterprise Zones, particularly along the critical east-west growth corridor of the Region. The New Anglia LEP Integrated Transport Strategy highlights the cross-party, cross-county support for the A47 dualling while the A47 Alliance in particular brings together the Chamber of Commerce, Local Authorities, LEPs, MPs and other stakeholders who support dualling of the A47 in its entirety. The Scheme is therefore an essential and integral part of the Region’s drive for economic success articulated in the objectives of the various sub regional policy documents.

6.3 Conformity of the Scheme with Local Development Plans and Local Transport Plans

Local Development Plans

6.3.1 The Scheme spans three separate council areas, Breckland Council, Broadland District Council and South Norfolk Council, within the county of Norfolk.

Joint Core Strategy for Broadland, Norwich and South Norfolk, 2011, amended 2014

6.3.2 The Joint Core Strategy (JCS) for Broadland, Norwich and South Norfolk, 2011 was adopted in March 2011, and amended in January 2014. It is the key planning policy document for the Greater Norwich area and forms part of the local plan for the districts of Broadland, Norwich and South Norfolk, setting out the broad vision for the growth of the area and containing strategic policies for the period 2008 to 2026.

6.3.3 Section 3 of the JCS acknowledges the increase in trip generation in and around Norwich, the impact on road capacity and resultant significant delays to traffic. As the economy in Norwich grows, so will traffic levels, exacerbating the problem. The Strategy states *“The A47 to the west (of Norwich) provides strategic road access to the Midlands and North. It is mostly single carriageway in Norfolk and suffers from congestion and safety issues. Significant growth is proposed at East Dereham and King’s Lynn.”*

6.3.4 The Spatial Vision outlines the potential for economic growth in the region and the importance of access to and across the area as a prerequisite for development. Objective 7 of the JCS is *“to enhance transport provision to meet the needs of existing and future populations while reducing travel need and impact”*. Objective 11 outlines the need for people to be offered the best opportunities to make healthy travel choices as part of their daily lives. The Scheme offers improvements to connectivity along the A47 corridor, including new walker and cyclist links that support this vision.

6.3.5 A number of policies the policies are applicable to aspects of the scheme. For example; Policy 1 Addressing climate change and protecting the environment. To address climate change and promote sustainability, seeks to ensure that new developments inter alia:

- provide for recycling of materials
- use locally sourced materials wherever possible
- be located to minimize flood risk
- minimize fragmentation of habitats and protect biodiversity

- contribute to providing a green infrastructure network
- increase public access to the countryside
- protect the built environment and heritage assets.

6.3.6 Further, the importance of ensuring priority is given to low impact modes of travel and the need to develop and maintain green infrastructure networks is also key. The Scheme proposes keeping the existing A47 for local use and new routes for walkers and cyclists along the A47 where possible, with abandoned sections to be landscaped. Also, a new route for walkers and cyclists linking Honingham with St Andrew's Church is proposed via an underpass below the A47; a new underpass for walkers and cyclists to the west of the proposed Norwich Road junction; and a new separate route for walkers and cyclists linking Easton with lower Easton via a bridge over the A47. This is addressed in Chapters 13 and 14 of the ES (**TR010038/APP/6.1**) and the Scheme Design Report (**TR010038/APP/7.3**).

6.3.7 Policy 2: 'Promoting good design' is also relevant in promoting the highest standards of design while respecting local distinctiveness in relation to the landscape, historic environment, provision of routes for walking and cycling, use of sustainable materials, where possible, and avoidance of harm to key environmental assets. The compliance of the Scheme with these issues is addressed in Sections 4.14 and 6.2 of this Case for the Scheme, supported by detail in Chapters 5 to 15 of the ES (**TR010038/APP/6.1**) and the Scheme Design Report (**TR010038/APP/7.3**). For example, the road alignment was moved 150m south from Grade II* listed St. Andrew's Church to reduce the setting impact as much as possible. Noise barriers and low noise surfacing for the whole of the Scheme have been embedded into the design to mitigate impacts of noise on health and quality of life. New footways and cycle tracks, plus lower traffic levels and slower speeds on the existing A47 and the provision of safe crossing points to the new A47, bring beneficial effects for walkers and cyclists.

6.3.8 Policy 5 promotes development of the local economy in a sustainable way to support jobs and economic growth both in urban and rural locations. The supporting narrative to the policy states "*achieving the full economic potential of the area is dependent on improved connectivity, including the implementation of the priorities set out in the sustainable transport policy and maintaining and enhancing the environment and quality of life in the area.*"

6.3.9 Policy 6 of the JCS seeks to improve the transportation system to develop the role of Norwich as a Regional Transport Node, particularly through the implementation of the Norwich Area Transportation Strategy and will improve access to rural areas. One of the ways this will be achieved is "*by promoting improvements to the A11 and A47*". The policy recognises that supported strategic improvements to aid delivery and economic success include A47 improvements to reduce the significant stretches that remain single carriageway.

