



West Winch Housing Access Road Transport Assessment (TA)

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Foreword

This Transport Assessment (TA) has been prepared to accompany the planning application for a new link road scheme being proposed to the east of West Winch King's Lynn, known as the West Winch Housing Access Road (WWHAR).

The TA considers the effects of the WWHAR scheme on all users of the local transport network within the scope of assessment as well as relevant A47 junctions on the Strategic Road Network (SRN). The TA adopts a multi-modal approach to assessment and considers the scheme to include a proposed set of transport mitigation measures as well as the new highway link itself. The Proposed Scheme also includes revisions to the A47 Hardwick Interchange junction at the intersection of A10, A149, Hardwick Road and A47 Constitution Hill.

The WWHAR is intended to facilitate and accelerate the delivery of sustainable housing growth in the Borough of King's Lynn and West Norfolk, allocated to land at West Winch referred to as the West Winch Growth Area (WWGA). The new access road would provide additional highway capacity to the east of the existing A10. This will enable through-traffic to divert away from the centre of the village and create headroom capacity on the existing A10 for new local development trips.

This document should be read in conjunction with the **Sustainable Transport Strategy** (Document Reference **NCC/4.02.00/WWHAR**) which explains a package of local transport improvements which are proposed to support sustainable travel patterns for trips with origins and destinations in West Winch. This includes measures along the existing A10 corridor to help improve opportunities for active Travel and bus travel and to facilitate a slower speed environment which is more suitable for Non-Motorised User crossing movements.

Relevant components of the Proposed Scheme are defined as follows:

- The highway mainline element of the new proposed bypass of West Winch to the east of the existing village. Within the Proposed Scheme this is referred to as the "Classified Road". This includes a new roundabout at its junction with A47 and a new roundabout at its southern end where the WWHAR meets the



existing A10 between Setchey and West Winch, plus additional development access roundabouts.

- The “Hardwick Interchange Improvement scheme” which includes direct slip roads from A47 on the east side of the main gyratory to replace the existing Constitution Hill roundabout.
- Dualling of the A47 between Hardwick Roundabout and the new WWHAR northern roundabout.
- The interventions in the surrounding highway network, including the provision of new public rights of way, the revisions to existing side roads that cross the scheme at Rectory Lane and Chequers Lane; Public rights of way that will enhance non-motorised user provision as an integral part of the Proposed Scheme and in relation to which planning permission is sought. These measures are referred to as the “Proposed Scheme’s Non-Motorised User Provision”; and
- The package of Public Transport Measures in the West Winch area that seek to improve sustainable transport by offering greater priority for and access to bus services on the existing A10. These measures can be delivered once the WWHAR new link is in place to help enhance opportunities for travel by non-car modes.

A pre-application public consultation for the Proposed Scheme was carried out from Monday 14 November 2022 and Sunday 8 January 2023. Feedback gleaned from this consultation has been reviewed and taken into account in this Transport Assessment (TA) and associated Sustainable Transport Strategy (Document Reference **NCC/4.02.00/WWHAR**). In particular, the sustainable transport proposals through the village of West Winch have been included within the strategic traffic modelling that has informed this Transport Assessment.

The background traffic growth forecasting within the SATURN-based King’s Lynn Transport Model (KLTM) has also been updated to include the latest DfT published information from the National Trip End Model version 8.0 (NTEM 8.0) which was published in August 2022.



The background traffic growth assumptions in the NTEM 8.0 forecast includes relevant housing and employment growth locations identified within the emerging Borough Council of King's Lynn and West Norfolk (BCKLWN) Local Plan Review which is undergoing Examination in Public at the time of preparing this document. Scenarios tested within this TA include development of up to 4000 additional dwellings in West Winch of which about 300 dwellings could proceed prior to the delivery of the WWHAR scheme. The remaining growth of up to 3,700 new homes is therefore considered as 'Dependent Development' within this assessment.



Glossary of Abbreviations and Defined Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
ATC	Automatic Traffic Count
ATE	Active Travel England
BCKLWN	Borough Council of Kings Lynn and West Norfolk
BR	Bridleway
CO ₂ e	Carbon Dioxide equivalent
CEMP	Construction Environment Management Plan
CTMP	Construction Traffic Management Plan
DfT	Department for Transport
DM	Do Minimum Scenario
DS	Do Something Scenario
EAST	Early Appraisal Sifting Tool
EqIA	Equality Impact Assessment
ESDAL	Electronic Service Delivery for Abnormal Loads
FP	Footpath
GIS	Geographical Information System
HGV	Heavy Goods Vehicle
JtW	Journey to Work
JCS	Joint Core Strategy
KL	Kings Lynn
KLTM	Kings Lynn Transport Model
LGV	Light Goods Vehicle
MCC	Manual Classified Count
MP	Member of Parliament
NCC	Norfolk County Council



Abbreviation	Description
NCN	National; Cycle Network
NH	National Highways
NMU	Non-Motorised User
NTS	National Travel Survey
OAR	Options Assessment Report
OBC	Outline Business Case
ONS	Office for National Statistics
OSR	Option Selection Report
OGV	Other Goods Vehicle
PCT	PSV
PCU	Passenger Car Unit
PROW	Public Right of Way
PSV	Public Service Vehicle
SOBC	Strategic Outline Business Case
SoCI	Statement of Community Involvement
STS	Sustainable Transport Strategy
SRN	Strategic Road Network
SRO	Side Road Order
TA	Transport Assessment
TRO	Traffic Regulation Order
UL	Uncertainty Log
WCHAR	Walking, Cycling & Horse Riding Assessment Report



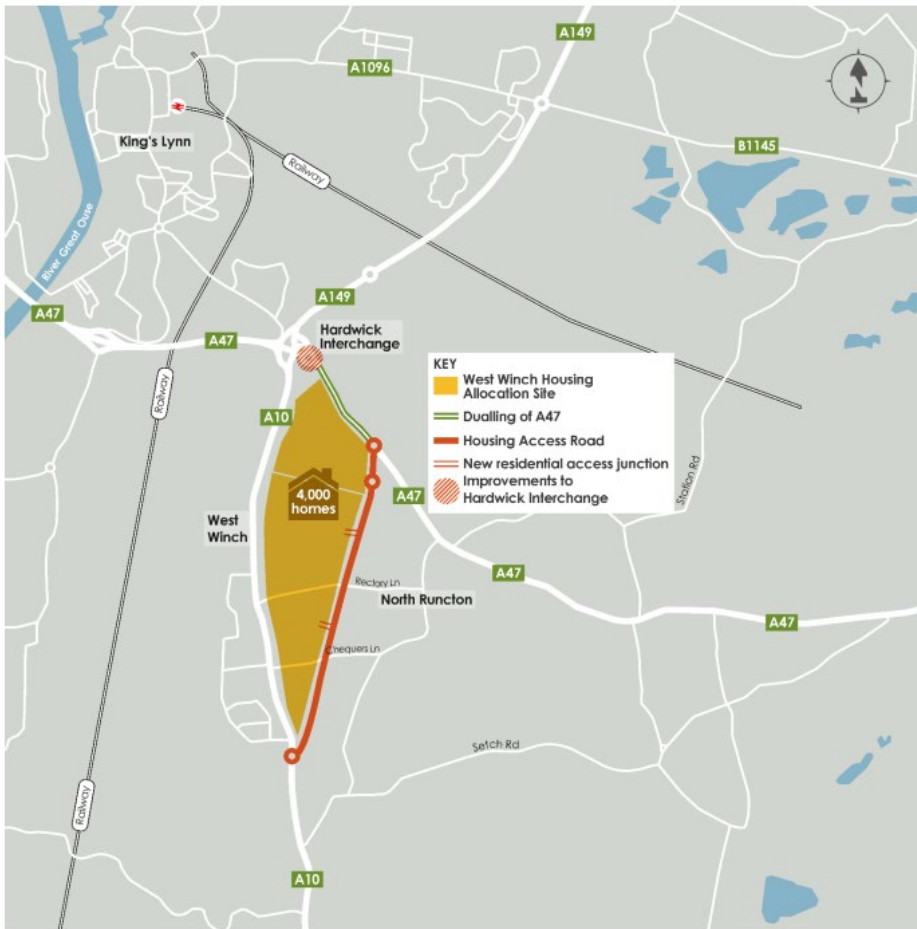
1 Executive Summary

1.1 Background

- 1.1.1 This Transport Assessment (TA) has been prepared to accompany the planning application for a new link road scheme being proposed to the south east of King's Lynn known as the West Winch Housing Access Road (WWHAR), referred to in this report as the 'Proposed Scheme'.
- 1.1.2 The Site is located approximately 2km south east of King's Lynn town centre. In addition to King's Lynn the nearest settlements to the Proposed Scheme include North Runcton to the east, Setchey and Watlington to the south and Middleton, Fair Green and Blackborough End to the east.
- 1.1.3 The Proposed Scheme consists of the construction of a new single carriageway road linking the A47 Constitution Hill from its junction with the A10 and A149 Cromer Road to the A10 south of West Winch. The road would pass through an area of predominantly existing farmland which is proposed for strategic housing development as part of the King's Lynn and West Norfolk Local Plan.
- 1.1.4 An overview plan is shown in **Figure 1-1** below.



Figure 1-1 Site Location Plan



1.1.5 National Highways own and operate the A47 which runs east-west at the northern boundary of Classified Road. The Proposed Scheme also includes dualling of a section of A47 between its new junction with the WWHAR Classified Road and Hardwick Interchange. An Improvement scheme is also proposed for the Hardwick roundabout which includes revisions to the main gyratory and removal of the Constitution Hill roundabout which is proposed to be replaced by direct slip roads from A47 main carriageway, seeking to reduce delays to through traffic on the Strategic Road Network.

1.2 Scheme Design and Development

1.2.1 The Proposed Scheme consists of the construction of a new single carriageway road linking the A47 Constitution Hill from its junction with the A10 and A149 Cromer Road to the A10 south of West Winch. The road would pass through an area of predominantly existing farmland which is proposed



for strategic housing development as part of the King's Lynn and West Norfolk Local Plan.

1.2.2 The main elements of the WWHAR scheme include:

- A housing access road to the east of West Winch connecting the A47 with the existing A10. This will provide the additional road capacity necessary to accommodate traffic associated with new dwellings;
- A roundabout on the housing access road providing access to the Hardwick Green planned housing development proposed by Hopkins Homes for up to 1100 new dwellings at the northern end of the WWGA;
- Two additional roundabout junctions on the housing access road to serve proposed dwellings that are outside the planned Hardwick Green development;
- A roundabout on the housing access road, at its southern end, providing a connection to the existing A10;
- Modifications to the existing Hardwick Interchange to accommodate additional housing traffic plus re-orientation of trips through the junction;
- Dualling of the existing A47 between Hardwick Interchange (Constitution Hill roundabout) and the housing access road;
- A signalised roundabout junction where the housing access road meets the A47; and
- An overbridge where Rectory Lane crosses the proposed scheme to maintain east-west connectivity for all users between West winch and North Runcton.
- A signalised Non-Motorised User crossing at the approximate location where Chequers Lane intersects the proposed WWHAR route, with motor vehicle access severed between North Runcton and West Winch.



- A dedicated left-in, left-out private access for Manor Farm onto the WWHAR alignment immediately south of chequers Lane to retain access and prevent re-routing of HGVs through the village of North Runcton.

1.3 Embedded Mitigation Measures

1.3.1 Strategic traffic modelling has been carried out across the wider network using the Kings Lynn Transport Model (KLTM). The SATURN model outputs from the KLTM have also been used to produce a more detailed Paramics Discovery model of the local area around the scheme encompassing the WWHAR and this more detailed assessment has informed the peak hour assessments within this TA. Earlier stage Paramics modelling highlighted that additional interventions were required to be included in the scheme as follows, so these elements are already captured within the main case for assessment within this TA as embedded mitigation. Comparison of the scenarios with and without the Proposed WWHAR Scheme indicated that the following additional interventions would assist with delivering a sustainable outcome:

- Beveridge Way needs to be additionally signalised to reduce queue lengths.
- Signalisation of WWHAR/A47 roundabout is required from the outset to balance flows and minimise queues and delays on A47.
- Revisions to signal timings at Scania Way junction with A149 Hardwick Road
- Reduced speed limits and a weight limit on A10 through the village of West Winch to reduce the attractiveness of the existing route to through traffic, and appropriate supporting measures to support these restrictions.
- Measures set out within the STS (Document Reference **NCC/4.02.00/WWHAR**) to be implemented on A10 to encourage uptake of bus services, including conversion of existing bus laybys to



on carriageway bus boxes with wider footways and improved passenger waiting facilities.

- A monitoring and evaluation scheme is also expected to be put in place following scheme opening covering the A10 through the village of West Winch. In the event that traffic flows on the A10 exceed the future year predicted volumes substantially, additional measures could be drawn from those considered within the Appendix 2 Multi-Criteria Assessment Framework of the STS (Document Reference **NCC/4.02.02/WWHAR**).

1.4 Key Justification for the Scheme

- 1.4.1 The proposal for the WWHAR has been developed by Norfolk County Council, working in partnership with National; Highways and Borough council of Kings Lynn and west Norfolk to serve the West Winch Growth Area. The Strategic Outline Business Case (SOBC) for the scheme was approved by the Department for Transport in Summer 2022. An Outline Business Case has subsequently been developed and submitted to the Department for Transport in October 2023.
- 1.4.2 The Hardwick Roundabout A10 approach is forecast to exceed its theoretical capacity by the opening year of the Proposed Scheme in 2027. As a key central junction within the West Norfolk road network, this will severely restrict the ability of housing growth to be delivered sustainably to support the housing need identified within the district.
- 1.4.3 The A47/A10/A149 junction is a key node in the local highway network around Kings Lynn with is immediately adjacent to the main employment hub within the District. With over 30,000 jobs within 5km, congestion at this interchange is a key constraint on the district realising its economic potential.
- 1.4.4 The Proposed Scheme would unlock housing growth in the WWGA where up to 4000 dwellings are planned, of which only 300 new homes can be built and occupied in the A10 corridor prior to strategic highway intervention being required. Therefore, the proposed WWHAR Scheme can be seen to unlock up housing capacity for to 3,700 dwellings.



1.4.5 The Scheme Objectives are set out within Chapter 2 of the TA. There are a number of existing transport problems that the Proposed Scheme has been developed to address. These include:

- The Proposed Scheme enables traffic travelling from A10 to A47 to avoid the congested Hardwick Interchange.
- The removal of the A47 Constitution Hill roundabout makes the Hardwick Interchange more logical and easier to navigate for drivers. This should help to improve highway safety as drivers are more likely to drive in the correct lane for their journey.
- The inclusion of direct slip roads to and from A47 on the east side of the junction reduce the likelihood of queues blocking back into the Hardwick gyratory.

1.4.6 With its connectivity to Cambridge and London, the existing A10 is strategically important to the region and is heavily used by commuters, visitors and haulage companies. The section between Watlington and King's Lynn experiences some of the highest traffic levels on the A10, as stated in the A10 Ely to King's Lynn Stage 1&2 Baseline Report prepared by Cambridgeshire County Council in 2017.

1.4.7 A traffic count undertaken in 2019 on the A10 immediately to the south of West Winch identified a daily flow of approximately 20,000 vehicles, of which over 11% are HGVs DfT Road Traffic Statistics. The section of the A10 on the approach to King's Lynn is prone to significant rush hour and seasonal congestion, regularly resulting in queues of 3-5km, as identified in the North Runcton & West Winch Neighbourhood plan period 2016-2026. These queues result in extended and unreliable journey times. These delays are likely to be partly due to the decrease in speed limit from 60mph to 40mph due to the vicinity of the road to West Winch and Setchey. In addition, there are severance issues for the local community in West Winch due to the volume and nature of traffic using the A10. This volume of traffic through West Winch is also likely to be contributing to poor air and noise quality for local residents.



On the A10 itself in this area, accident records show that over the last five years there have been 28 accidents, 4 of which were considered serious and the remainder slight.

1.4.8 As it currently operates, the character of the existing A10 through West Winch is not in keeping with a road on the Major Road Network (MRN) due to:

- A high number of direct accesses to private properties
- Numerous priority junctions with side roads, from which local traffic struggles to enter the A10
- Various controlled and uncontrolled pedestrian crossings

1.4.9 The section of the A47 within the area is a single carriageway. When approaching from the east, the 40mph speed limit starts approximately 150m from the Hardwick Interchange and through the satellite roundabout on Constitution Hill, where it then increases to 60mph.

1.4.10 The A47 is classed as a regional trunk road and a vital east-west corridor connecting Norfolk to the Midlands and the north. Its strategic location means that the A47 generates a high level of HGV movements. With a high level of HGV traffic on a single carriageway there are frequent slow-moving tailbacks and delays at pinch points. This results in high levels of congestion and a lack of network resilience.

1.4.11 The existing Hardwick Interchange is a major junction and a main gateway into and out of King's Lynn from the Strategic Road Network (A47). It comprises the following:

- A six-arm roundabout forming a junction with the A47, A10, A149, Hardwick Road and Beveridge Way, five of the six arms are traffic signal controlled
- A flyover above the roundabout that provides a single lane in each direction for east-west (and west-east) through traffic on the A47



- A satellite roundabout on the A47 Constitution Hill, east of the flyover, which forms a connection between the A47 and the main roundabout

1.4.12 At present the Hardwick Interchange is a known road capacity constraint and is responsible for significant delays for vehicles travelling to/from King's Lynn. The Hardwick roundabout has also been identified as a 'cluster location' for accidents within King's Lynn in the Kings Lynn Transport Study and Strategy, Evidence Gathering and Analysis of Current and Future Transport Problems and Opportunities (Norfolk County Council and Borough Council of King's Lynn and West Norfolk, 2018).

1.4.13 King's Lynn has experienced an increase in economic activity over the last decade and a half. The development of the Enterprise Zone, and other strategic employment sites is making the town an increasingly attractive destination for working and living. From 2003 to 2016, there was 12% growth in jobs, amounting to 6,500 net new jobs, identified in the King's Lynn and West Norfolk Local Report for the Greater Cambridge Greater Peterborough (GCGP) Enterprise Partnership Area-Based Review, which can be found on the GCGP website. This growth has resulted in an increase in the number of vehicles travelling on roads within the region including commuting, freight and tourism traffic.

1.4.14 Over 76% of commuting trips within King's Lynn are by private car (as a driver). This is higher than the England and Wales average of 67% Journey to Work Census data 2021. In addition, a further 8% travel by private car as a passenger. This shows the fundamental role that the region's roads play in keeping people and businesses moving. In particular the significance of the A10, A47 and the Hardwick Interchange in providing connectivity to the wider region and UK.