6.3.10 This is reiterated in Policy 9: Strategy for growth in the Norwich Policy Area, within which the Scheme is located, is the focus for major growth and development in all sectors, supported by safe and efficient transport infrastructure. In the Easton/Costessey area 1,000 new dwellings are allocated, with 2,000 dwellings on Broadland smaller sites and 1,800 on South Norfolk smaller sites in the Norwich Policy Area and possible additions to named growth locations. There are also significant areas designated for business development including Norwich Research Park, the

airport area business park and Broadland Business Park.

- 6.3.11 Policy 10: Locations for major new or expanded communities in the Norwich Policy Area states that most of the growth within the plan will be located in the Norwich Policy Area, where it can be best served by greatly enhanced public transport, walking and cycling.

Broadland District Council Local Plan

- 6.3.12 Broadland's current local plan is made up of several documents³⁰:
- The JCS adopted 2011, amendments adopted January 2014
 - Development Management Development Plan Document (DPD) adopted August 2015
 - Site Allocations DPD, adopted May 2016
 - Supplementary Planning Documents (SPD), including Landscape Character Assessment SPD September 2013
 - Growth Triangle Area Action Plan, adopted July 2016 - east of Norwich, so not considered further
 - Neighbourhood Plans – none adopted or proposed along the North Tuddenham to Easton corridor, so not considered further
- 6.3.13 These documents set out the general and specific planning policies and contain detailed local policies. They aim to help planning officers and applicants to achieve high standard of development in the district and they are the main guide to determining planning applications.
- 6.3.14 The Local Plan highlights sections of congested single carriageway on the A47 as requiring improvement to dual status and supports these improvements by restricting development of land adjacent to the single carriageway sections for potential future improvements by Highways England.

Broadland District Council's Development Management DPD adopted August 2015

- 6.3.15 Development Management Development Plan Document (DPD) adopted August 2015 sets out the generic policies that are to be applied throughout the Broadland planning authority area. It should be read alongside the JCS. The policies set out within the Development Management DPD do not repeat, but seek to further, the aims and objectives set out within the NPPF and JCS. It therefore includes more detailed local policies for the management of development, including the following transport policies that the Scheme aligns with:
- **Policy TS1 – Protection of land for transport improvements:** land required for the improvement of the transport network will be safeguarded.
 - **Policy TS3 – Highway safety:** development will not be permitted where it would result in any significant adverse impact upon the satisfactory functioning or safety of the highway project.

Broadland District Council's Site Allocations DPD, adopted May 2016

- 6.3.16 The Site Allocations Development Plan Document DDP adopted 2016 sets out those

³⁰ https://www.broadland.gov.uk/info/200139/planning_for_future_development/247/the_current_local_plan

sites across the district that are suitable for certain forms of development such as housing, employment, community facilities etc. The scale of development reflects the requirements set out in the JCS.

- 6.3.17 Sites are identified for 900 dwellings at Easton and 1,000 at Costessey adjacent to the A47. The DPD also states that the Easton/Costessey area is a prime location to accommodate part of the 1,800 units in the Norwich Policy Area that are not attributed to a particular settlement. It is acknowledged that existing capacity problems at nearby junctions on the A47 will need to be addressed.

Broadland District Council's Supplementary Planning Documents (SPD), including Landscape Character Assessment SPD September 2013

- 6.3.18 The Landscape Character Assessment SPD is supplementary to the Joint Core Strategy Development Plan Document (DPD) Policy - 1 Addressing Climate Change and Protecting Environmental Assets and as such forms part of Broadland's emerging Local Plan.
- 6.3.19 The SPD contains the 2013 Broadland Landscape Character Assessment (LCA) that needs to be considered when assessing development proposals. ES Chapter 7, Landscape and Visual (**TR010038/APP/6.1**), has identified that part of the Scheme lies within LCA D2 'Weston Green Tributary Farmland (Tributary Farmland Type)'. Therefore, this LCA has informed the baseline for assessment of the Scheme's landscape effects.

Broadland District Council's Local Development Orders - Greater Norwich Food Enterprise Zone

- 6.3.20 The Greater Norwich Food Enterprise Zone (FEZ)³¹ was designated by DEFRA in March 2015. The aim of the FEZ is the development of a flagship, centralised, commercial facility comprising food production, food research, education and ancillary businesses. Additionally, it aims to contribute towards economic and employment growth in the Greater Norwich area, and in Norfolk more generally.
- 6.3.21 A local development order (LDO) has been made by Broadland District Council in 2017 for approximately 19 hectares south-west of Easton for the Greater Norwich FEZ. The LDO effectively grants planning permission for an initial period of 15 years (i.e. to October 2032). The first occupier is the new 25,000 square feet Condimentum mustard mill.

South Norfolk Local Plan

- 6.3.22 The following Development Plan Documents were adopted by the Council in October 2015 and now form part of the development plan for South Norfolk:
- Site Specific Allocations and Policies Document³²
 - Development Management Policies Document³³

³¹ https://www.broadland.gov.uk/info/200139/planning_for_future_development/455/local_development_orders_idos

³² <https://www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan/site-specific-allocations-and>

³³ <https://www.south-norfolk.gov.uk/residents/planning/planning-policy/adopted-south-norfolk-local-plan/development-management-policies>

- Wymondham Area Action Plan – south-west of Norwich, so not considered further
- Long Stratton Area Action Plan – south of Norwich, so not considered further
- Neighbourhood Plans – there is a plan for Easton
- Supplementary Planning Documents (SPD)

South Norfolk Council's Development Plan and Policies Document, adopted October 2015

6.3.23 This document sets out the generic policies that are to be applied throughout the South Norfolk planning authority area. It should be read alongside the JCS. The policies set out within the Development Plan and Policies Document do not repeat, but seek to further, the aims and objectives set out within the NPPF and JCS. It therefore includes more detailed local policies for the management of development including the following transport policies that the Scheme aligns with:

- **Policy DM 3.10 – Promotion of sustainable transport:**

“(1) All development should support sustainable transport and development objectives, utilise all opportunities to integrate with local sustainable transport networks, be designed to reduce the need to travel and to maximise the use of sustainable forms of transport appropriate to the location.

(2) Inside the Norwich Policy Area development should support the proposals of the Norwich Area Transportation Strategy.

(3) Land required for the improvement of the transport network will be protected from prejudicial development.”

- **Policy DM 3.11 – Road safety and the free flow of traffic:**

“(1) On all sites development will not be permitted that endangers highway safety or the satisfactory functioning of the highway network.

(2) Planning permission will be granted for development involving the formation or intensified use of a direct access onto a Corridor of Movement providing it would not:

(a) Prejudice the safe and free flow of traffic or planned proposals for sustainable transport initiatives along the Corridor of Movement;

(b) Be practical to gain access from the site to the Corridor of Movement via a secondary road; and

(c) Facilitate the use of the Corridor of Movement for short local journeys.”

South Norfolk Council's Site Specific Allocations and Policies Document, adopted October 2015

6.3.24 This document sets out those sites across the district that are suitable for certain forms of development such as housing, employment, community facilities etc. The scale of development reflects the requirements set out in the JCS. It also includes the definition of development boundaries or “settlement limits” for those places where some growth may take place.

6.3.25 Policy EAS 1 of the Site-Specific Allocations and Policies Document allocated 52.6 hectares of land south and east of Easton for housing and associated

infrastructure. This allocation will accommodate approximately 900 dwellings and supporting facilities, including a new village centre. This development is included in the transport analysis and has been taken into account in the development of the design of the Scheme along with traffic growth associated with other developments in the area.

South Norfolk Council's Landscape Character Assessment Supplementary Planning Documents (SPD), September 2013

- 6.3.26 The Landscape Character Assessment SPD is supplementary to the Joint Core Strategy Development Plan Document (DPD) Policy - 1 Addressing Climate Change and Protecting Environmental Assets and as such forms part of Broadland's emerging Local Plan.
- 6.3.27 The SPD contains the 2001 South Norfolk Landscape Character Assessment (LCA) that needs to be considered when assessing development proposals. ES Chapter 7, Landscape and Visual (**TR010038/APP/6.1**), has identified that part of the Scheme lies within LCA G1 'Easton Fringe Farmland (Fringe Farmland Type)' and LCA A3 'Tud Rural River Valley (Rural River Valley Type)'. These LCAs have informed the baseline for assessment of the Scheme's landscape effects.

Easton Neighbourhood Plan 2017 - 2042, adopted September 2017³⁴

- 6.3.28 With the JCS identifying Easton for significant housing growth, the Neighbourhood Plan policies seek to protect the village's heritage (esp. setting of St Peter's Church), open space and local character and improve biodiversity. Relevant policies to the Scheme are:
- **Policy 1 'Heritage protection'** and **Policy 4 'Church of St Peter'** – Policy 4 in particular requires: "The integrity and setting of the Church of St Peter will be safeguarded. Any development proposal in the immediate vicinity of the Church should demonstrate that they have been designed so that they do not generate substantial harm to the setting of the building. Development proposals should ensure that their arrangement of open space and landscaping are designed in a fashion that would protect and enhance the setting of the Church". In liaison with Historic England, the Scheme has been designed to preserve the setting of the Grade I listed St Peter's Church, in Easton, and minimise any impacts including keeping outside the churchyard and retaining as much of the existing vegetation screening as possible. ES Chapter 6 Cultural Heritage and ES Chapter 12 Population and Human Health (**TR010038/APP/6.1**) discuss the impacts of the Scheme on the setting of the building and consecrated land, respectively. Section 7.4 of this Case for the Scheme explores the planning balance with regards the risk of substantial harm to the setting of the building.
 - **Policy 5 'Enhancing biodiversity'** – the Scheme includes an Environmental Masterplan (**TR010038/APP/6.8**) to illustrate the proposed biodiversity planting around Easton.
 - **Policy 10 'New development road'** – the Scheme design, layout and building has been developed in liaison with Norfolk County Council to ensure local highways meet their adoptable standards. The Scheme has also sought to

³⁴ <https://www.south-norfolk.gov.uk/residents/planning/planning-policy/neighbourhood-plans/easton-neighbourhood-plan>

minimise disturbance to existing dwellings, such as laying low noise surfacing along the existing A47 east of Easton roundabout to mitigate increase noise risks from faster flowing traffic.