1.4.15 Demand above capacity on the road network in the region, and the lack of alternative routes, has resulted in economic, environmental and safety concerns. The WWHAR Proposed Scheme would provide an alternative to the existing A10 through the village of West Winch enabling the A10 to be re-purposed as a local road and made safer for NMU crossing movement.



1.4.16 Businesses rely on the road network for distribution and/or supply needs.

These businesses have been presented with higher operating costs due to delays during congested periods while employees can be faced with longer commutes. These can impact business productivity. The availability of increased highway capacity is anticipated to alleviate this issue in the vicinity of West Winch and would provide longer-distance through traffic with an alternative route option to avoid congestion.

1.4.17 Employees and residents are faced with unreliable journey times making it difficult for drivers to predict the time needed for their journeys. The more time spent in traffic delays, results in less time spent for leisure or at work. The WWHAR provides additional network resilience by providing an alternative route to the A10 which is designed to operate within capacity for the foreseeable future. This should offer more reliable journey times.

1.4.18 Collisions, roadworks and seasonal tourism can have more impact on single carriageway roads due to the lack of additional lanes or alternative routes. Without an alternative route, it is difficult for the current A10 carriageway to recover quickly from incidents or to accommodate unexpected peaks in demand which also limits the ability to bring forward housing development.

1.4.19 The Hardwick Interchange has a relatively poor highway safety record due to its current layout which can be confusing for drivers wishing to access A47 via Constitution Hill roundabout. Anecdotal evidence and observations during site visits indicate that the existing layout may be counterintuitive and unfamiliar drivers can select the incorrect lane for their journey causing conflict within the main gyratory. As this route is on a main coastal tourism route to the North Norfolk Coast, the junction is frequently used by unfamiliar drivers. The Proposed Scheme includes removal of the existing Constitution Hill satellite roundabout and replacement of this with slip roads is expected to offer a more traditional and intuitive layout and is therefore expected to reduce collision risk due to incorrect lane selection.

1.4.20 Both the A10 and A47 offer regional connectivity to the Queen Elizabeth II Hospital (QEIIH) located approximately 3km north east of Hardwick



Interchange immediately adjacent to A149 junction with A1076. QEIIH is a major hospital and A&E department that serves Kings Lynn and the surrounding area. According to information published by Queen Elizabeth Hospital NHS Foundation Trust, the QEIIH “provides a comprehensive range of specialist, acute, obstetrics and community-based healthcare services to around 331,000 people across west and north Norfolk, in addition to parts of Breckland, Cambridgeshire and South Lincolnshire, plus approximately 530 beds, and a helipad for air ambulances”. Source: [Employer details | trac.jobs \(nhsjobs.com\)](https://www.nhsjobs.com)

- 1.4.21 Improvements to the highway network at Hardwick interchange would facilitate improved access to the hospital and improved emergency response times. The hospital site is also a major employer with more than 4,000 staff and volunteers, so access to jobs would also be enhanced for staff working in key worker jobs and critical services.
- 1.4.22 The area around Hardwick Interchange is also a major employment hub, which encompasses Hardwick Industrial Estate to the northwest, Scania Way to the north and Hardwick Narrows Industrial Estate to the south west. The Proposed WWHAR Scheme is expected to facilitate the delivery of housing in close proximity to this major hub which in the longer term has the potential to create a synergy to help reduce trip distances for access to jobs in the local area. The West Winch Growth Area would place 4000 new dwellings in walking and cycling distance of key jobs, helping to reduce commuting distances and increase the mode share of active travel and public transport. Unlocking this level of sustainable growth would be facilitated by the delivery of the Proposed WWHAR Scheme.
- 1.4.23 A Technical Note on A10 Headroom was submitted to Borough Council of Kings Lynn and West Norfolk to support the evidence base for the Local Plan Review in 2023. A copy of the A10 Headroom technical note is enclosed in **Appendix 3** of the TA (Document Reference **NCC/4.01.03/WWHAR**). This includes a review of highway capacity constraints on the A10 to understand the theoretical link capacity of the existing network based on DMRB guidance



set out within TA 79/99 and observed surveys of traffic flows on the A10 at peak times collected in October 2022. This indicates that there is peak hour capacity available of around 95 trips in the Northbound direction in the AM peak hour. A range of trip rates have been considered based on the Hopkins Homes development assumptions in their submitted planning application from the TA dated 2017. These trip rates were calculated on pre-pandemic traffic survey data and indicate development capacity in the region of 300 dwellings could be delivered prior to strategic intervention is required in the A10 corridor.

1.4.24 A sensitivity test has been carried out using more recent data from the TRICS database for site selections available in 2023, indicates that there may be a slight increase in capacity for non-dependent development of up to 350 dwellings. However, it is clear from public consultation feedback obtained by BCKLWN in July 2022 in relation to the masterplan that there is concern from local residents regarding additional development in West Winch due to the existing capacity issues on A10 and increased pressure on the Hardwick Interchange. Therefore, the lower bound total of 300 dwellings has been used as a robust trigger point for strategic intervention within the Kings Lynn and West Norfolk Local Plan.

1.4.25 Paragraphs 4 and 5 of the DfT Circular 01/22 also highlights the strategic importance of the SRN in facilitating efficient access to key destinations, stating that '4. The principal purpose of the SRN is to enable safe, reliable, predictable, efficient, often long distance, journeys of both people (whether as drivers or passengers) and goods in England between our:

- main centres of population
- major ports, airports and rail terminals
- geographically peripheral regions of England and
- chief cross-border routes to Scotland and Wales



1.4.26 5. In this regard, the SRN provides critical links between our cities and other urban areas, serves as a gateway to global markets and travel destinations, connects our communities with families and job opportunities, and binds and strengthens our union. It drives productivity and prosperity by unlocking growth, encouraging trade and attracting investment, and plays a vital role in levelling up the country.'

1.4.27 The WWHAR scheme is therefore well placed to enhance the efficiency of connections to the main population centres of Kings Lynn and other towns and settlements in West Norfolk. The BCKLWN area is the county's third most densely populated built up area, with a population of 154,900 (Nomis, 2021). Dating back to the 12th century, King's Lynn has retained its role as an import centre. The historic port has facilities for steel, timber, dry bulk cargo, such as cereals, and liquid bulk cargo, such as petroleum. Retail and tourism are other key industries in the area, with visitors attracted to King's Lynn's historic centre and nearby Sandringham House.

1.4.28 The county of Norfolk can also be considered to be a peripheral region of England as it is a coastal area enclosed by the North Sea and the Wash on three sides. It has limited coverage of the SRN within Norfolk and this scheme helps to reduce delays for traffic access local destinations from A47 and congestion on interfacing Primary Roads especially the A10.

1.5 Transport Assessment Scope and Methodology

1.5.1 A Transport Assessment (TA) has been prepared for the Proposed Scheme. The scope of the Transport Assessment was discussed with NCC Highways and National Highways Development Management teams and is to be produced in accordance with the applicable local and national guidance set out within Norfolk County Council Safe Sustainable Development note 2022 and DfT Circular 01/22.

1.5.2 A strategic transport model has been developed to assess the potential rerouting of traffic in response to the new highway link and this has been used



to identify whether any measures are necessary to mitigate the traffic impacts of the scheme.

1.5.3 The Safe Sustainable Development Guidance Note sets out the following Aims:

- Aim 1 Climate change & Net Zero - New development and its travel impacts need to contribute to the county council's commitment to decarbonisation.
- Aim 2 (Transport Sustainability). Minimising travel to ensure people can access facilities they need by appropriate transport modes, encouraging walking, cycling and public transport use and reducing the use of private cars especially for shorter journeys.
- Aim 3 To encourage residents to explore active and healthier ways to travel.
- Aim 4 (Rural Diversification). To support agricultural enterprises and the rural economy, by encouraging other appropriate forms of development.
- Aim 5 To support national targets relating to the percentage of electricity that should be provided by renewable energy
- Aim 6 To keep commercial vehicles away from areas where their presence would result in danger/unacceptable disruption to the highway/or cause irreparable damage.
- Aim 7 Development needs to be serviced in a safe manner which does not result in any detriment to the free flow of traffic or public safety. In accordance with the NPPF, it also needs to allow for the efficient delivery of goods.
- Aim 8 To ensure development conforms to parking policies and standards which take into account strategic and local objectives.



- Aim 9 To ensure the Major Road Network and Principal Road Network (PRN) can safely cater for sustainable development, which, if not suitably addressed, would otherwise cause fundamental road safety and accessibility concerns.
- Aim 10 New development within Norfolk of regional/national importance shall promote the use of rail and water.

1.5.4 The requirement for a full Transport Assessment rather than a Transport Statement is based on the thresholds specified in Appendix A of Safe Sustainable Development 2022. The Proposed Scheme is considered to fall into the category of 'Any development proposed in a location where the local transport infrastructure is inadequate - for example, substandard roads, poor pedestrian/cyclist facilities and inadequate public transport provision'.

1.6 Policy Compliance

1.6.1 The Proposed Scheme takes into consideration and adheres to following national and local transport related policy and guidance. The following policy documents have been reviewed within Chapter 5 of this TA:

- National Planning Policy Framework (NPPF) 2023;
- Planning Practice Guidance (PPG), 2023;
- The DfT Circular 01/22 (2022) – Strategic road network and the delivery of sustainable development
- Gear Change: A Bold Vision for Walking & Cycling (2020);
- Decarbonising Transport: A Better, Greener Britain (2021)
- The Clean Growth Strategy (2017)
- Clean Air Strategy (2019)
- Net Zero Strategy: Build Back Greener (2021)
- National Design Guide (2021)



- National Model Design Code (2021)
- Cycle Infrastructure Design Local Transport Note LTN 1/20 (2020);
- Active Travel: Local Authority Toolkit (2022)
- Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (2021)
- The Second Cycling and Walking Investment Strategy (2023)
- Norfolk Strategic Framework – Shared Spatial Objectives for a Growing County (July 2017)
- Norfolk Strategic Infrastructure Delivery Plan (2022)
- Norfolk Local Transport Plan 4 Implementation Plan (2022)
- Safe, Sustainable Development (SSD, revised July 2022)
- Norfolk County Council Local Transport Plan 4 2021 – 2036
- Norfolk Bus Service Improvement Plan (2021)
- King's Lynn Local Cycling and Walking Infrastructure Plan Main Report (2022)
- King's Lynn and West Norfolk Local Plan
- King's Lynn and West Norfolk Borough Council Local Plan (Core Strategy) 2011
- King's Lynn & West Norfolk Site Allocations And Development Management Policies (2016)
- North Runcton and West Winch Neighbourhood Plan (2017)
- Emerging King's Lynn & West Norfolk Local Plan Review (2016-2036)
- King's Lynn Transport Strategy (2019)
- Draft Southeast King's Lynn Growth Area Framework Masterplan Spatial Planning Document July 2022

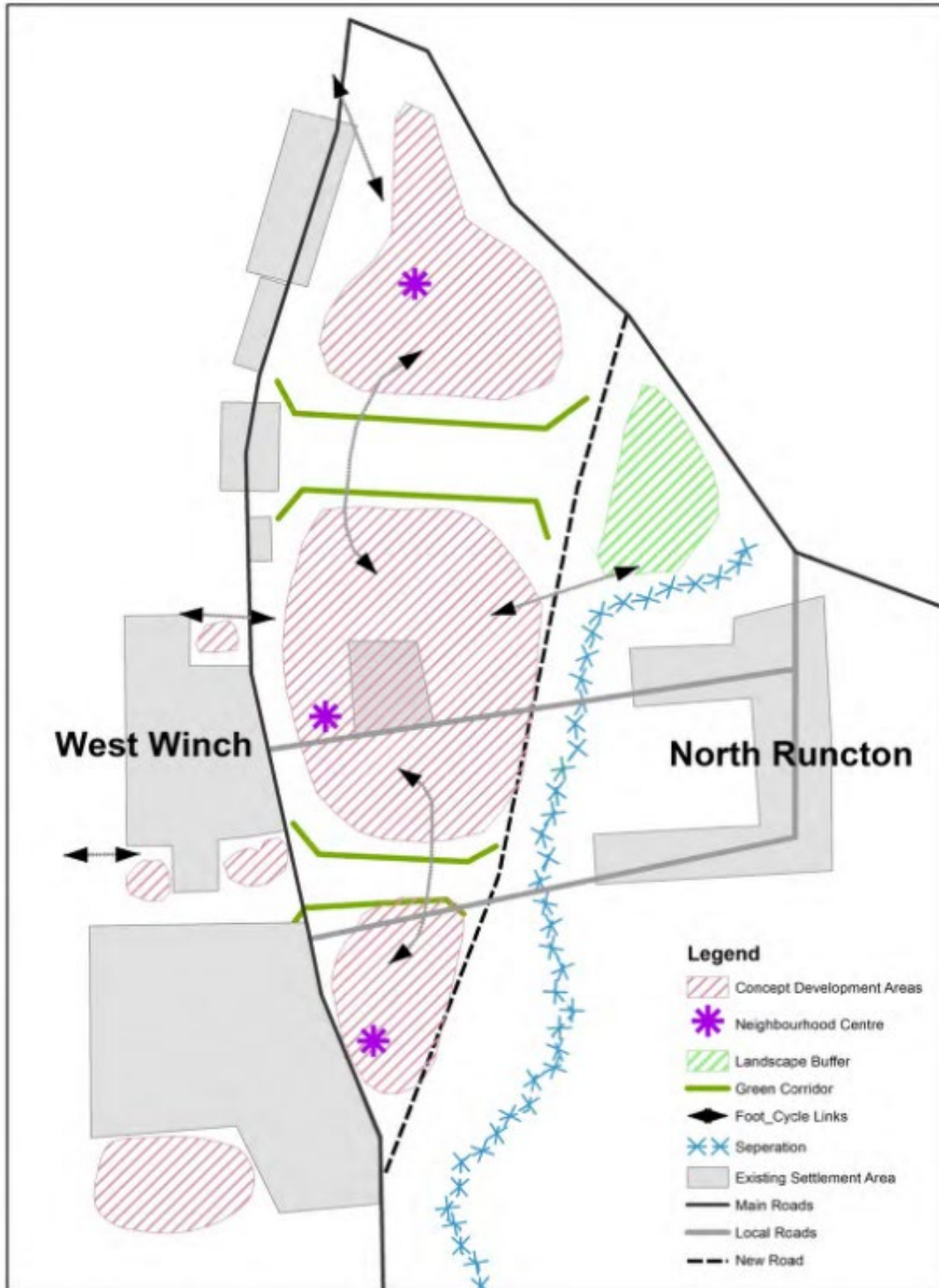


- BCKLWN Climate Change Policy (October 2020)
- Norfolk County Council Local Transport Plan (LTP4) 2020 – 2037 (2022)
- Norfolk County Council Climate Strategy (2023)

1.6.2 BCKLWN Climate Change Policy (October 2020) The Proposed Scheme is specifically recognised in the King’s Lynn and West Norfolk Borough Council (BCKLWN) Site Allocations and Development Management Policies Plan as shown in **Figure1-2** below.



Figure 1-2 BCKLWN Site Allocations: West Winch Strategic Concept (indicative)





1.7 Modelling and Forecasting

1.7.1 As set out above, this TA has been informed by a strategic SATURN Model known as Kings Lynn Transport Model (KLTM) and a Paramics Discovery model.

1.7.2 Analysis of the modelling (operational traffic) results showed that the Proposed Scheme is forecast to:

- Redistribute the majority of through traffic to the WWHAR
- Alleviate pressure on the A10 northbound approach to the Hardwick Interchange
- Removal of the Constitution Hill roundabout reducing congestion and delays on the A47
- Proposed new WWHAR roundabouts are shown to operate well within capacity with good levels of service.

1.7.3 Additional testing has been carried out including the proposed WWGA housing development of up to 3,700 additional dwellings in the DS2 scenario. This showed that in the TA assessment year of 2037, some 10 years after opening of the new road, the Proposed Scheme is able to operate acceptably.

1.8 Baseline Conditions

1.8.1 An Uncertainty Log has been developed in consultation with the local planning and highway authorities to identify proposed developments and their current planning status in order to ascertain whether they require consideration within the transport assessment in addition to the WWGA housing proposals.

1.8.2 The future Do Minimum scenario has been developed within the KLTM and the localised Paramics model to reflect all developments that are classed in the UL as 'near certain' or 'more than likely' within a core growth scenario as used within the Outline Business Case. The Do Minimum forecast includes non-dependent development in West Winch totalling 300 dwellings but without



the Proposed WWHAR Scheme. The remaining 3,700 dwellings proposed within the WWGA are excluded.

- 1.8.3 In the Do Minimum scenario the A10 northbound approach to the Hardwick Interchange is shown to be under considerable pressure with a poor level of service and significant queues and delays and the situation is shown to worsen in the future years of assessment. Hence there is considerable opportunity for the Proposed Scheme to address this issue.

1.9 Impact Assessment Summary

- 1.9.1 Two 'Do Something' (DS) scenarios have been considered within the forecasting that forms the basis to this assessment. DS1 takes the Do Minimum (DM) scenario and simply adds the Proposed WWHAR new highway scheme, whilst DS2 additionally includes the 3,700 dwellings and associated development in the WWGA that are expected to be dependent on the WWHAR.
- 1.9.2 The Paramics modelling in the DS1 scenario indicates that the provision of an alternative route via the WWHAR enables traffic to divert away from the previously congested A10 corridor and alleviates pressure on the A10 northbound approach to the Hardwick Interchange. Traffic accessing Kings Lynn and destinations to the north via A149 are instead able to re-route via the proposed dualled section of the A47 and access Hardwick via the revised slip roads that replace the Constitution Hill roundabout.
- 1.9.3 In the DS2 scenario, additional strategic development traffic is added to the network and this can be seen to occupy some of the headroom capacity that is created on A10 as a result of the WWHAR, as well as increasing use of the new road and A47. However, with both the housing and the WWHAR in place, the network is shown to operate acceptably with a good level of service at the majority of junctions.



1.10 Proposed Mitigation

1.10.1 Earlier testing within the Paramics modelling as the Proposed Scheme design has been emerging, indicated that some aspects of the design required modification in comparison with the original scheme design considered within the Outline Business Case. The following elements have been included at the planning stage additionally as embedded mitigation, so these components are already included within the Paramics modelling in the DS1 and DS2 scenarios:

- Beveridge Way signalisation to reduce queue lengths.
- Signalisation of WWHAR/A47 roundabout from the outset to balance flows on WWHAR and A47 as there is a high demand for right turning movements at this junction.