Greater Norwich Local Plan (not yet adopted)

- 6.3.29 Broadland District Council, Norwich City Council, South Norfolk Council and Norfolk County Council are working together to prepare the Greater Norwich Local Plan (GNLP). The GNLP is therefore emerging policy.
- 6.3.30 The GNLP builds on the joint working arrangements for Greater Norwich, which have delivered the current JCS for the area. The JCS plans for the housing and job needs of the area to 2026 and the GNLP will ensure that these needs continue to be met to 2036.
- 6.3.31 The GNLP will include strategic planning policies to guide future development and plans to protect the environment. It will look to ensure that delivery of development is done in a way which promotes sustainability and the effective functioning of the whole area. The Plan will also allocate land for development.
- 6.3.32 Of particular note is Policy 4 'Strategic Infrastructure' that states transport infrastructure will be brought forward to support the development aims of this plan. It also states the aims of this policy will be achieved by: "Supporting improvements to the A47, including delivery of the Blofield to North Burlingham, Thickthorn and Easton to East Tuddenham improvements being progressed by Highways England".
- 6.3.33 Initial work to develop the Greater Norwich Local Plan has begun and the councils have begun preparing evidence to enable them to assess what the main needs and constraints of the Greater Norwich Areas.

Breckland District Local Plan, Adopted 2019

- 6.3.34 The Breckland Local Plan was adopted on the 28 November 2019 and sets the strategic context for development in the District until 2036. The plan also contains the district-wide Development Control policies for Breckland that will inform future planning decisions.
- 6.3.35 The plan supports the Council's 2015 Corporate Plan to:
- support Breckland to develop and thrive
 - provide the right services, at the right time and the right way
 - develop the local economy to be vibrant with continued growth
 - enable stronger, more independent communities.
- 6.3.36 Breckland's Strategic Vision aims to articulate where the Council wishes to be by the end of the plan period in 2036. This includes:
- "Enabling the full potential of the A11 gateway and A47 corridor to contribute to economic growth of the District through investment, partnership works with neighbouring authorities and inward investment."*
- 6.3.37 The Local Plan acknowledges the Government's commitment to investment of over £300 million for improvements along the A47 for delivery in the early 2020s. It also identifies the following housing growth in the vicinity of the North Tuddenham to Easton dualling scheme:

- Hockering (98 dwellings) – lies along the route of the Scheme
- Dereham (756 dwellings) – located on the A47 west of Hockering
- Mattishall (149 dwellings) – south-west of Hockering.

6.3.38 The Scheme lies within a landscape area designated ‘plateau farmland’ and the River Tud Valley. There is an area of ancient woodland north of the Scheme, east of North Tuddenham.

Green Belt Policy

6.3.39 The Scheme is not located within adopted Green Belt.

Local Transport Policy

Norfolk County Council Local Transport Plan, 2011-2026:

6.3.40 Norfolk County Council’s (third) Local Transport Plan (LTP3) was adopted in 2011. It describes the county’s strategy and policy framework for delivery up to 2026 with an Implementation Plan covering the period 2015-2021 and includes six objectives which seek to address transport issues. These are: Managing and maintaining the transport network; Sustainable growth; Strategic connections; Transport emissions; Road safety; and Accessibility.

6.3.41 The Council is currently refreshing LTP3. LTP4 will cover the period 2020 to 2036. A consultation on the key priorities was held during January and February 2020. Proposed Policy 8 prioritises the improvement of major road and rail connections between larger places in the county. It notes the government commitment to over £300 million of investment for the A47 works. Policy 7: Strategic connections of the existing LTP3. “To bring about an improvement in journey time reliability in and around Norfolk, local agencies should work together to enhance the strategic network”, which includes the A47.

Norwich Area Transport Strategy, 2004, updated 2013

6.3.42 The Norwich Area Transportation Strategy (NATS4) was adopted in 2004, with an updated Implementation Plan published in 2013 by Norfolk County Council.

6.3.43 The Norwich Area Transportation Strategy (NATS) summarises the characteristics of the Norwich Area, existing and predicted future travel patterns, and transport problems and issues in the Norwich area.

6.3.44 Although the Scheme is not specifically mentioned in this document there is support for other parts of the A47 Improvement Programme.