1.10.2 In both DS1 and DS2 scenarios, the Scania Way junction with A149 Hardwick Road were also shown to receive a slight increase in pressure, with reduced Levels of Service evident on the southbound approach at the Sania Way arm. This junction is already approaching capacity in the Do Minimum situation so even a small impact will increase queues and delays. The Paramics modelling indicates that changes to the signal timing are expected to assist with minimising queue lengths and delays at this junction. However, it is recommended that SCOOT re-validation is additionally undertaken at this location once the new WWHAR link and changes to Hardwick Interchange are in place so that the performance of the signal technology on the ground can be optimised at this location for the revised levels of demand.

1.10.3 For accessibility and highway safety reasons, an at grade crossing of the WWHAR is proposed where Chequers Lane is severed by the new road. To meet the design requirements set out within the LTN1/20 guidance in respect of highway safety, the crossing is expected to require signalisation, especially with intensified usage as a result of the proposed WWGA development in close proximity as this will increase the number of desire lines crossing the



new road in the future. A grade separated bridge is also to be provided at Rectory Lane.

1.10.4 A signal strategy is provided alongside the Planning Application (Document Reference **NCC/2.18.00/WWHAR**) which sets out the approach taken and decisions made on signalisation across the Proposed Scheme.

1.11 Sustainable Transport Strategy

1.11.1 In order to assist with meeting the full set of overall scheme objectives, a Sustainable Transport Strategy (STS) has been developed. The STS is intended to encourage active travel and public transport use to offer alternatives to car travel for shorter journeys in the study area. This is set out within the Sustainable Transport Strategy (Document Reference **4.02.00**). Measures included in the STS have been prioritised based on their value for money and alignment with the Proposed Scheme objectives, plus other delivery and feasibility criteria.

1.11.2 With traffic relief to the A10 provided by the WWHAR and increased emphasis on local trips using the existing road in preference to strategic through traffic (as is currently the situation), there is an opportunity to re-purpose the A10 to help create improved placemaking. The proposals therefore include the following works to the A10 which are set out in more detail in Appendix 4 of the STS (Document Reference **NCC/4.02.04/WWHAR**):

- Additional signalised crossings on the A10 throughout West Winch
- Bus stops on carriageway instead of in laybys as currently configured
- Mobility hub in the centre of the village
- Speed limit reductions to 30mph with as short section of 20mph speed limit in the centre of West Winch
- 7.5 Tonne HGV weight restriction except for access



1.11.3 The STS was informed by public consultation and stakeholder engagement as explained in Appendix 1 of the STS (Document Reference **NCC/4.02.01/WWHAR**).

1.11.4 In formulating the STS, applicable policies have been taken into account including the aspirations for a 50% mode share for active travel going forward as set out within Gear Change, 2020. The policy is aligned with the LCWIP and BSIP which are Norfolk County Council's local strategies for improving access by cycling, walking and bus.

1.11.5 The STS also assists with fulfilling Aims 1-3 set out within the Safe Sustainable Development guidance 2022 which emphasise the importance of providing a multi-modal and accessible development which maximises opportunities for active and sustainable travel.

1.11.6 The STS also contributes towards meeting the paragraph 12 of the DfT Circular 01/22 'Strategic road network and the delivery of sustainable development' which emphasises the importance of providing development in accessible locations:

- '12. New development should be facilitating a reduction in the need to travel by private car and focused on locations that are or can be made sustainable...Developments in the right places and served by the right sustainable infrastructure delivered alongside or ahead of occupancy must be a key consideration when planning for growth in all local authority areas.

1.12 Conclusions

1.12.1 The TA concludes that the implementation of the Proposed Scheme in combination with the proposed traffic mitigation measures will help to create a more sustainable and resilient transport network for the future which will adequately support forecast traffic levels to 2037 and beyond.

1.12.2 The Proposed Scheme offers a new single carriageway road link to the east of A10 avoiding the village of West Winch, plus a dual carriageway section of



A47 and improvements to the layout of the Hardwick Interchange which is a key node in the local and Strategic Road Network. This is expected to enhance highway safety and capacity to enable delivery of the Borough of Kings Lynn and West Norfolk planned housing growth totalling 4000 dwellings at the West Winch Growth Area (WWGA) as set out within the Local Plan Review.

- 1.12.3 Overall, the TA finds that the proposed scheme is likely to provide operational and capacity benefits to the wider highway network, including the Strategic Road Network at the A47. A Sustainable Transport Strategy has also been developed to assist with delivering the full set of WWHAR scheme objectives, so that the strategic outcomes envisaged for the project can be realised.
- 1.12.4 Therefore, in the context of the NPPF, 2023 planning policy requirements, there should be no reason in highways and transport terms for the scheme not to proceed.
- 1.12.5 Taking into account the above, the TA concludes that the Proposed Scheme should be considered acceptable in terms of highways and transport impact.



2 Introduction

2.1 Introduction

2.1.1 WSP has been appointed to produce a Transport Assessment (TA) on behalf of Norfolk County Council (NCC) to support the planning application for the proposed West Winch Housing Access Road (WWHAR) scheme. Within this document WSP set out the proposed Scope of the TA for the WWHAR.

2.2 Scheme description

2.2.1 The main elements of the West Winch Housing Access Road (WWHAR) ('the Proposed Scheme') include:

- A 3.5km long carriageway to the east of West Winch connecting the A47 with the existing A10, providing access to proposed housing development;
- Modifications to the existing Hardwick Interchange and dualling of the existing A47 between Hardwick Interchange and the housing access road;
- Treatment of local roads severed by the housing access road including an overbridge at Rectory Lane to accommodate road and bridleway users, and closure of Chequers Lane where it crosses the scheme with an at-grade signalised crossing, to maintain east to west access;
- Modifications to the existing A10 to improve safety and support its repurposing as a local traffic route;
- Construction of drainage features, including basins, and associated maintenance access tracks;
- Landscaping, and connections for non-motorised users;
- Utility diversions, including National Grid gas mains;
- Demolition of Hill Cottages on A47 Constitution Hill; and



- Temporary use of land during construction for working areas, haul routes, site compounds, and storage.

2.2.2 The housing access road will be predominantly single carriageway, with a short section of dual carriageway on the approach to the A47 and feature a total of five roundabouts including;

- A partially signalised roundabout junction where the housing access road meets the A47;
- A roundabout on the housing access road providing access to the Hardwick Green (i.e. Hopkins Homes) planned development, plus two roundabout junctions to accommodate connections to further housing development;
- A roundabout at the southern end of the housing access road, providing a connection to the existing A10 with new signalised crossings nearby;

2.2.3 A comprehensive description is provided in Chapter 3 of the Environmental Statement 'Description of the Proposed Scheme' (Document Reference: **NCC/3.03.00/WWHAR**).



2.2.4 The WWHAR, forms a vital part in the development of the South-East King's Lynn Strategic Growth Area (known locally as the West Winch Growth Area), which was identified in the King's Lynn and West Norfolk Local Plan Review as the primary site for substantial housing development in the district. The West Winch Growth Area is set to comprise up to 4,000 new dwellings on land between the A10 and A47. The site has been selected for (amongst other reasons) its proximity to an extensive range of employment opportunities and local facilities in King's Lynn. This would help minimise trip distances for many journeys.

2.2.5 The Hardwick Interchange is a key junction in the local and Strategic Road Network (SRN). It is known to suffer capacity issues at peak times. Hence an improvement scheme has been developed by Norfolk County Council working with National Highways. This forms part of the West Winch Housing Access Road scheme.

2.3 Site Location and Surrounding Areas

2.3.1 The Proposed West Winch Housing Access Road (WWHAR) is intended to connect the A10 to the A47 along a new 3.5km road, starting south of Gravelhill Lane in West Winch and joining the A47 before it reaches the Hardwick Interchange. A plan showing the location of the Site and surrounding areas is provided in **Figure 2-1** below.



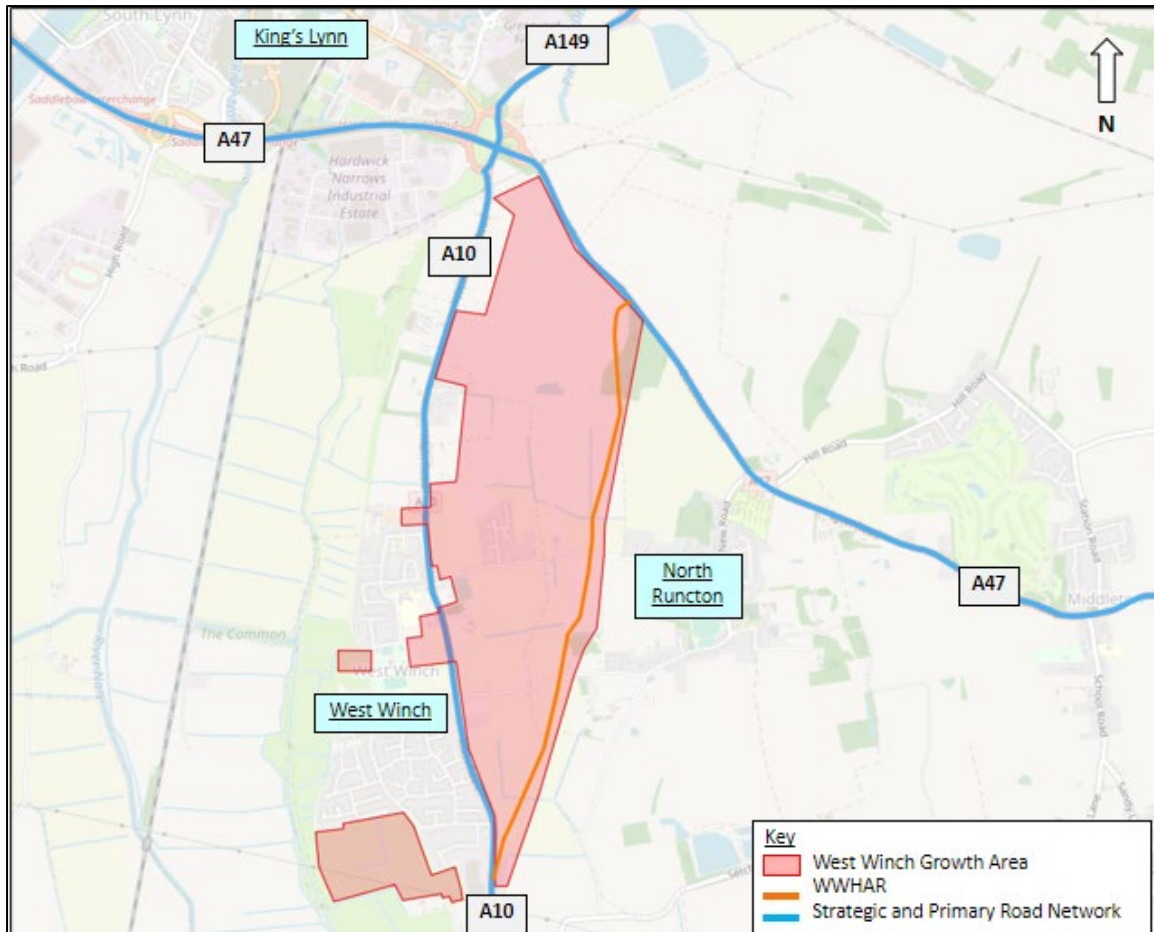
Figure 2-1 Site Location and Surrounding Areas



2.3.2 The West Winch Strategic Growth Area (WWSGA), presented in **Figure 2-2**, is located to the south-east of King's Lynn, occupying an undeveloped area between the villages of North Runcton and West Winch. It stretches 3.5km north-south and 1.5km east-west. The area borders the village of West Winch and the main road (A10) north towards Hardwick Interchange and King's Lynn. It stretches towards, but stops short of, North Runcton village.



Figure 2-2 West Winch Growth Area Indicative Location Plan



2.4 Creating Highway Capacity for Growth

2.4.1 The traffic flows on the A10 have been reviewed to identify available headroom based on link capacity, as set out in **Appendix 3** (Document Reference **NCC/4.01.03/WWHAR**). This analysis indicates that there is existing capacity for about 300 new homes at West Winch prior to a requirement for strategic intervention.

2.4.2 The completion of the Proposed Scheme is intended to unlock capacity for the remainder of the planned 3,700 dwellings within the West Winch Growth Area beyond the initial 300 dwellings which can proceed prior to the WWHAR. The Proposed Scheme would simultaneously address the existing traffic problems on the A10 approach to Hardwick Interchange by providing an alternative route around the village that conforms to Major Road Network Standards.



2.4.3 Norfolk County Council (NCC) is working in partnership with National Highways and the Borough Council of King's Lynn and West Norfolk (BCKLWN) to support planned housing delivery and coordinate the provision of the required highway infrastructure in the West Winch area. This comprises the West Winch Housing Access Road (WWHAR) which includes improvements to the Hardwick Interchange, dualling of a section of the A47 west of its connection with the WWHAR and modifications to the existing A10 to reduce the dominance of traffic and prioritise sustainable modes through the existing village of West Winch.

2.5 Scope of Assessment

2.5.1 The scope and assumptions of the TA have been discussed with the Local Highway Authority and National Highways Spatial Planning team as custodian of the Strategic Road Network (SRN) as set out within **Appendix 1** (Document Reference **NCC/4.01.01/WWHAR**). Key aspects considered are explained below.

2.5.2 The TA should include a description of the Proposed Scheme in so far as it is relevant to the assessment of traffic and transport, including A47 and Hardwick Interchange works, proposed new housing access road and associated roundabouts and the walking, cycling and equestrian facilities that are proposed as part of the scheme.

2.5.3 Consideration of relevant planning and transport-related planning policy covering national guidance set out within NPPF 2023 and associated planning practice guidance, as well as applicable local transport and development policies. These include Norfolk Local Transport Plan 4, Borough Council of Kings Lynn and West Norfolk Local Plan Review which is currently undergoing Examination in Public (EiP), amongst others.

2.5.4 The Transport Assessment is produced in accordance with the Safe Sustainable Development policies published by NCC which includes the following Aims:



- Aim 1 Climate change & Net Zero - New development and its travel impacts need to contribute to the county council's commitment to decarbonisation.
- Aim 2 (Transport Sustainability). Minimising travel to ensure people can access facilities they need by appropriate transport modes, encouraging walking, cycling and public transport use and reducing the use of private cars especially for shorter journeys.
- Aim 3 To encourage residents to explore active and healthier ways to travel.
- Aim 4 (Rural Diversification). To support agricultural enterprises and the rural economy, by encouraging other appropriate forms of development.
- Aim 5 To support national targets relating to the percentage of electricity that should be provided by renewable energy
- Aim 6 To keep commercial vehicles away from areas where their presence would result in danger/unacceptable disruption to the highway/or cause irreparable damage.
- Aim 7 Development needs to be serviced in a safe manner which does not result in any detriment to the free flow of traffic or public safety. In accordance with the NPPF, it also needs to allow for the efficient delivery of goods.
- Aim 8 To ensure development conforms to parking policies and standards which take into account strategic and local objectives.
- Aim 9 To ensure the Major Road Network and Principal Road Network (PRN) can safely cater for sustainable development, which, if not suitably addressed, would otherwise cause fundamental road safety and accessibility concerns.



- Aim 10 New development within Norfolk of regional/national importance shall promote the use of rail and water.

2.5.5 DfT Circular 01/22 is also applicable in respect of the Strategic Road Network as required by National Highways. Paragraph 12 of the DfT circular emphasises the importance of achieving a sustainable development:

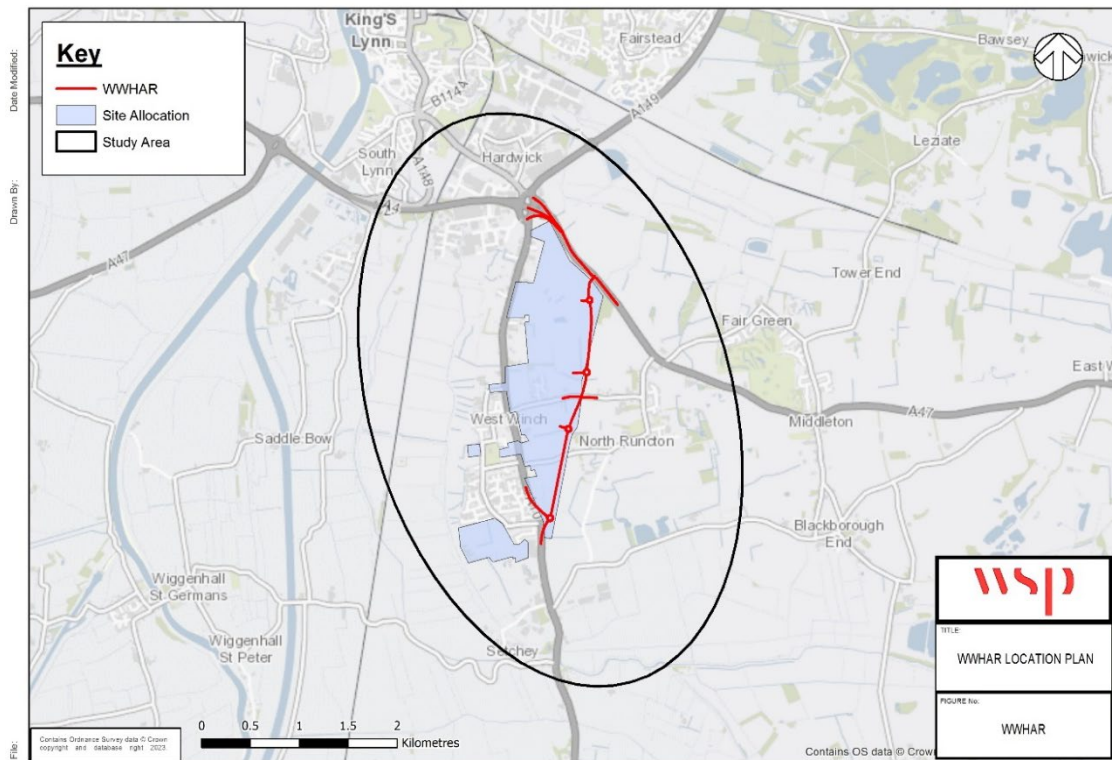
- '12. New development should be facilitating a reduction in the need to travel by private car and focused on locations that are or can be made sustainable...Developments in the right places and served by the right sustainable infrastructure delivered alongside or ahead of occupancy must be a key consideration when planning for growth in all local authority areas.

2.5.6 The TA should include a review of baseline transport conditions covering all users of the local transport network, including: traffic conditions on the surrounding local road network; pedestrian facilities; cycle facilities; equestrian facilities; public transport facilities; and Personal Injury Accidents (PIAs) that have occurred on the surrounding local road network.