Greater Norwich Infrastructure Plan, 2020

6.3.45 The Greater Norwich Infrastructure Plan (‘GNIP’), adopted May 2020, which covers the districts of Broadland, Norwich and South Norfolk, has been prepared to help coordinate and manage the delivery of strategic infrastructure to support growth. The purpose of the document is to inform prioritisation of investment and delivery and support the JCS.

6.3.46 The GNIP discusses housing growth and identifies the delivery of over 1,000 dwellings at Easton. The GNIP also acknowledges that the A47 Easton junction will be affected by the proposed dualling of the A47 between Easton and North Tuddenham; acknowledging the Development Consent Order Process is expected during 2021/22

with construction starting in 2022.

Conformity of the Scheme

- 6.3.47 The Joint Core Strategy for Broadland, Norwich and South Norfolk highlights current problems of congestion and safety in and around Norwich and in particular on the A47 as a result of the single carriageway stretches. The strategic importance of the A47 west of Norwich and the potential for future economic growth in the region, which is inextricably linked to the need for fluid and safe access, is highlighted.
- 6.3.48 The Scheme accords with other policies of the Strategy in relation to sustainability, incorporation of green infrastructure networks and inclusion of good design.
- 6.3.49 The Scheme is also located within the designated Norwich Policy Area which is the focus for major growth and development. Future residential developments of over 4,800 dwellings, several business park developments are allocated within the Norwich Policy Area with related service provision, meaning the Scheme is a strategic necessity underpinning growth and investment.
- 6.3.50 The Local Plans for Breckland Council, Broadland District Council and South Norfolk Council identify the single lane carriageway between North Tuddenham and Easton for improvement to dual status to ease congestion, improve safety and support local demand and growth aspirations on the corridor including the aforementioned residential and business allocations and the Greater Norwich FEZ south-west of Easton.
- 6.3.51 The plans also highlight the importance of creating attractive communities where healthy travel choices are available, noting the commitment to climate change and green infrastructure including public rights of way.
- 6.3.52 The Scheme will therefore accord with Development Plan policy and objectives in relieving congestion for the benefit of existing users; facilitating significant new residential developments; supporting business and commercial allocations; and increasing the region's attractiveness to potential commercial investors. It will result in safer connections and a reduction in accidents and provides for improved footpath and cycle way connections to support the provision of sustainable travel.
- 6.3.53 The Scheme also supports the priorities of the current and emerging Norfolk County Council Local Transport Plan in supporting growth, improving a strategic connection and improving safety and access for current users while providing for future proposed and committed residential and business developments in the area.

Planning Balance

- 6.3.54 Section 104(7) of the PA 2008 (as amended) requires that the application should be determined in accordance with relevant National Policy Statement unless the adverse impact of the proposed development would outweigh its benefits. This Case for the Scheme document provides an overview of the economic, social and environmental benefits of the Scheme. The potential adverse impacts of the Scheme have also been comprehensively assessed, considered and addressed through the management and mitigation measures described in the ES (**TR010038/APP/6.1**). The balance of benefits and adverse impacts is also considered through the Applicant's response to the balancing exercises for relevant topic areas expressed within the NPS NN, as set out in Section 6.2 of this Case for the Scheme and the NPS NN Accordance Tables (**TR010038/APP/7.2**).

- 6.3.55 The ES (**TR010038/APP/6.1**) has considered each impact assessment topic according to whether there are likely to be significant environmental effects, in line with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). The conclusions from the ES have been reviewed in order to consider the conformity of the Scheme with the NPS NN, the NPPF, the development plan, plus other infrastructure and transport plans and strategies as set out in Appendices to this document.
- 6.3.56 In terms of adherence to national policy requirements, the Scheme demonstrates compliance with the Government's strategic vision for the development of the national road network. The benefits of the Scheme are demonstrated by its inclusion within the RIS and within national, regional and local transport and planning policy. Section 3(6) of the Infrastructure Act 2015 places a duty on the SoS to comply with the provisions of the RIS.
- 6.3.57 By increasing capacity and removing many of the constraints associated with the existing single carriageway between North Tuddenham and Easton, the Scheme meets the objectives contained in the transport and economic strategies for the area as well as policies within the Joint Core Strategy and the Broadland, South Norfolk and Breckland local development plans.
- 6.3.58 The Scheme is strongly supported at a sub-regional level, as being essential and integral to the Region's drive for economic success articulated in the objectives of the various sub regional policy documents. Improvements to the SRN are considered to be key priorities for the delivery of economic growth in Norfolk and the East of England as a whole.
- 6.3.59 The Scheme, in providing safe and fluid road capacity to accommodate increased trip generation, will help to support economic growth by encouraging inward investment in business and residential development and will tackle a range of identified issues including congestion, safety and journey times along this stretch of the A47. It also provides for the improvement of green infrastructure for sustainable transport modes. Table 3.2 of this Case for the Scheme sets out how the Scheme has been designed to meet the objectives of the NPS NN in the above regard, as well as protecting the environment, ensuring a more accessible and integrated network which represents value for money.
- 6.3.60 The Scheme's benefits have been assessed in the context of unavoidable impacts that are identified in the ES (**TR010038/APP/6.1**). It is acknowledged that, for example, the Scheme will result in temporary and permanent impacts and suitable mitigation is proposed to manage these impacts. The overall benefits of the Scheme are considered to outweigh any unavoidable adverse effects.
- 6.3.61 Following public consultation and feedback the Scheme is considered by the Applicant to be the best available option for the dualling of the A47 between North Tuddenham and Easton. It is fully funded as illustrated in the Funding Statement (**TR010038/APP/4.2**) and if granted, the DCO will include the compulsory acquisition powers required to deliver the Scheme.
- 6.3.62 The Scheme therefore comprises an opportunity to secure a deliverable and fully funded A47 North Tuddenham to Easton Scheme in accordance with the NPS NN, RIS, and current and emerging planning and transport policies.