2.5.7 A study area for the TA has been defined as shown in **Figure 2-3**. This is broadly consistent with the study area considered within the WCHAR (Walking, Cycle and Horse Riding Assessment).



Figure 2-3 Proposed TA Study Area



2.5.8 The existing peak highway hours and development peaks should be identified and these should be considered within the assessment within any modelling carried out, with appropriate time periods modelled and results extracted.

2.5.9 An assessment of the impacts that re-routing vehicle trips are likely to have on the local highway network in response to the Proposed Scheme, and a description of proposed mitigation if shown to be required.

2.5.10 The future assessment years considered within the TA report cover the Proposed Scheme opening year of 2027 and a future horizon year of 2037, some 10 years after opening. This goes beyond the timescale covered by the adopted Local Plan and emerging committed development policy within the Local Plan Review and is similar to the adopted Local Transport Plan 4 (2038), so the 10 year horizon should be sufficient to account for committed developments that are likely to come forward that are near certain or more than likely. It should also be noted that for a strategic road scheme of this nature that does not generate trips directly, the majority of impact will occur in



the scheme opening year, with traffic re-routing in response to the provision of new highway capacity.

2.5.11 The future horizon year is included to assess whether the planned housing growth can be sustainably accommodated within the local highway network as the Proposed WWHAR Scheme is intended to unlock significant housing growth across the district. However, this TA is not considered to replace the need for a separate Transport Assessments for each of the housing development sites and there may also be additional mitigation requirements applicable to those sites. Any mitigation proposed within this TA is purely related to the impacts created by the Proposed Housing Access Road scheme.

2.5.12 Strategic modelling is to be derived from the Kings Lynn Transport Model (KLTM) which is an existing SATRUN model that has been validated and made fit for purpose for assessment of the Proposed Scheme as part of the Outline Business Case process. The KLTM has been developed in accordance with DfT TAG guidance and has been reviewed by DfT as part of the Outline Business Case process. The SATURN model provides the strategic overview of how traffic will redistribute across the wider network.

2.5.13 For transport assessment of local junctions, a more detailed approach is taken using a Paramics Discovery model for the local junctions within the scope of assessment shown in **Figure 2-3** above for each of the assessment years.

2.5.14 The Level of Service indicator and queue lengths output from the Paramics model are used as the basis for consideration of whether a junction can be seen to work acceptably. Poor levels of Service are considered to be Level of Service E or below.

2.5.15 Where LoS reduces to Category E or below as a result of the Proposed Scheme or if the scheme is shown to significantly worsen an already congested junction, the appropriateness of mitigation is considered further in the context of predicted queues and delays modelled.



2.5.16 The requirement for a full Transport Assessment rather than a Transport Statement is based on the thresholds specified in Appendix A of Safe Sustainable Development 2022. The Proposed Scheme is considered to fall into the category of 'Any development proposed in a location where the local transport infrastructure is inadequate - for example, substandard roads, poor pedestrian/cyclist facilities and inadequate public transport provision'.

2.6 Scheme Objectives

2.6.1 The overarching project objectives have been developed for the WWHAR scheme to align with the current overarching themes presented in national, regional, and local policy, as well as associated guidance.

2.6.2 The objectives are in two tiers: high-level and specific local objectives. These were developed in the earlier stages of the WWHAR project; and are shown below in **Table 2-1**.

2.6.3 The high-level objectives of the WWHAR reflect issues and opportunities to support the principal aims of a modern and efficient transport system, and include the need to:

- Support housing delivery and employment growth in the region to drive economic growth.
- Enhance the A10's role as a strategic link to support the wider King's Lynn economy.
- Provide a more resilient highway network to improve journey time reliability and safety for all users.
- Reduce the volume of non-local traffic through the village to improve the quality of life of residents of West Winch
- Provide better conditions in West Winch and along the A10 for travel by non-motorised modes to support healthy, inclusive, and sustainable growth.
- Seek to minimise environmental impacts of the scheme.



2.6.4 The Sustainable Transport Strategy seeks to address the non-highway orientated scheme objectives from the list below, as highlighted in bold in **Table 2-1**.

The South East King’s Lynn Growth Area Masterplan also emphasises the importance of ‘seeking to make the most of opportunities to create or improve habitats and biodiversity, while minimising the environmental impacts of the scheme’

Table 2-1: Scheme Specific Objectives

Outputs (Operational Objectives)	Outcomes (Specific or Intermediate Objectives)	Impacts (High Level or Strategic Outcomes)
Facilitate delivery of housing in the South-East King’s Lynn Strategic Growth Area	Enable delivery of the West Winch Housing Allocation Increase in local and regional employment labour pool	Support housing delivery and employment growth in the region to drive economic growth
Deliver the WWHAR scheme to become an alternative to the existing route through West Winch Facilitate delivery of housing in the South-East King’s Lynn Strategic Growth Area Provide the necessary infrastructure to support the use of active modes	Enable delivery of the West Winch Housing Allocation Increase in local and regional employment labour pool. Reduce congestion, queuing, and delay on the A10, A47 and Hardwick Interchange in King’s Lynn and West Norfolk Remove through traffic, including HGVs, from West Winch Increase levels of cycling and walking in the local area	Support housing delivery and employment growth in the region to drive economic growth. Reduce the volume of non-local journeys through the village to improve the quality of life of residents of West Winch Provide better conditions in West Winch and along the A10 for travel by non-motorised modes to support healthy, inclusive, and sustainable growth



Outputs (Operational Objectives)	Outcomes (Specific or Intermediate Objectives)	Impacts (High Level or Strategic Outcomes)
<p>Deliver the WWHAR scheme to become an alternative to the existing route through West Winch</p> <p>Provide the necessary infrastructure to support the use of active modes</p>	<p>Reduce congestion, queuing, and delay on the A10, A47 and Hardwick Interchange in King's Lynn and West Norfolk</p> <p>Improve road safety for all road users.</p> <p>Increase levels of walking and cycling in the local area</p>	<p>Enhance the A10's role as a strategic link to support the wider King's Lynn economy.</p> <p>Provide a more resilient road network to improve journey time reliability and safety for all users.</p> <p>Provide better conditions in West Winch and along the A10 for travel by non-motorised modes to support healthy, inclusive, and sustainable growth.</p> <p>Seek to minimise the environmental impacts of the scheme</p>
<p>Deliver the WWHAR scheme to become an alternative to the existing route through West Winch</p> <p>Provide the necessary infrastructure to support the use of active modes</p>	<p>Reduce congestion, queuing, and delay on the A10, A47 and Hardwick Interchange in King's Lynn and West Norfolk</p> <p>Remove through traffic, including HGVs, from West Winch</p> <p>Improve road safety for all road users.</p> <p>Increase levels of walking and cycling in the local area</p> <p>Reduce greenhouse gas emissions in the local area, and improve air quality</p>	<p>Provide a more resilient road network to improve journey time reliability and safety for all users.</p> <p>Reduce the volume of non-local journeys through the village to improve the quality of life of residents of West Winch</p> <p>Provide better conditions in West Winch and along the A10 for travel by non-motorised modes to support healthy, inclusive, and sustainable growth.</p> <p>Seek to minimise the environmental impacts of the scheme</p>



Outputs (Operational Objectives)	Outcomes (Specific or Intermediate Objectives)	Impacts (High Level or Strategic Outcomes)
Facilitate delivery of housing in the South-East King's Lynn Strategic Growth Area Deliver the WWHAR scheme to become an alternative to the existing route through West Winch	Enable delivery of the West Winch Housing Allocation Increase the local and regional employment labour pool	Support housing delivery and employment growth in the region to drive economic growth

2.7 Structure of Report

2.7.1 The report is structured as follows:

- Section 3 – Summarises relevant national, regional and local policies;
- Section 4 – Outlines the scheme proposals, including how the scheme has developed and the key conclusions from consultation;
- Section 5 – Outlines the existing transport conditions in the surrounding area;
- Section 6 – Summarises the Scheme Development and Consultation information;
- Section 7 – Summarises the Modelling and Forecasting undertaken to assess the highways impact of the proposed scheme;
- Section 8 – Outlines the future baseline situation in the local area, taking into account committed developments;
- Section 9 - Presents the Impact Assessment of the proposed scheme;
- Section 10 – Summarises the Sustainable Transport Strategy that has been developed to accompany the proposed WWHAR scheme;
- Section 11 - Provides an overview of the Construction Traffic Impact on the proposed scheme; and
- Section 12 – Provides a summary and concludes the TA.



3 Policy and Guidance Review

3.1 Introduction

3.1.1 An extensive review of adopted and emerging transport and development policy has been undertaken within this chapter. This includes applicable policies and guidance at the national, regional and local levels, particularly those relevant to the WWHAR area. The following documents have been reviewed.

National

- National Planning Policy Framework (NPPF) 2023
- Planning Practice Guidance (PPG), 2023
- The DfT Circular 01/2022 (2022)
- Gear Change: A Bold Vision for Walking & Cycling (2020)
- Decarbonising Transport: A Better, Greener Britain (2021)
- The Clean Growth Strategy (2017)
- Clean Air Strategy (2019)
- Net Zero Strategy: Build Back Greener (2021)
- National Design Guide (2021)
- National Model Design Code (2021)
- Cycle Infrastructure Design Local Transport Note LTN 1/20 (2020)
- Active Travel: Local Authority Toolkit (2022)
- Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (2021)
- The Second Cycling and Walking Investment Strategy (2022)



Regional

- Norfolk Strategic Framework – Shared Spatial Objectives for a Growing County (July 2017)
- Norfolk Strategic Infrastructure Delivery Plan (2022)
- Norfolk Local Transport Plan 4 Implementation Plan (2022)
- Safe, Sustainable Development (SSD, revised July 2022)
- Norfolk County Council Local Transport Plan 4 2021 – 2036
- Norfolk Bus Service Improvement Plan (2021)

Local

- King's Lynn Local Cycling and Walking Infrastructure Plan Main Report (2022)
- King's Lynn and West Norfolk Local Plan
- King's Lynn and West Norfolk Borough Council Local Plan (Core Strategy) 2011
- King's Lynn & West Norfolk Site Allocations And Development Management Policies (2016)
- North Runcton and West Winch Neighbourhood Plan (2017)
- Emerging King's Lynn & West Norfolk Local Plan Review (2016-2036)
- King's Lynn Transport Strategy (2019)
- Draft Southeast King's Lynn Growth Area Framework Masterplan Spatial Planning Document July 2022
- BCKLWN Climate Change Policy (October 2020)
- Norfolk County Council Local Transport Plan (LTP4) 2020 – 2037 (2022)
- Norfolk County Council Climate Strategy (2023)



3.2 National Planning Policy Framework (2023)

3.2.1 The National Planning Policy Framework (NPPF) was last updated in July 2023 and sets out the Government's planning policies for England and how these are expected to be applied. This revised document replaces the previous NPPF document that was published in 2021.

3.2.2 At the heart of the NPPF is a presumption in favour of sustainable development, meaning development that meets the needs of the present without compromising the ability of future generations to meet their needs.

3.2.3 When considering the development proposals, the NPPF (Paragraph 110) advises that the development should ensure:

“Appropriate opportunities to promote sustainable transport modes can be, or have been taken up, given the type of development and location;

Safe and suitable access to the site has been achieved for all users;

The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and

Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.”

3.2.4 Paragraph 111 notes that development should only be prevented, or refused, on highway grounds, if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

3.2.5 The NPPF notes (Paragraph 112) that applications for developments should:

- Give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second to facilitate access to high quality public transport;
- Address the needs of people with disabilities and reduced mobility in relation to all modes of transport;



- Create places that are safe, secure and attractive, which minimise the scope of conflicts between pedestrians, cyclists and vehicles; and
- Allow for the efficient delivery of goods, and access by service and emergency vehicles.

3.2.6 The Proposed Scheme is in accordance with these NPPF objectives. Written alongside this TA is a Sustainable Transport Strategy (Document Reference **NCC/4.02.00/WWHAR**), which includes A10 measures and new infrastructure for pedestrians, cyclists, horse riders and persons of reduced mobility as part of the Proposed Scheme.

3.3 Planning Practice Guidance (PPG) (2023)

3.3.1 Guidance on Travel Plans, Transport Assessments and Statements, published by MHCLG in March 2014, is provided within the National Planning Practice Guidance (NPPG). The guidance states:

“Transport Assessments and Statements are ways of assessing the potential transport impacts of developments... Transport Assessments are thorough assessments of the transport implications of a development, and Transport Statements are a ‘lighter-touch’ evaluation to be used where this would be more proportionate to the potential impact of the development”.

3.3.2 Due to the scale of the Proposed Scheme, a comprehensive TA is considered necessary to assess the transport implications of the proposed development on the local and wider highway network. The guidance also recognises that TA’s can positively contribute towards:

- Encouraging sustainable travel;
- Lessening traffic generation and its detrimental impacts;
- Reducing carbon emissions and climate impacts;
- Creating accessible, connected, inclusive communities;
- Improving health outcomes and quality of life;
- Improving road safety; and



- Reducing the need for new development to increase existing road capacity or provide new roads.

3.4 The DFT Circular 01/2022 (2022)

3.4.1 The Department for Transport (DfT) Circulars are a series of policy papers and guidance that provide advice to transport professionals and local councils. The Circular document relevant to this Study is the 'Strategic Road Network and the delivery of sustainable development' (December 2022).

3.5 Circular 01/2022 Strategic Road Network and Delivery of Sustainable Development

3.5.1 The new circular advocates a modal hierarchy with non-car travel to be prioritised and options considered for all modes and all users of the network.

3.5.2 Paragraph 19 relates to new connections with the SRN – it states 'the principle of creating new connections on the SRN should be identified at the plan-making stage in circumstances where an assessment of the potential impacts on the SRN can be considered alongside whether such new infrastructure is essential for the delivery of strategic growth'.

3.5.3 Paragraph 48 relates to Transport Assessments noting 'this should start with a vision of what the development is seeking to achieve and then test a set of scenarios to determine the optimum design and transport infrastructure to realise this vision...developers should demonstrate that the development would be located in an area of high accessibility by sustainable transport modes and would not create a significant constraint to the delivery of any planned improvements to the transport network or allocated sites'.

3.5.4 Paragraph 49 states 'A transport assessment for consideration by the company must also consider existing and forecast levels of traffic on the SRN, alongside any additional trips from committed developments. Assumptions underpinning projected levels of traffic should be clearly stated to avoid the default factoring up of baseline traffic. The scenario(s) to be assessed, which depending on the development and local circumstances may include



sensitivity testing, should be agreed with the company; where a scenario with particularly high or low growth is proposed, this should be supported by appropriate evidence.

3.5.5 Planned improvements to the SRN or local road network should also be considered in any assessment where there is a high degree of certainty that this will be delivered’.

3.5.6 The Proposed Scheme includes a new road link between the A47 to the north-east of the proposed development and the A10 to the south of the proposed development. A Paramics Discovery model has been used to forecast how traffic movements will change across the local transport network, following construction of the WWHAR and a sensitivity test has been carried out with the future housing development added. This TA considers peak hour traffic and transport effects associated with the Proposed Scheme 10 years after opening. The AADT situation is considered for the opening year of 2027 and forecast horizon of 2042 in the Environmental Statement (ES) Chapter on Traffic and Transportation.

3.6 Gear Change: A Bold Vision for Walking & Cycling (2020)

3.6.1 The document produced by the Department for Transport, sets out a bold vision for the future of transport across England. The policy notes that cyclists must be considered as vehicles, with all new provision to include segregation between pedestrians and cyclists.

3.6.2 The key design principles to be considered going forward are:

- Cyclists must be separated from volume traffic, both along roads and at junctions;
- Cyclists must be treated as vehicles and be separated from pedestrians;
- Routes must join together;
- Routes must feel direct, logical and intrinsically understandable;



- Routes must take into account of how users actually behave;
- Purely cosmetic alterations should be avoided;
- Routes must be designed for larger numbers of cyclists and for users of all abilities and disabilities;
- Barriers, such as chicane barriers and dismount signs, should be avoided; and
- Routes should only be designed by those who have experienced the road on a cycle.

3.6.3 The development proposals at West Winch consider active travel design and infrastructure that will help encourage walking and cycling.

3.7 Decarbonising Transport: A Better, Greener Britain (2021)

3.7.1 The report published in 2021, follows the 'Decarbonising Transport: Setting the Challenge' (March 2020), which set out the scale of reductions needed to meet the net zero target by 2050. The new report sets out the commitment the UK Government will make to decarbonise all forms of transport, this includes:

- Increasing walking and cycling
- Delivering the Prime Minister's bold vision for cycling and walking investing £2 billion over five years with the aim that half of all journeys in towns and cities will be cycled or walked by 2030.
- Delivering a world class cycling and walking network in England by 2040
- Zero emission buses and coaches
- Delivering the National Bus Strategy's vision of a transformed bus industry and a green bus revolution.
- Consulting on modernising the Bus Service Operators' Grant in 2021



- Supporting delivery of 4,000 new zero emission buses and the infrastructure needed to support them.
- Delivering the first All-Electric Bus Town or City
- Consulting on a phase out date for the sale of new non-zero emission buses.
- Consulting on a phase out date for the sale of new non-zero emission coaches.
- A zero-emission fleet of cars, vans, motorcycles and scooters.
- Supporting and encourage modal shift of freight from road to more sustainable alternatives, such as rail, cargo bike and inland waterways.
- Taking forward measures to transform 'last mile' deliveries.

3.7.2 To enable these commitments to be met, there will be investment into sustainable travel, low carbon fuels, electric vehicles and providing the funding and tools for local authorities to invest in local priorities. The strategic priorities along the path to net zero include:

- Accelerating modal shift to public and active transport;
- Decarbonising road transport;
- Decarbonising the freight system; and
- Place-based solutions to emissions reduction.

3.7.3 Whilst increasing the number of journeys undertaken by sustainable modes is a key focus, the report also notes that continued investment is still needed in the road network to improve resilience and to reduce congestion, so that traffic is able to flow more freely and the highway network is able to support essential longer journeys that are less able to switch modes.



3.8 The Clean Growth Strategy (2017)

3.8.1 Published in October 2017, The Clean Growth Strategy sets out the proposals for decarbonising all sectors of the UK economy through the 2020s. It explains how the whole country can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change.