7 CONCLUSIONS

7.1 Overview

7.1.1 This Case for the Scheme and accompanying NPS NN Accordance Tables (**TR010038/APP/7.2**) sets out the policy context against which the Scheme should be viewed. Together they demonstrate a clear justification for the Scheme grounded in national, regional and local planning and transport policy.

7.1.2 The NPS NN, NIDP and the RIS set out a strong position of support in delivering national networks that meet the country's long-term needs, whilst supporting a prosperous and competitive economy and improving the quality of life for all.

7.2 Need and Scheme Objectives

7.2.1 The single carriageway section of the A47 between North Tuddenham and Easton experiences congestion and is currently operating at over capacity, leading to longer and unreliable journey times. Growth in Norwich and around Easton is expected to exacerbate the situation.

7.2.2 Safety is also currently compromised and a high accident rate has been an unfortunate effect. The A47 is ranked 2nd nationally for fatalities on A roads and the accident severity ratio is above average. During the period 2014 to 2018 a total of 2 fatal, 15 serious and 76 slight accidents have been recorded along a 11km length of the existing A47 from North Tuddenham to Easton. Over a 60-year timeframe the Scheme's improvements will save a total of 291 accidents and 47 killed or seriously injured.

7.2.3 The proposed solution to the traffic and safety issue, which is defined in the RIS is: *"dualling of the single carriageway section of the A47 between Norwich and Dereham, linking together two existing sections of dual carriageway"*.

7.2.4 Dualling of this section of the A47 offers a solution to the above issues and, further, will unlock economic growth and development in the area which is considered essential at a regional level and is promoted strongly by the A47 Alliance.

7.3 Alternatives, the Scheme and its benefits

7.3.1 A wide ranging and detailed optioneering process, involving extensive study and consultation, has considered reasonable alternatives, ultimately resulting in the announcement of the preferred route in August 2017 *"Online dualling following the existing A47"*.

7.3.2 The Scheme has been further developed since the preferred route announcement. Taking on board feedback received and from ongoing stakeholder engagement the design of the Scheme has been developed to that now set out within the DCO application.

7.3.3 The Scheme has been identified as the best option to meet the defined need and objectives, including the delivery of a comprehensive set of benefits as detailed in this document.

7.3.4 Transportation benefits include reduced journey times and improved safety, resilience and journey time reliability consistent with national and local planning objectives for transport, economy and the environment.

- 7.3.5 Through the increased capacity and improved journey time reliability, the Scheme would assist in making the region more attractive for businesses and provide the required infrastructure for development including housing and employment.
- 7.3.6 The Scheme is supported by an Environmental Impact Assessment to establish the impacts and mitigation measures needed to meet the Scheme objective of avoiding unacceptable impacts on the surrounding natural and historic environment and landscape and optimise opportunities for enhancement. For more details see the ES (TR010038/APP/6.1)

7.4 Compatibility with NPS NN

- 7.4.1 The Scheme is compliant with the NPS NN. It meets the Government's strategic vision for the development of the national road network and wider policies for economic performance, environment, safety, technology, sustainable transport and accessibility, as well as journey reliability and the experience of road users. Where impacts are generated by the construction or operation of the Scheme, it has been demonstrated, through careful and comprehensive assessment, that the substantial and long-lasting transportation, economic and community benefits will outweigh the limited impacts identified.
- 7.4.2 The detailed NPS NN Accordance Tables (TR010038/APP/7.2) demonstrate the conformity of the Scheme with the NPS NN. Several NPS NN paragraphs recommend the Secretary of State does not grant development without reasonable justification. Those relevant to this Scheme are considered below:
- 7.4.3 **Paragraph 4.66** (*"The Secretary of State should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to: minimise the risk of road casualties arising from the Scheme; and contribute to an overall improvement in the safety of the Strategic Road Network."*):
- The Scheme has been designed in accordance with current national design standards as set out in the DMRB. In addition, as discussed in Section 4.13 of this Case for the Scheme, the transport modelling for this Scheme has demonstrated that over a 60-year timeframe it will reduce the risk of road casualties by saving a total of 291 accidents and 47 killed or seriously injured (KSI). It is therefore considered that reasonable steps have been taken in the design and will be effective in the operation to ensure that the Scheme will contribute to an overall improvement in the safety of the SRN.
- 7.4.4 **Paragraph 5.174** (*"The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities."*):
- The Scheme does not permanently affect any public open space, sports and recreational buildings and land. Though not public open space, it is worth noting that the Scheme would require permanent land take from a small area of consecrated land owned by St Peter's Church in Easton. At this point the land has not been used as a burial ground, though a large significant effect could

potentially arise if the area were to be used as a burial ground. The Applicant is engaging with the St Peter's Church to manage this risk and compensate for the land take. It is important to note that the majority of the consecrated land would be unaffected in the long-term.

- As the Scheme does not affect any existing open space or sports facilities, including playing fields, it is considered that it does not conflict with this paragraph of the NPS.

7.4.5 Paragraph 5.195 (*"The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development: avoid significant adverse impacts on health and quality of life from noise as a result of the new development; mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and contribute to improvements to health and quality of life through the effective management and control of noise, where possible."*):

- Construction – the potential significant effects on Acorn Barn would be temporary and dependent on whether construction noise levels exceed a defined threshold for a specific duration of time. Efforts would be made to avoid significant adverse impacts on health and quality of life from noise by not exceeding this threshold through appropriate managing of the works programme. Measures in the environmental management plan (**TR010038/APP/7.4**) would also be applied to minimise adverse impacts on health and quality of life from noise at this part of the Scheme.
- Operation - The design has sought to minimise adverse impacts on health and quality of life from noise due to the operation of the Scheme through embedded mitigation measures in the form of four permanent acoustic barriers and a low noise surfacing. However, there will remain some limited significant operational noise effects from traffic re-routing along local highways authority roads where acoustic barriers will not reduce the magnitude of effects. Where predicted impacts are not due to traffic re-routing, the significant operational effects are due to:
 - More road users choosing to access the improved A47 between North Tuddenham and Easton.
 - Some effects remaining significant at some locations despite mitigation being included, and further mitigation would result in adverse landscape and visual effects.
 - Acoustic barriers in some locations would not change the magnitude of impact and in most cases would only provide marginal benefits. Provision of barriers in these locations would not be proportionate or reasonable mitigation measures.
- The design of the Scheme has sought to avoid significant adverse effects on health and quality of life from noise by the Scheme. During construction potentially significant effects would be on one property, but measures are proposed to mitigate and minimise impacts on health and quality of life from noise. During operation measures have been embedded into the design to reduce and minimise effects of noise where possible. As it is not possible to incorporate further mitigation into the design it is considered that the Secretary

of State can be satisfied that the Scheme demonstrates it meets the aims of this NPS paragraph.

7.4.6 Paragraphs 5.131 (*“When considering the impact of a proposed development on the significance of a designated heritage asset, the Secretary of State should give great weight to the asset’s conservation. The more important the asset, the greater the weight should be. Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Given that heritage assets are irreplaceable, harm or loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II Listed Building or a grade II Registered Park or Garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including World Heritage Sites, Scheduled Monuments, grade I and II* Listed Buildings, Registered Battlefields, and grade I and II* Registered Parks and Gardens should be wholly exceptional.”*) and **Paragraph 5.132** (*“Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the harm to the significance of the heritage asset, the greater the justification that will be needed for any loss”*):

- Grade II* listed St Andrew’s Church, Honingham, and Grade I listed St Peter’s Church, Easton, are predicted to have large and moderate adverse significant effects, respectively. Both these churches are currently located immediately adjacent to the existing A47, but the Scheme carefully considered their setting in the Scheme design process. For St Andrew’s Church, following statutory consultation the alignment of the proposed A47 dual carriageway was moved 150m south from St Andrew’s Church and a proposed north facing retaining wall replaced with landscaped earth embankment. This reduced the intrusion of the Scheme on the church’s setting. Consideration of the Grade I listed status of St Peter’s Church contributed to deciding the final location of the Norwich Road junction, at Blind Lane and Taverham Road junction with the A47 rather than at the existing Easton roundabout immediately adjacent to the church. The construction and operational impacts on the settings of Listed Buildings are discussed in Tables 6.3 and 6.4, respectively, of ES Chapter 6 Cultural Heritage (**TR010038/APP/6.1**). In particular, the tables demonstrate the efforts made to minimise the harm so far as possible to the settings of St Andrew’s Church and St Peter’s Church.
- These design changes were also developed in consultation with Historic England to ensure the Scheme design has done all it can to avoid substantial loss or harm to the heritage assets, even though there will remain residual adverse effect on the settings.
- Overall, in response to these NPS paragraphs, the Scheme is a linear project and the routeing has been determined through several stages. At all stages environmental factors, including cultural heritage impacts, have been considered. The design of the Scheme included in the application has sought to minimise impacts on these particular assets where possible through routeing and in determining the location of the Norwich Road junction. Although significant effects remain for these two assets these need to be considered against their existing position immediately adjacent to the A47 and wider

economic and transport benefits of the Scheme, as set out in this document. It is therefore considered that on balance the wider benefits outweigh the harm.