3.8.2 One of the key policies/proposals stated within the strategy document is 'Accelerating the Shift to Low Carbon Transport'. This policy outlines how the government will achieve this:

- End the sale of new conventional petrol and diesel cars and vans by 2040.
- Spend £1 billion supporting the take-up of ultra low emission vehicles (ULEV), including helping consumers to overcome the upfront cost of an electric car.
- Develop one of the best electric vehicle charging networks in the world.
- Accelerate the uptake of low emission taxis and buses.
- Work with industry as they develop an Automotive Sector Deal to accelerate the transition to zero emission vehicles.
- Announce plans for the public sector to lead the way in transitioning to zero emissions vehicles.
- Invest £1.2 billion to make cycling and walking the natural choice for shorter journeys.
- Work to enable cost-effective options for shifting more freight from road to rail, including using low emission rail freight for deliveries into urban areas, with zero emission last mile deliveries.
- Position the UK at the forefront of research, development and demonstration of Connected and Autonomous Vehicle technologies, including through the establishment of the Centre for Connected and



Autonomous Vehicles and investment of over £250 million, matched by industry.

- Innovation: Invest around £841 million of public funds in innovation in low carbon transport technology and fuels.

3.8.3 The proposed development at West Winch will consider ways in which its transport network can be de-carbonised to help aid the governments Clean Growth Strategy.

3.9 Clean Air Strategy (2019)

3.9.1 Published in January 2019, the Clean Air Strategy sets out the comprehensive actions required across all parts of government and society to improve air quality. The strategy sets out how the government will:

- Protect the nation's health;
- Protect the environment;
- Secure clean growth and innovation;
- Reduce emissions from transport, homes, farming and industry; and
- Monitor progress.

3.9.2 Chapter 5 of the document 'Action to reduce emissions from transport' identifies that transport has a key role to play in reducing emissions and meeting the government's objectives on the environment and public health.

3.9.3 One way in which the government aims to reduce emissions is through modal shift. The use of active travel and public transport are identified as ways in which to reduce road traffic and reduce emissions. The Proposed Scheme will have an active travel path alongside the carriageway, therefore helping to encourage a modal shift towards walking and cycling.



3.10 Net Zero Strategy: Build Back Greener (2021)

3.10.1 Published in October 2021 and last updated in April 2022, the Net Zero Strategy: Build Back Greener sets out clear our decarbonisation pathways to net zero by 2050, including illustrative scenarios policies and proposals to reduce emissions for each sector cross-cutting action to support the transition.

3.10.2 With regards to transport, Chapter 3v. – ‘Transport’ lists key commitments, setting the pace for greener and better transport. The key commitments that are relevant to the development proposal include:

- Ensure the UK’s charging infrastructure network is reliable, accessible, and meets the demands of all motorists.
- Increase the share of journeys taken by public transport, cycling and walking.
- Support decarbonisation by investing more than £12 billion in local transport systems over the current Parliament.
- Invest £2 billion in cycling and walking, building first hundreds, then thousands of miles of segregated cycle lane and more low-traffic neighbourhoods with the aim that half of all journeys in towns and cities will be cycled or walked by 2030.
- Invest £3 billion in the National Bus Strategy, creating integrated networks, more frequent services, and bus lanes to speed journeys, and support delivery of 4,000 new zero emission buses and the infrastructure needed to support them.

3.10.3 The proposed development at West Winch will incorporate Net Zero infrastructure into its design, helping to increase the number of journeys taken by active travel modes.



3.11 National Design Guide (2021)

3.11.1 The National Design Guide, recently updated in January 2021, sets out the characteristics of well-designed places and demonstrates what good design means in practice.

3.11.2 This document should be read in conjunction with the National Model Design Code and Guidance Notes for Design Codes, which sets out detailed guidance that to be considered in the production of local design codes, guides and other design policies.

3.11.3 The National Design Guide presents the ten characteristics of well-designed places. These characteristics are listed below and presented in **Figure 3-1** which is shown on page 8 of the National Design Guide:

- Context – enhances the surroundings;
- Identity – attractive and distinctive;
- Built form – a coherent pattern of development;
- Movement – accessible and easy to move around;
- Nature – enhanced and optimised;
- Public spaces – safe, social and inclusive;
- Uses – mixed and integrated;
- Homes and buildings – functional, healthy and sustainable;
- Resources – efficient and resilient; and
- Lifespan – made to last.



Figure 3-1 – Characteristics of a Well-Designed Place



3.11.4 With regards to movement, the National Design Guide states that patterns of movement for people are integral to well-designed places. A well-designed movement network defines a clear pattern of streets that:

- Are safe and accessible for all;
- Function efficiently to allow movement for all, taking into consideration the diverse needs of all potential users and provides a genuine choice of sustainable transport modes;
- Prioritises active travel and public transport to limit the impacts of car use and improve air quality;
- Promote activity and social interaction, contributing to health, well-being, accessibility and inclusion; and



- Incorporates green infrastructure, including street trees that will in turn help improve air quality, contribute to biodiversity and soften the impact of car parking.

3.11.5 The proposed development at West Winch considers a safe, efficient and accessible transport network that prioritises active travel and the utilisation of public transport.

3.12 National Model Design Code (2021)

3.12.1 Published in July 2021 and last updated October 2021, the National Model Design Code sets out clear design parameters to help local authorities and communities decide what good quality design looks like in their area.

3.12.2 The National Model Design Code forms part of the government's planning practice guidance and expands on the 10 characteristics of good design set out in the National design guide, which reflects the government's priorities and provides a common overarching framework for design.

3.12.3 With regards to movement, the National Model Design Code sets out a series of model design parameters for the following:

- M.1: A connected network for all modes of transport;
- M.2: Active travel; and
- M.3: Well-considered parking, servicing, and utilities infrastructure for all modes and users.

3.12.4 The proposed development will incorporate the model design parameters set out within the National Model Design Code.

3.13 Cycle Infrastructure Design Local Transport Note LTN 1/20 (2020)

3.13.1 Published in July 2020, the updated national guidance aims to help cycling become a form of mass transit in more places across the UK. The guidance sets out that much higher design standards are now required and includes a condition that any future Government funding for new cycle infrastructure is designed in a way that is consistent with this national guidance. LTN 1/20



states how new cycling infrastructure should be implemented and prioritised over car infrastructure.

3.13.2 Five core design principles are included which are essential requirements to achieve a greater increase in the number of people walking or cycling:

- Coherent - cycle networks should be planned and designed to allow people to reach destinations easily, along simple and high-quality routes;
- Direct - routes should be direct and preferably more direct than those available for private motor vehicles;
- Safe - it should also be perceived to be safe so that more people feel able to cycle;
- Comfortable - route with good quality well-maintained surfaces, adequate widths for the volume of users, minimal stopping/starting and avoiding steep gradients; and
- Attractive - help to deliver public spaces that are well designed and finished in attractive materials, so that they become places people want to spend time using.

3.13.3 Planning for cycling should be based around providing a network of on- and/or off-carriageway routes that are suitable for all abilities.

3.13.4 This strategy is aligned with these core principles and will assess the cycling infrastructure in the local area against the core design principles and design summary principles, highlighted with LTN 1/20.

3.14 Active Travel: Local Authority Toolkit (2022)

3.14.1 The Active Travel: Local Authority Toolkit guidance, recently updated in August 2022, advises on how walking, wheeling and cycling are the least carbon-intensive ways to travel. The guidance states that local authorities can play an important role in increasing active travel with primary actions including:



- Developing Local Cycling and Walking Infrastructure Plans (LCWIPs) which aim to help local authorities take a strategic approach to improving conditions for walking and cycling;
- Developing and implementing Travel Demand Management Plans which aim to manage pressure on transport networks at peak times;
- Planning for and improving active travel infrastructure; and
- Promoting behaviour change to enable active travel.

3.14.2 The development proposal at West Winch incorporates active travel infrastructure within its design.

3.15 Inclusive Mobility: A Guide to Best Practice On Access to Pedestrian and Transport Infrastructure (2021)

3.15.1 The Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure document, recently published in December 2021, provides guidance on creating and maintaining an accessible public realm which is crucial in ensuring that disabled people are not excluded from playing a full role in society. The document provides guidance on the following infrastructure:

- Footways, footpaths and pedestrian crossing facilities;
- Changes in level such as steps, stairs and ramps;
- Tactile paving surfaces;
- Making cycle facilities accessible to all;
- Car parking;
- Bus, Light Rapid Transit (LRT) and tram stops;
- Taxi ranks;
- Transport buildings: access and facilities;
- The use of digital technology in public transport; and



- Signing and information;
- Lighting; and
- Access in the countryside.

3.15.2 The proposed development will consider the Inclusive Mobility guidance when developing its sustainable transport strategy.

3.16 The Second Cycling and Walking Investment Strategy (2023)

3.16.1 The Second Cycling and Walking Investment Strategy (CWIS2), updated recently in 2023, outlines the government's ambition to make cycling and walking the natural choices for shorter journeys, or as part of a longer journey by 2040. The aims and targets in CWIS1, alongside the vision set out in Gear Change (2020), have informed the revised set of objectives to:

- Increase the percentage of short journeys in towns and cities that are walked or cycled;
- Increase walking;
- Double cycling; and
- Increase the percentage of children aged 5 to 10 who usually walk to school.

3.16.2 The proposed development will incorporate active travel into its design to make cycling and walking the natural choices for shorter journeys, or as part of a longer journey.

3.17 Norfolk Strategic Framework – Shared Spatial Objectives for a Growing County

3.17.1 Norfolk's Local Planning Authorities (LPAs) produced a shared framework, which has recently been updated in parts in May 2021, to agree shared objectives and priorities to improve outcomes for Norfolk and inform the preparation of future Local Plans. The updated agreements set out within a Statement of Common Ground include a requirement for all planning policies



to consider a timeframe to at least 2036. Hence, this Transport Assessment is aligned with that time horizon.

3.17.2 The Framework sets out a proposed Spatial Vision and shared objectives for the Norfolk LPAs, having regard to the main spatial planning issues of population growth, housing, economy, infrastructure and environment.

3.17.3 The proposed spatial vision for transport is to “be better connected by having good transport links to major cities in the UK and Europe and excellent digital connectivity. A good relationship between homes and jobs will minimise the need to travel and residents will have choice about how they meet their demand for local travel.”

3.17.4 Under Agreement 3 of the Norfolk Strategic Framework’s proposed shared objectives, it is stated that by 2036, Norfolk will seek to maximise the delivery of a number of objectives. Those in line with this study include:

- *Facilitating the development and infrastructure needed to support the region’s business sectors and clusters, driving economic growth through the enhancement of productivity, skills and education to provide widening opportunities in line with the New Anglia Local Enterprise Partnership Economic Strategy, Local Industrial Strategy and Covid 19 Economic Recovery Restart Plan;*
- *Providing for job growth broadly matching increases in housing provision and improving the alignment between the locations of workplaces and homes; and*
- *Strengthening Norfolk’s competitiveness through the delivery of well-planned balanced new developments providing access to a range of business space.*

3.17.5 In section 5.4.6 of the Statement of Common Ground, it is noted that ‘To realise the growth potential of the A10 Corridor there is a need to improve journey times, reliability of services and enhancement of operational capacity’ the report also notes that in order to deliver the largest housing allocation in



the West at West Winch/North Runcton, the completion of the WWHAR and Hardwick junction improvements is required to be developed.

3.17.6 To reduce Norfolk's greenhouse gas emissions, there will be encouragement towards a modal shift in travel away from car use towards public transport, walking and cycling.

3.18 Norfolk Strategic Infrastructure Delivery Plan (2022)

3.18.1 The Strategic Infrastructure Delivery Plan (SIDP) sets out Norfolk County Council's priority projects each year. The goal of these projects and the SIDP is to deliver projects that will provide significant economic, housing, and jobs growth across Norfolk.

3.18.2 One of the road projects listed within the SIDP is the A10 West Winch Housing Access Road. This access road is required to facilitate planned housing growth in the West Winch Growth Area and provide a strategic improvement to the A10 to enhance resilience on the Major Road Network (MRN). It will distribute trips from the proposed development at West Winch, alleviate congestion on the A10 through West Winch and also provide an alternative route around the village for strategic long distance traffic.

3.18.3 The scheme includes the following:

- Improvements at the Hardwick junction;
- Dualling of a short length of the A47; and
- A housing access road linking the A10 and the A47.

3.18.4 The WWHAR is supported by Transport East as a priority for MRN funding and the Strategic Outline Business Case (SOBC) was approved by DfT in July 2022. Work has now commenced on further scheme development to ensure the scheme incorporates appropriate bus priority and Active Travel, (walking and cycling measures). The next stage is the development of an Environmental Statement, the preparation of a planning application and development of the Outline Business Case (OBC).



3.19 Norfolk Local Transport Plan 4 Implementation Plan (2022)

3.19.1 The Local Transport Plan Strategy sets out Norfolk County Council's plans, policies and programmes on transport and transport infrastructure. The Implementation Plan details our proposals for the implementation of the policies in the adopted strategy. It does not detail every scheme (a project delivered on the ground such as a new zebra crossing) that the county council intends to carry out over the period. Rather, it sets out the measures and actions that the county council will take, with our partners, to implement the policies. Its focus is over the next five years.

3.19.2 The implementation plan states 7 objectives:

- Embracing the Future
- Delivering a Sustainable Norfolk
- Enhancing Connectivity
- Enhancing Norfolk's Quality of Life
- Increasing Accessibility
- Improving Transport Safety
- A Well Managed and Maintained Transport Network

3.19.3 The WWHAR is mentioned throughout this document as a key scheme to be implemented as the scheme is seen as crucial in reducing congestion on the A10 and improving sustainable travel on the A10 and onto the A47. The West Winch proposals ensure active and sustainable travel modes are fully considered for the WWHAR scheme and sustainable travel improvements in terms of connectivity, accessibility, safety, and maintenance are included as part of the proposals.



3.20 Safe, Sustainable Development (SSD, revised July 2022)

3.20.1 The document presents Norfolk's aims for sustainable development across the county through a number of aims that are supported by the Proposed Scheme:

- **Aim 1** – provide evidence of how development will minimise its carbon impact from its travel demand;
- **Aim 2** – minimising travel to ensure people can access facilities they need by appropriate transport modes, encouraging walking, cycling and public transport use and reducing the use of private cars especially for shorter journeys;
- **Aim 3** – to encourage residents to explore active and healthier ways to travel; and
- **Aim 11** - reduce the environmental impact of highway improvements associated within new development.

3.20.2 The proposed scheme will incorporate sustainable development and infrastructure within its design.

3.21 Norfolk County Council Local Transport Plan 4 2021 – 2036

3.21.1 The Local Transport Plan details how the county council deals with a wide range of transport matters to achieve council objectives including a strong and stable economy, the health and well-being of our residents and climate change. The plan shapes the nature of our own projects and the design and delivery of these as well as how we influence the plans and programmes of other agencies, key partners in government, communities, the commercial sector and the third sector where these are relevant to transport (such as district council growth plans or government programmes of schemes on the trunk road and rail network).



3.21.2 The LTP4 states:

“The Government’s Cycling and Walking policy has placed sustainable modes of transport and active travel at the heart of the way we design transport infrastructure”.

3.21.3 This sustainable transport strategy for the WWHAR will ensure the WWHAR contributes to the sustainable travel-based objectives of the LTP 4.

3.21.4 The development proposals at West Winch will demonstrate the strategy to improve accessibility for all users within the local area, improve transport safety for vulnerable users and enhance the quality of life for residents through encouraging active travel.

3.21.5 The A10 West Winch Housing Access Road is noted as a priority scheme to tackle the infrastructure deficit to ensure journeys on our major road, bus and rail connections are quick and reliable. The development proposals at West Winch will help contribute to this through incorporating active and sustainable travel within the WWHAR designs to ensure these modes see quicker and more reliable connections.

3.22 Norfolk Bus Service Improvement Plan (BSIP) (2021)

3.22.1 The Norfolk BSIP:

- Sets out the context that currently exists in Norfolk in relation to bus services;
- Takes that context and develops clear and concise objectives and outcomes;
- Proposes an ambitious and highly deliverable programme of measures and schemes to deliver the outcomes, identifying funding streams for each element of the programme; and
- Outlines the governance and processes that will be put in place to deliver these measures and schemes once the funding is available, based upon a county-wide Enhanced Partnership that we intend to



establish for the start of April 2022 and deliver improvements over the five-year lifetime of this BSIP.

3.22.2 NCC acknowledge that in and between the smaller market towns, services are more infrequent, buses are older, and passengers do not benefit from real-time information and inviting waiting areas.

3.22.3 The development proposals at West Winch look to actively promote sustainable travel linked to the WWHAR. The proposals are aligned with these BSIP objectives to help encourage sustainable travel, including buses, and demonstrate the local area surrounding the WWHAR will have a green and sustainable transport offer and public transport network that is the first-choice mode for most journeys, for existing and new customers.

3.22.4 'New customers' is particularly important for the development at West Winch given the scale of housing growth within the area. Any active travel focus will also support access to key public transport interchanges.

3.23 King's Lynn Local Cycling and Walking Infrastructure Plan (2022)

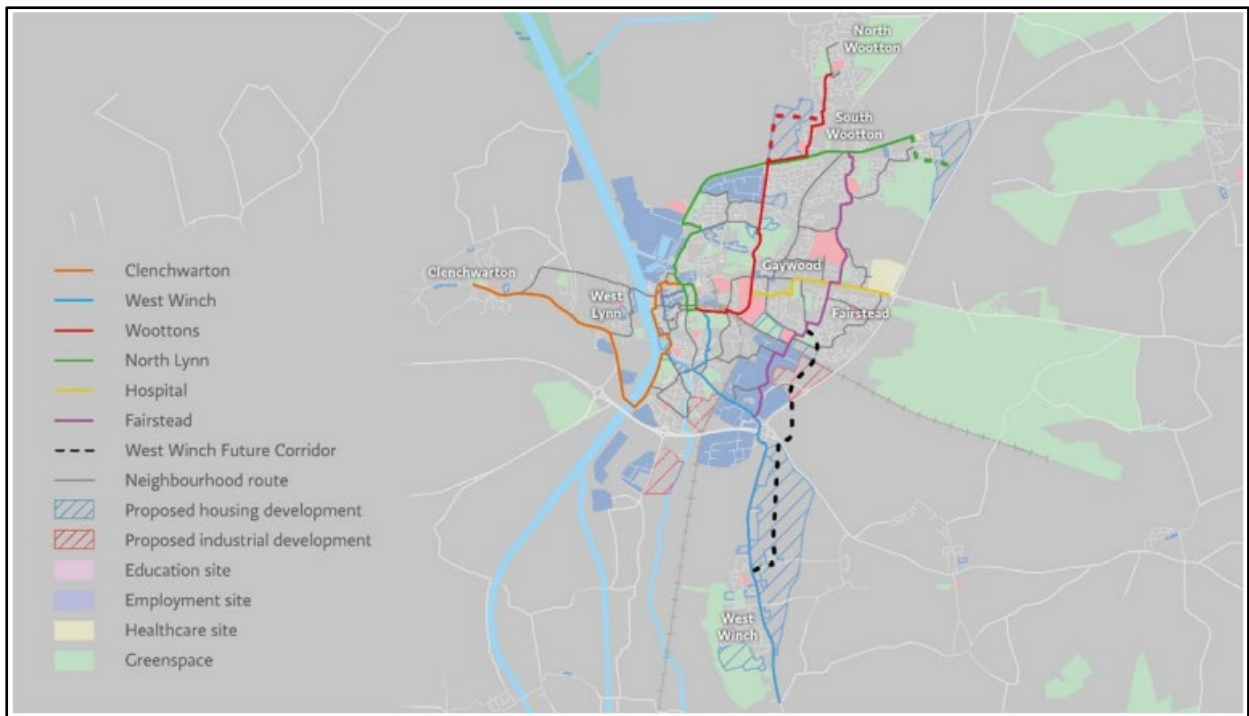
3.23.1 This report contains the detail of priority cycling and walking network improvements schemes identified by the planning process, all of which have been subject to stakeholder engagement, appraisal and prioritisation using Department for Transport's (DfT) assessment tools.

3.23.2 The aims of the King's Lynn LCWIP are to help reduce congestion, improve air quality, help combat climate change, improve physical and mental health and address inequalities within communities.

3.23.3 The development of the King's Lynn LCWIP has identified a network of key active travel routes which will enable people to make journeys across the town on foot or by cycle. This network is shown in **Figure 3-2**.



Figure 3-2 Map of King's Lynn active travel network



3.23.4 This active travel network shows two key corridors relevant to the development proposals at West Winch for the WWHAR for travel between King's Lynn and the proposed West Winch housing development. These are the existing West Winch (Blue) cycling and walking route on the A10 and the West Winch Future Corridor (dashed black).

3.24 King's Lynn and West Norfolk Local Plan

3.24.1 The King's Lynn and West Norfolk Local Plan provides an understanding of the following:

- Guiding development within the borough;
- Setting out the long term future for the borough;
- Outlining how the Borough will ensure that growth is delivered in the right places; and
- Guiding how the growth will take into account the needs of our local communities.



3.24.2 The plans and policies that make up the Local Plan are:

- the Local Plan (this plan includes two policies; the Core Strategy, and the Site Allocations and Development Management Policies Plan)
- any completed neighbourhood plans
- the Norfolk County Council Mineral and Waste Plan

3.25 King's Lynn and West Norfolk Borough Council Local Plan (Core Strategy) 2011

3.25.1 The Core Strategy sets out the spatial planning framework for the development of the borough up to 2026 and is part of King's Lynn and West Norfolk's Local Development Framework. The Core Strategy provides guidance on the scale and location of future development.

3.25.2 Within this document, West Winch is stated as an area with potential for urban expansion. It states West Winch functions as separate community with a range of facilities, but also supports the adjacent larger settlements, often through significant residential developments. These settlements benefit from public transport linkages to King's Lynn and the main towns. The proposed 4,000 dwellings will further West Winch's role in this.

3.25.3 The WWHAR is clearly supported by the local plan through the prioritisation of the West Winch development. The WWHAR is clearly an important part of delivering the West Winch housing development. The development at West Winch will help to fulfil the Transportation - Policy CS11 in providing sustainable transport links for local residents.

3.26 King's Lynn & West Norfolk Site Allocations and Development Management Policies (2016)

3.26.1 The King's Lynn and West Norfolk Local Plan - Site Allocations & Development Management Policies (SADMP) Plan was formally adopted in September 2016. The SADMP sets out land allocations and development



management policies for King's Lynn and West Norfolk. The document will also guide development and change within the borough until March 2026.

3.26.2 The SADMP outlines the adopted Core Strategy Policy CS09 – 'Housing Distribution' which provides for an allocation within the vicinity of West Winch of at least 1,600 new homes with supporting infrastructure.

3.26.3 Policy E2.1 of the document – 'West Winch Growth Area Strategic Policy' highlights how strategic development will occur at West Winch, stating that the development will include:

- At least 1,600 new dwellings, together with associated facilities and infrastructure, including around 1ha of employment land.
- The potential for further development beyond the plan period (subject to future development plans).
- A new road linking the A10 and A47 to provide a degree of relief of traffic on the existing A10 around West Winch, and access to new development.
- Early and continuing delivery of various traffic calming measures and environmental enhancements on the existing A10 in and around West Winch, for the benefit of existing local residents.
- Provision of suitable arrangements for public transport to route through the wider site, and connectivity to main routes to encourage non car modes
- Provision of a network of cycle and pedestrian routes (including links to King's Lynn town centre) which would facilitate the level of growth both that planned to 2026 and potential further growth
- A network of cycle and pedestrian routes (including links to King's Lynn town centre) which would facilitate the level of growth both that planned to 2026 and potential further growth



3.26.4 Local highway improvements and management measures to fully integrate the development into the surrounding network while avoiding adverse impacts including, in particular, consideration of the capacity of the Hardwick interchange and environmental and amenity impacts of potential additional traffic through North Runcton.

3.27 North Runcton and West Winch Neighbourhood Plan (2017)

3.27.1 The vision for this neighbourhood plan is:

“West Winch and North Runcton will be closely linked parishes with separate communities that are popular and attractive places to live. They will remain distinct from King’s Lynn characterised by a predominantly rural setting. They will have a range of excellent facilities allowing residents of all ages to live, work, play and contribute fully to the ongoing success of the communities.”

3.27.2 The Transport aims seek to:

- Enable local people to go about their business in a timely manner.
- Reduce the domination of through traffic on residents’ day-to-day lives.
- Provide an excellent network of road, cycle and footpaths that allow genuine choice in future transport options and mitigate against excessive road traffic and car dependency.
- The transport objective within the plan is to “...mitigate traffic and environmental problems on the A10 encouraging a future road hierarchy that will reduce the impact of proposed development. It will encourage and support traffic calming measures. It will encourage high standards of public transport, cycle path and footpath infrastructure.”
- The Neighbourhood Plan seeks to ensure improvements to the A10 corridor environment as a priority, help to support the development proposals at West Winch.



3.28 Emerging King's Lynn & West Norfolk Local Plan Review (2016-2036)

3.28.1 As presented above, the Local Plan for King's Lynn & West Norfolk is currently made up of the:

- Core Strategy (adopted in 2011)
- Site Allocations and Development Management Policies Plan (adopted 2016)

3.28.2 These two documents have been reviewed and combined to create a new draft document. The new document sets out a strategy and detail for delivering growth in the borough. It identifies where development should be located and how it should be delivered up to 2036.

3.28.3 Policy E2.1 of the Emerging local Plan Review 'West Winch Growth Area Strategic Policy' states the following Part A – Area Wide Strategic Outcomes:

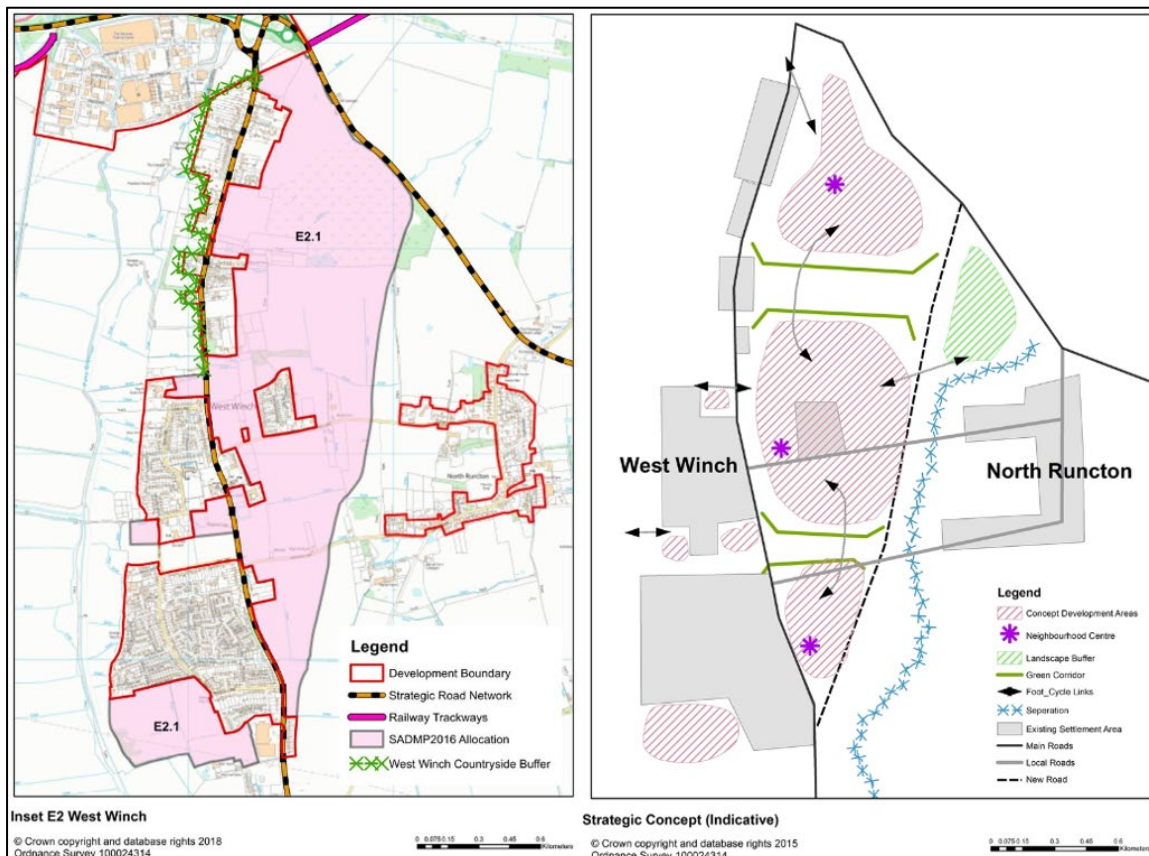
- At least 2,500 new dwellings, together with associated facilities and infrastructure, including around 1ha of employment land, in the current Plan period. Within the region of 3,500 – 4,000 new homes being delivered in the fullness of time;
- The potential for further development beyond the plan period (subject to future development plans).
- A new road linking the A10 and A47 to facilitate housing growth and prevent undue pressure on the existing highway network.
- Early and continuing delivery of various traffic calming measures and environmental enhancements on the existing A10 in and around West Winch, for the benefit of existing local residents, with the first measures commencing within 12 months of the start of development.
- Provision of suitable arrangements for public transport to route through the wider site, and connectivity to main routes to encourage non car modes.



- A network of cycle and pedestrian routes (including links to King’s Lynn town centre) which would facilitate the level of growth both that planned to 2036 and potential further growth.
- Local highway improvements and management measures to fully integrate the development into the surrounding network while avoiding adverse impacts including, in particular, consideration of the capacity of the Hardwick interchange and environmental and amenity impacts of potential additional traffic through North Runcton.
- Three new distinct neighbourhoods to the east of the A10, with some smaller areas of development expanding the existing neighbourhoods to its west.

3.28.4 **Figure 3-3** presents Strategic Policy E2.1 and a Strategic Concept map of West Winch.

Figure 3-3 - Strategic Policy E2.1 and Strategic Concept





3.29 King's Lynn Transport Strategy (2019)

3.29.1 The Borough Council of King's Lynn and West Norfolk (BCKLWN) in partnership with Norfolk County Council (NCC) have created a Transport Strategy for the town. The strategy aims to support sustainable economic growth in King's Lynn by improving travel choices for all, whilst also improving air quality and protecting historic areas.

3.29.2 The Transport Strategy's full objectives are to:

- provide a safe environment for travel by all modes.
- encourage town centre accessibility by all modes, whilst conserving and enhancing King's Lynn's rich historic environment
- support sustainable housing and economic growth.
- reduce the need to travel by car through development planning.
- manage traffic congestion in King's Lynn
- increase active travel mode share for short journeys.
- promote and encourage the use of public transport.
- reduce harmful emissions and air quality impacts.

3.29.3 The development proposals at West Winch are fully aligned with these objectives and aims and will ensure that safe, and coherent sustainable travel infrastructure is demonstrated and incorporated into the WWHAR scheme.

3.30 Draft Southeast King's Lynn Growth Area Framework Masterplan Spatial Planning Document July 2022

3.30.1 The Spatial Planning Document (SPD) is a material consideration in the planning decision-making process. The Core Strategy (2011) (CS) and the Site Allocation and Development Management Policies Plan (2016) (SADMP) allocated the West Winch Growth Area as a strategic 'urban expansion' area around King's Lynn to meet most of the Borough's need for housing over the plan period in a sustainable manner with the appropriate



level of supporting facilities. This strategic allocation has been carried forward into the Local Plan Review which will replace the CS and SADMP.

3.30.2 The transport infrastructure requirements contained within the SPD consist of the following:

- Housing Access Road Roundabouts
- Dualling on A47 east of Hardwick
- Traffic calming in West Winch A10 (may include speed bumps, reduced speed limits, pavement build outs etc.
- Local Roads & Streets
- Sustainable Transport including bus.
- Strategy, Cycle & Shared use pathways

3.30.3 The development proposals at West Winch intend to incorporate all of the transport infrastructure requirements above.

3.31 BCKLWN Climate Change Policy (October 2020)

3.31.1 This policy primarily sets BCKLWN's intention for addressing our carbon footprint, whilst also noting our need to help reduce the district's carbon footprint and act as a community leader to encourage others to tackle climate change.

3.31.2 The policy states that the council will "proactively identify, understand, manage and review its level of greenhouse gas emissions to play its part in contributing towards achieving the Climate Change Act 2008 and the Paris Climate Agreement".

3.31.3 The policy noted the net zero target has now been brought forward to 2035 demonstrating our commitment to tackling climate change, in reducing our corporate emissions. The development proposals at West Winch consider actions centred particularly around public transport and active travel.



3.32 Norfolk County Council Local Transport Plan (LTP4) 2020 – 2037 (2022)

3.32.1 The fourth Local Transport Plan was adopted in July 2022 which covers the period of 2020-2037 and replaces the previous version adopted in 2011. The document is accompanied by an Implementation Plan that sets out the proposals for implementation.

3.32.2 The LTP was updated to include new priorities, such as the Norwich Western Link, A140 Long Stratton Bypass, A10 West Winch Relief Road, Attleborough Link Road and full dualling of the A47 including Tilney to East Winch and Acle Straight.

3.32.3 The objectives of the new LTP are to:

- Embrace the future;
- Deliver a sustainable Norfolk;
- Enhance connectivity;
- Enhance Norfolk's quality of life;
- Increase accessibility;
- Improve transport safety; and
- Create a well managed and maintained transport network.

3.32.4 At West Winch, the LTP4 states that partners are working on development proposals at this location, including the West Winch Housing Access Road. This Access Road is required for 4,000 planned houses and will be complemented by sustainable transport links including links to the town.

3.33 Norfolk County Council Climate Strategy (2023)

3.33.1 The purpose of Norfolk County Council's Climate Strategy is to provide a clear statement of NCC's strategic framework to help tackle climate change. The document outlines how Norfolk aims to meet its commitment to reach net zero by 2030 and how Norfolk will become carbon neutral.



3.33.2 The document states its aim to take a pragmatic approach to supporting carbon reduction county-wide by prioritising the areas that have the greatest opportunity to make positive change. One of these areas includes transport.

3.33.3 Three dimensions are stated within the Climate Strategy in its approach to decarbonising Norfolk's transport:

- supporting the switch to electric vehicles;
- improving the county's public transport; and
- encouraging more sustainable and active travel.

3.33.4 The Climate Strategy states that Norfolk needs investment in digital connectivity, utilities, and transport infrastructure to enable businesses and communities to thrive. The Council will promote investments that support sustainable housing and economic growth plans, provide physical and digital access to education and employment, and reduce traffic and pollution in town centres.



4 Scheme Proposals

4.1.1 This section of the TA will describe the WWHAR scheme and its proposed construction.

4.1.2 The main elements of the WWHAR scheme include:

- A housing access road to the east of West Winch connecting the A47 north east of Hardwick Interchange with the existing A10 south of the village. The Proposed Scheme is intended to provide the additional highway capacity necessary to accommodate traffic associated with the housing growth planned across the district;
- A roundabout on the housing access road providing access to the Hardwick Green planned development;
- Two priority junctions on the housing access road to serve proposed dwellings that are outside the planned Hardwick Green development;
- A roundabout on the housing access road, at its southern end, providing a connection to the existing A10;
- Modifications to the existing Hardwick Interchange to accommodate additional housing traffic plus re-orientation of trips through the junction;
- Dualling of the existing A47 between Hardwick Interchange (Constitution Hill roundabout) and the housing access road;
- A signalised roundabout junction where the housing access road meets the A47; and
- Treatment of local roads severed by the housing access road.

4.1.3 A full description of the proposed highway alignment, treatment of sideroads and existing PROW links crossing the scheme, construction phasing and access, and proposed works to the A10 and A47 as well as local roads including Rectory lane and Chequers Lane can be found within Chapter 3 of the Environmental Statement (Document Reference **NCC/3.03.00/WWHAR**).



4.1.4 A Sustainable Transport Strategy (STS) also accompanies the scheme (Document Reference **NCC/4.02.00/WWHAR**), seeking to encourage mode shift for shorter distance trips. The active travel and public transport elements of the STS are highlighted in more detail in Section 6 and Section 7 below.



5 Existing Transport Conditions

5.1 Introduction

5.1.1 This chapter of the TA outlines the travel characteristics of the local area and population along with the current accessibility of the site by all relevant modes of travel.

5.1.2 Personal Injury Collision (PIC) data is presented and a review of the surrounding highway network is also provided in this chapter.

5.2 Existing Travel Patterns of Local Residents

5.2.1 To determine existing travel patterns of local residents, data from the 2011 Census Method of Travel to Work data has been reviewed for the areas of North Runcton and West Winch.

5.2.2 As shown in **Table 5-1**, for residents at North Runcton and West Winch, driving a car or van dominates as the main mode of transport for commuting, accounting for 84% of journeys.

Table 5-1 - Existing Observed Travel Mode Shares

Main Mode	Percentage
On foot	4%
Bicycle	4%
Train	1%
Bus, minibus, or coach	2%
Driving a car or van	84%
Passenger in a car or van	5%
Total	100%

5.2.3 Sustainable modes of transport have a combined mode share of 11%, with 4% of residents walking, 4% of residents cycling, and 3% using public transport – which includes bus and train.