7.4.7 Paragraph 5.26 (*"In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment."*):

- As the Scheme is a linear project, it has not been possible to avoid affecting all protected species, habitats and other species of principal importance for the conservation of biodiversity. However, through careful routeing it has avoided direct loss of sites designated for biodiversity and geological interests, plus achieved a neutral effect from indirect risks (e.g. air quality, pollution risks) on the internationally, nationally and locally designated sites during construction and operation. There would also be neutral residual effects on the protected species water vole, great crested newts and badger as mitigation within the licence method statements would remove any harm occurring to them and the Scheme includes increased habitat for them.
- A significant moderate adverse residual effect is predicted for priority habitats of woodland, hedgerows and grazing marsh habitats, but only due to the long time lag until proposed replacement habitats reach maturity. Priority grassland and pond habitats will have a slight beneficial effect.
- The barn owl, fully protected Schedule 1 under the Wildlife and Countryside Act, 1981, is predicted to experience a moderate adverse residual effect, but only until landowners have been identified and agreements put in place to install suitable nest boxes 1.5km from the Scheme. Once these agreements are signed the residual effect will decrease to slight adverse.
- With the Scheme risks to bats, especially the rare barbastelle bats *Barbastella barbastellus*, the design has incorporated measures to mitigate effects on bats; for example, the bridge over the River Tud only has a 2.7m headroom, so bats currently flying over the road will be encouraged to fly high above traffic by planting high trees and fencing along the bridge. However, a significant large adverse residual effect on habitats for bats, especially the rare barbastelle bats *Barbastella barbastellus*, is predicted due to the time lag between loss of habitat and the remediated habitats reaching maturity. This could lead to loss of foraging and commuting habitat and traffic mortality, and also due to the presence of rare bats leading to a national level of importance in the area.
- However, the significant large adverse residual effect reflects the fact that there is currently no data available that proves whether or not the proposed mitigation to help them cross the new A47 safely will work. Underpasses are known to be successful when placed directly on the current flight paths of bats (Berthinussen and Altringham, 2015). The underpasses on the Scheme are not directly on existing flight paths as that could not be designed into the Scheme, but planting will be used to encourage bats to use them. Therefore, bat crossing points will be monitored and managed to minimise the permanent adverse effect on bats.
- Therefore, although a worst case significant residual effect is predicted for a protected species and habitats of principal importance for the conservation of

biodiversity, these need to be considered against the worst case context for which they have been predicted significant and the wider economic and transport benefits of the Scheme as set out in this document. It is therefore considered that on balance the wider benefits of the Scheme outweigh the potential harm to biodiversity within the wider environment, the extent of which should decrease over time as new habitats mature.

- 7.4.8 Overall, it is considered that the public benefits provided by the Scheme are clear, founded in factual evidence and outweigh any unavoidable impacts. This document has shown that, where the NPS NN requires a balanced judgement between harm and benefits, the evidence demonstrates that the Scheme fully complies with the NPS and that the Scheme benefits significantly outweigh any adverse impacts.

7.5 Delivery of Government Policy and Programmes

- 7.5.1 The Scheme forms part of the Government's vision and strategic objectives for improving the UK's transport infrastructure as detailed in Section 3 of this Case for the Scheme. It will meet the identified need to provide safe, expeditious and resilient networks that better support social and economic growth as set out in the NPS NN.
- 7.5.2 The A47 North Tuddenham to Easton is both a committed scheme in the DfT's RIS and also fulfils the aims of the NIDP and the Highways England Delivery Plan

7.6 Delivery of Local Planning and Transport Policy

- 7.6.1 The Scheme accords with, and will deliver, the policy and aims of the Joint Core Strategy for Broadland, Norwich and South Norfolk. The relevant local plans and local transport plans within which there is broad support for improvements to the A47 and specifically the section between North Tuddenham and Easton.

7.7 The Planning Act 2008

- 7.7.1 The Planning Act 2008 requires that, in determining DCO applications, the SoS must have regard to the relevant NPS, the Local Impact Report, any prescribed matters and any other matters the SoS thinks are important and relevant. Paragraph 4.2 of the NNNSP confirms that there is a presumption in favour of granting development consent for national networks.
- 7.7.2 The Planning Act 2008 also states that DCO applications should be determined in accordance with the relevant NPS except in certain circumstances including where adverse impacts would outweigh benefits, or where to do so would be unlawful, in breach of duty or condition, or in breach of international obligations.
- 7.7.3 The Scheme complies with the NPS NN and accords with all other relevant and important policy matters that the SoS might need to take into consideration, including the adopted development plan for the local area and the NPPF.