5.2.4 It should be noted that the population not in employment and those working from home have been excluded as they do not make a journey to work on the surrounding highway network.

5.3 Walking Accessibility and Pedestrian Network

5.3.1 To understand the existing accessibility of the local area, research into the local pedestrian, cycle and public transport networks has been undertaken.

5.3.2 **Figure 5-1** below presents the existing Public Rights of Way (PRoW) around the proposed development site. This shows that the area is currently well served by a network of existing pedestrian footpaths and public rights of way predominantly passing through Rectory Lane and Chequers Lane.

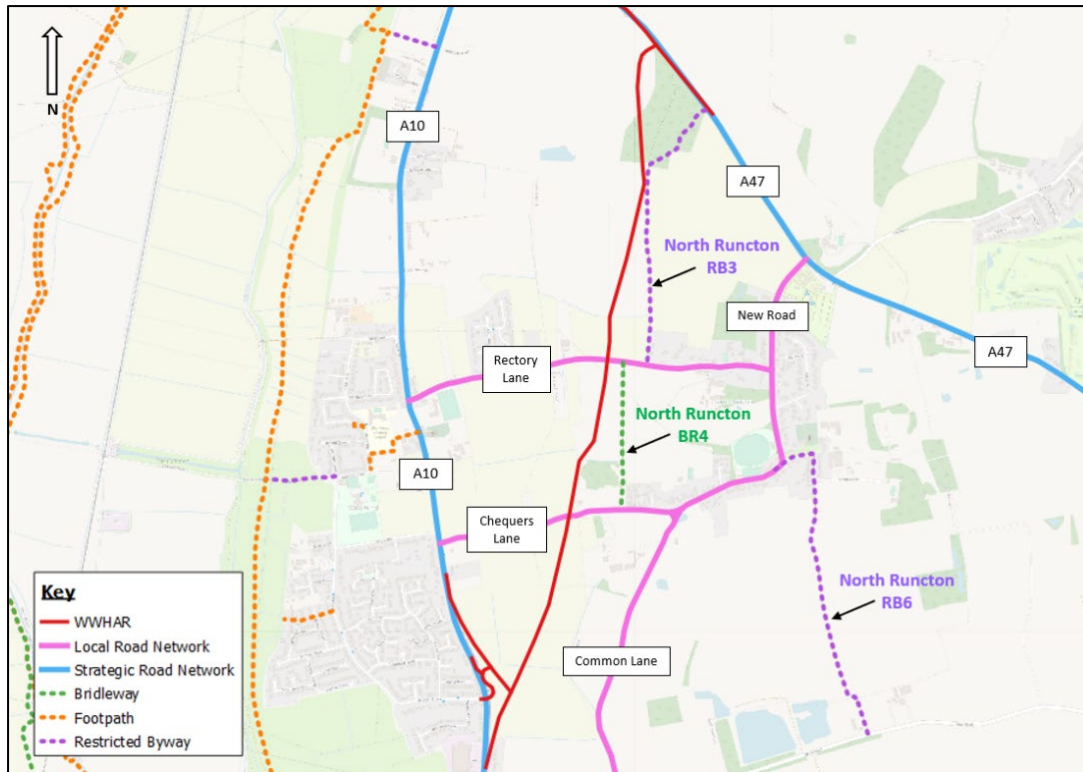
5.3.3 West Winch currently benefits from a shared use path for pedestrians and cyclists along the east side of A10 which runs from the A47 to A134 junction close to Watlington. This route provides pedestrian and cycle access towards King's Lynn via Hardwick Roundabout.

5.3.4 The Hardwick Roundabout itself has a mix of controlled and uncontrolled crossings on the southern and western arms, allowing pedestrian access to and from King's Lynn. However, there is no existing NMU (Non-Motorised User) provision along the A47 corridor.

5.3.5 There are numerous single-laned roads within this study area with no dedicated pedestrian facilities but low traffic volumes enabling shared use, especially during off-peak conditions.



Figure 5-1 - Existing Public Rights of Way



5.3.6 Based on a review of the NCC definitive map, the PRoWs which directly connect to the scheme or are in close proximity include:

- **West Winch FP2** – A footpath running south east to north east from the A10, crossing agricultural land and Grange Lane, connecting to West Winch FP2 to the north. This footpath is located approximately 800m southwest of the Hardwick Roundabout.
- **North Runcton FP1** – A 530m footpath running between Beveridge Way to the north and West Winch FP2 to the south, crossing agricultural land.
- **North Runcton RB2** – A 175m restricted byway which runs in an east – west direction connecting North Runcton FP1 to the A10 West Winch Road.
- **West Winch FP3** – A 240m footpath running in a south-west direction between the A10 and Watering Lane. The footpath ties into and exiting pelican crossing along the A10.



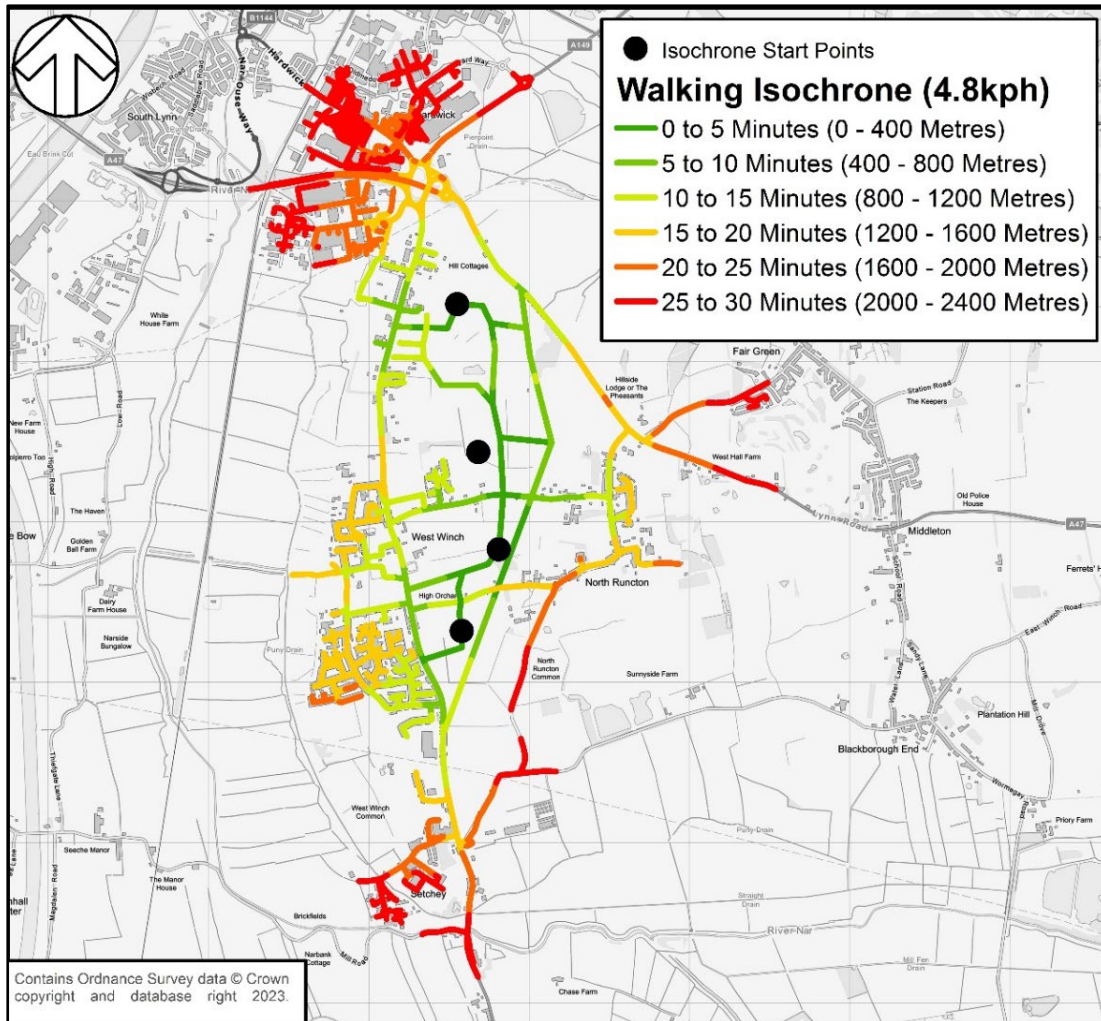
- **West Winch RB1** – A 230m restricted byway running in an east – west direction between Watering Lane and West Winch FP2.
- **North Runcton RB3** – A restricted byway stemming from the A47 and running in a southern direction towards Rectory Lane.
- **North Runcton BR4** – A restricted byway running in a north – south direction between Rectory Lane and Chequers Lane.
- **North Runcton RB6** – A restricted byway running between Common Lane and Setch Road.

5.3.7 Using the indicative road alignments for the West Winch Housing Development, it is possible to estimate walking distances from the development.

5.3.8 Due to the size of the development area, multiple start points have been used to best consider the walking distances from the development. A 25-minute time catchment based on an average walking speed of 80m/minute has been assumed.



Figure 5-2 – Existing Walking Accessibility



5.3.9 As shown in **Figure 5-2**, it is possible to access several different settlements from the West Winch development. Locations accessible within a 30-minute walk are:

- North Runcton
- Fair Green
- Setchey
- South King's Lynn

5.3.10 It is important to note that some minor roads do not have dedicated pedestrian facilities but given these routes likely have very low motor vehicle



flows, they have been deemed to have adequate provision for the walking isochrones.

5.3.11 The pedestrian isochrone demonstrates that key services are accessible within a 30-minute walk. These include:

- Supermarkets (Sainsbury's and Tesco Extra)
- West Winch Stores and Post Office
- West Winch Primary School
- Hardwick Industrial Estate
- Hardwick Narrows Industrial Estate
- Scania Way
- Buttercups Pre-school (North Runcton)

5.4 Cycling Accessibility and Network

5.4.1 West Winch benefits from existing, dedicated cycling infrastructure, mainly centred around the shared footway and cycleway along the A10.

5.4.2 This consists of a wide footway/cycleway between Oakwood Corner Roundabout to the South and Hardwick Roundabout to the north, providing a safer route for cyclists into King's Lynn and most of the way to Watlington.

5.4.3 On the Hardwick Roundabout, there are a number of toucan crossings which provide a walking and cycling route across the roundabout under the A47.

5.4.4 The shared path on the A10 continues north across Hardwick Roundabout onto the A149 Hardwick Road, this continues towards South Gates Roundabout, where the shared path links to other cycle tracks for destinations across King's Lynn. The shared space path continues to the south until the Oakwood Corner Roundabout.

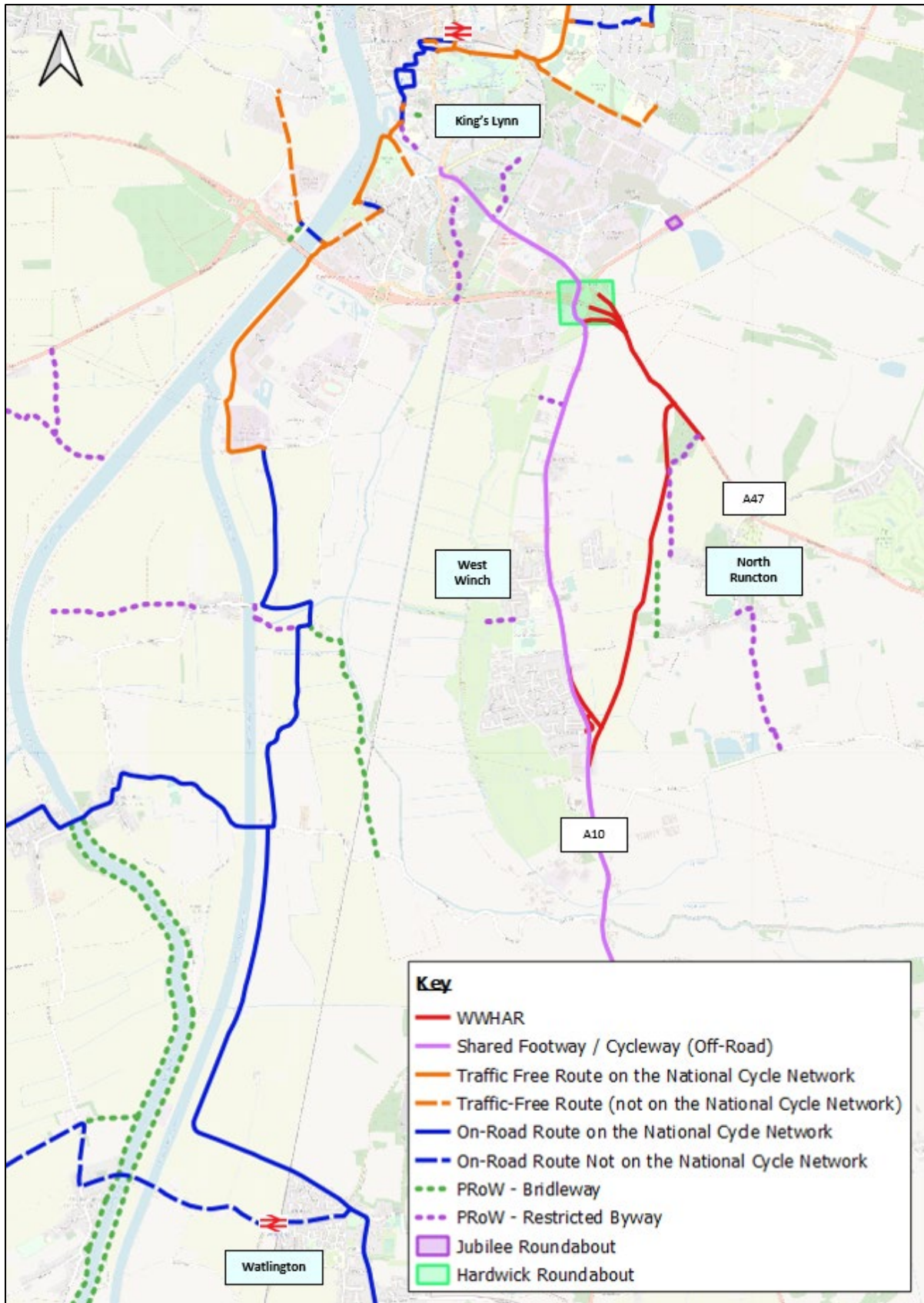
5.4.5 **Figure 5-3** below provides an overview of the cycle network surrounding the proposed development. This includes the National Cycle Network, PRoWs



and the shared footway / cycleway that follows the A10 northbound into King's Lynn to the Southgates Roundabout. Other shared footway / cycleways are present in King's Lynn, however for the purpose of this map, only the A10 shared footway / cycle is presented.



Figure 5-3 - Regional Cycle Network

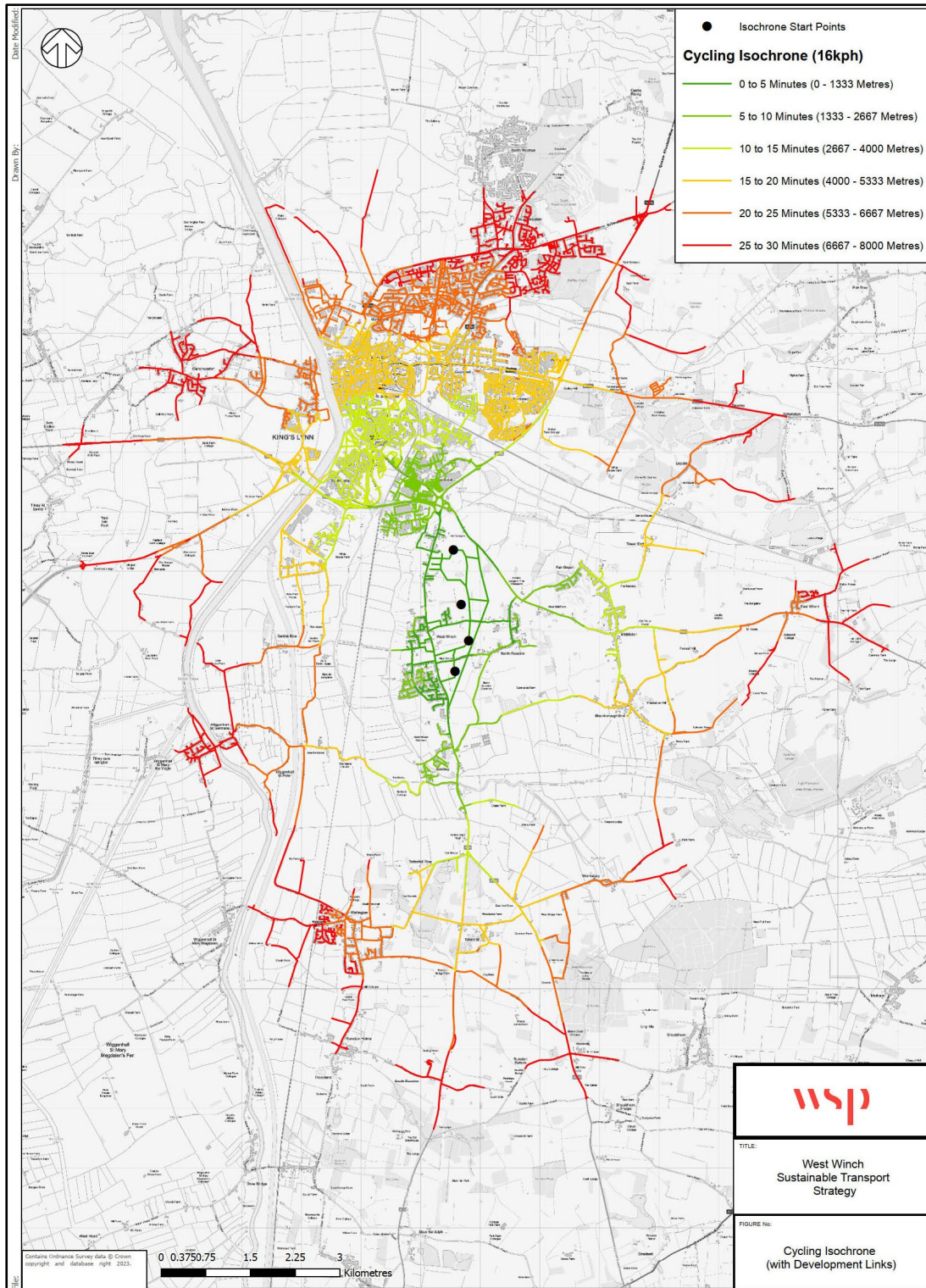




- 5.4.6 **Figure 5-3** above demonstrates that West Winch benefits from a reasonable level of cycling infrastructure to and from King's Lynn. The new West Winch housing development access link roads will help to extend the local cycling infrastructure. Additionally, many of the local side roads and lanes have low motor vehicle traffic, which may be attractive to less confident cyclist.
- 5.4.7 The National Cycle Network (NCN) routes 1 and 11 are near West Winch. National Cycle Route (NCR) 1 joins NCR 11 south west of West Winch on Mill Road, east of Wiggshall. NCR 1 runs parallel to the A10 to the west of West Winch on the other side of the River Nar.
- 5.4.8 The nearest connection to NCN route 1 is in King's Lynn just west of Southgates Roundabout (approximately 14 minutes cycle from the centre of the West Winch development). The nearest connection to NCN Route 11 is southwest of West Winch on Mill Road just east of Wiggshall (approximately 19 minutes cycle ride centre of West Winch development). In a straight line NCN 1 is only 3km away however there are no direct routes between West Winch and NCN 1, mainly due to the River Nar and the Fen Railway Line.
- 5.4.9 Cycle isochrones have been developed for the existing cycle-accessible network in five-minute time bands. The isochrone is based on average cycle speeds of 200m/minute.
- 5.4.10 **Figure 5-4** below shows the cycling isochrones for the West Winch development. As stated in the business case for the WWHAR, walking and cycling facilities within the development area will tie-in to the combined footway/cycleway that will be provided along the length of the WWHAR and also connect to existing facilities located in West Winch and on the A10.
- 5.4.11 Cyclists can reach a significant number of settlements within 30 minutes of the proposed West Winch development. This puts a variety of services and facilities within a 30-minute bike ride of the development.
- 5.4.12 All of King's Lynn is accessible within a 30-minute bike ride.



Figure 5-4 - Existing Cycle Accessibility





5.5 Public Transport

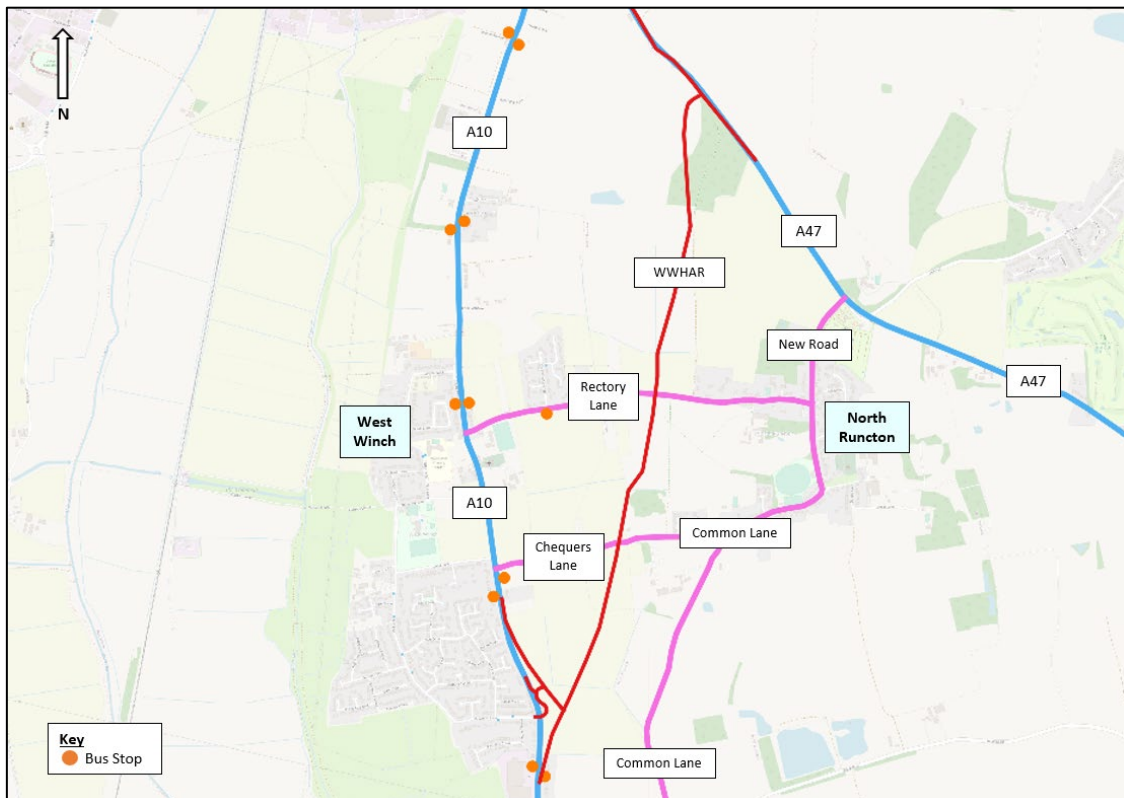
5.5.1 A network of accessible, frequent and reliable public transport is an important factor influencing and encouraging a shift in travel mode share from the private car to more sustainable means of transport. This section of the TA describes existing bus and rail services within the vicinity of the site. The data presented is accurate at the time of writing this TA.

Bus Services

5.5.2 There are bus stops located on the radial routes into King’s Lynn. Within West Winch there are bus stops along the A10, Rectory Lane, and the A47. These are within walking distance from a small catchment of residential dwellings. There is limited pedestrian access to some bus stops, so access on foot from some hamlets and rural villages is less viable.

5.5.3 Within the immediate vicinity of the WWHAR are a series of bus stops located along the A10 and Rectory Lane. **Figure 5-5** presents a location of these stops.

Figure 5-5 - Bus Stop Locations





- 5.5.4 Across these bus stop locations, “Go to Town” operate a service (32) from King’s Lynn to Mileham via Swaffham. This is mostly used for school and college travel but does offer one service per day during school holidays – this service uses the A47.
- 5.5.5 Lynx Buses provide several services (37, 38, 39) connecting West Winch, Middleton, Fair Green, Hardwick, Setchey, Watlington, and King’s Lynn.
- 5.5.6 Coach Services provide a number of services (88, 89) connecting King’s Lynn to Thetford and Brandon.
- 5.5.7 A summary of these routes can be found in **Table 5-2** with a plan showing local bus network coverage in **Figure 5-6** below.

Table 5-2 - Summary of Local Bus Service Information

Service	Route
32	Mileham to King’s Lynn (North Runcton, Swaffham, and Castle Acre)
37	King's Lynn - Downham Market (then Southery or Ten Mile Bank)
38	King's Lynn - Fair Green - King's Lynn via West Winch
39	Marham via Hardwick Road, West Winch & Shouldham
88	Thetford – King’s Lynn
89	Brandon – King’s Lynn



Figure 5-6 - Local Bus Routes



5.5.8 The above list of services indicates that there are semi-regular services into King’s Lynn, Downham Market and towards the coast plus several villages south of the A10. There are also less frequent services to other villages such as Fair Green, Middleton, Marham, and Watlington as well as towns such as Thetford, Swaffham, and Brandon. There is also a direct service to RAF Marham which is a local key employer, plus connections to Hardwick where there is an abundance of jobs.

Rail Services

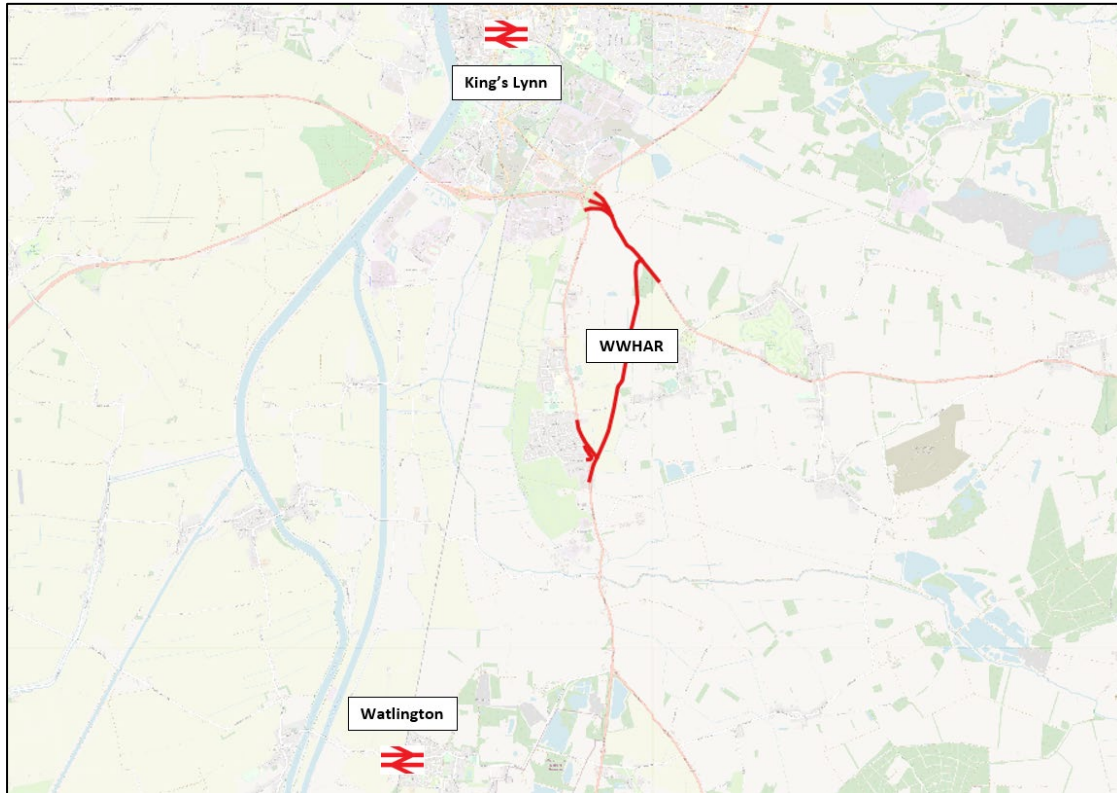
5.5.9 There are no train stations within the immediate vicinity of the WWHAR. The nearest railway line is the Fen Line to the west of West Winch. The other rail line to the north of West Winch is freight-only line serving the quarry.

5.5.10 The closest train stations to the proposed WWHAR are King’s Lynn and Watlington. The locations of these train stations in context to the WWHAR are presented below in **Figure 5-7**.



5.5.11 It should be noted that the distance starting points refer to the centre of Rectory Lane.

Figure 5-7 - Location of Local Rail Stations



5.5.12 **Table 5-3** presents information associated with King's Lynn and Watlington rail stations, including their approximate distance from the WWHAR, which train operators run services at these stations, and the key services provided at these stations.



Table 5-3 – Rail Station Summary Information

Station	Distance	Operator	Key Services
King's Lynn	5.7km	Great Northern – operating on the Fen Line	Direct services to London King's Cross every half hour with stops at stations including Watlington, Downham Market, Ely, Cambridge, Royston and Letchworth Garden City.
Watlington	7.4km	Great Northern – operating on the Fen Line	Direct services to London King's Cross every half hour (same as above). Direct services to King's Lynn every half hour.

5.5.13 In terms of access to the stations from the West Winch area, there is a good bus service along the A10 to and from the King's Lynn Station, with a service every 15 minutes during the day via the 37, 39, and 40 bus services. The 38 service also offers a public transport option to King's Lynn Station in the morning and a return service in the evening. The 37 service provides an occasional service to Watlington Station from West Winch.

5.5.14 In terms of cycling access to the rail stations, there is a shared path along the A10 and A149 north towards King's Lynn Rail Station and southwards towards Watlington. The second half of the route to Watlington Station requires cyclists to use the main carriageway as there is no segregated cycle route.

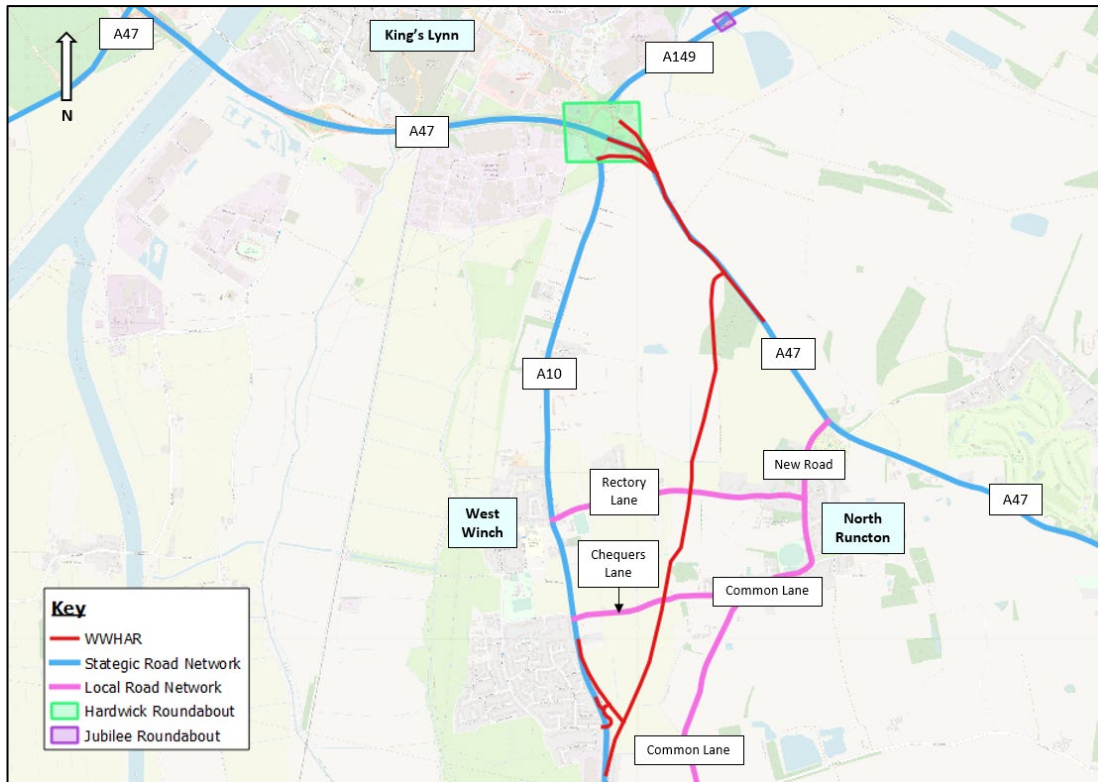
5.5.15 Pedestrians have not been considered in detail to the railway stations as a journey on foot would take over 30 minutes, therefore access to stations from West Winch is more likely to be by car, bus or cycle.

5.6 Existing Highway Network

5.6.1 This section of the TA describes the existing conditions of the surrounding highway network, local to the Proposed Scheme. **Figure 5-8** presents an overview of the local and strategic highway network surrounding the WWHAR.



Figure 5-8 - Strategic and Local Highway Network



Strategic Highway Network

5.6.2 West Winch has good access to a number of strategic road links including the A10, A47, and A149.

A10

5.6.3 The A10 is a 40-mile stretch of predominantly single carriageway road routing north to south between Cambridge and King's Lynn. The A10 forms a key strategic link in the area, providing a connection to residents of Milton, Waterbeach, Ely, Littleport, Downham Market and of course West Winch, where the Proposed Scheme is centralised.

5.6.4 The speed limit along the A10 varies significantly along its stretch. On approach to more populated areas, it frequently reduces down to below the national speed limit of 60mph to 30 and 40mph.

5.6.5 Through the village of West Winch, speed along the A10 is restricted to 40mph. To the east of the A10 in this area, there is a shared-use path of varying width.



5.6.6 To the north, the A10 intersects with both the A47 and the A149 at a grade-separated junction known as the Hardwick Interchange. The WWHAR aims to provide a new route between the A10 and the A47, reducing traffic on the A10 through West Winch while simultaneously improving the capacity of the A47 Hardwick roundabout.

A47

5.6.7 The A47 is a key section of carriageway, routing east to west across Cambridgeshire and Norfolk. It forms a key part of the strategic road network connecting Leicester, Peterborough, King's Lynn and Norwich to the port of Lowestoft.

5.6.8 For the majority of its length, the A47 is single carriageway and is subject to a national speed limit of 60mph. However, around Norwich the A47 forms a section of dual carriageway that is subject to a national speed limit of 70mph.

5.6.9 On approach to King's Lynn, the A47 intersects with both the A10 and the A149 at a grade-separated junction known as the Hardwick Interchange. The Hardwick Interchange is a complex 6-arm grade-separated junction that is subject to change as part of the Proposed Scheme.

5.6.10 The WWHAR will also provide access to the A47 north for the 4,000 home West Winch Housing allocation, helping to relieve the pressure on the existing A10 as a result of the development.

A149

5.6.11 The A149 is a major section of carriageway, running 87 miles from King's Lynn to Great Yarmouth via the North Norfolk coastal villages.

5.6.12 Starting at Southgates Roundabout in King's Lynn, the A149 heads eastwards away from the town along Hardwick Road.

5.6.13 Within the vicinity of the HAR, the A149 is a single carriageway with a speed limit of 50mph, increasing to 60mph on approach to the Jubilee Roundabout approximately 850m north-east of the Hardwick Roundabout.



Local Highway Network

5.6.14 In addition to the A10 and A47, the WWHAR is also surrounded by a number of key local roads, which are subject to the national speed limit:

Rectory Lane

5.6.15 Rectory Lane is a rural, narrow single lane carriageway that connects the A10 at West Winch to the A47 via New Road in an easterly and westerly direction.

5.6.16 The speed limit on Rectory Lane is restricted to 40mph from the A10 for approximately 910m where it then becomes a 30mph road to New Road.

5.6.17 Given its width, vehicular traffic predominantly favours Rectory Lane as opposed to Chequers Lane to the south.

Chequers Lane

5.6.18 Chequers Lane is situated to the east of the A10, approximately 2km south of Hardwick Interchange, and provides connectivity between the villages of West Winch and North Runcton.

5.6.19 Vehicles can utilise the single-track carriageway in an easterly and westerly direction by pulling into passing places where vehicles travelling in opposite directions meet.

5.6.20 From the A10, Chequers Lane is a 60mph road until it the residential area of North Runcton where Chequers Lane becomes a 30mph road.

Common Lane

5.6.21 Common Lane is located within North Runcton and connects Chequers Lane to New Road.

5.6.22 It is a narrow single-lane carriageway, restricted to a speed limit of 30mph, that provides access to residential dwellings within North Runcton.

New Road

5.6.23 New Road is also situated within North Runcton and connects Common Lane with the A47.



5.6.24 It is a narrow single-lane carriageway, restricted to a speed limit of 30mph, that provides access to residential dwellings within North Runcton.

5.7 Personal Injury Collision (PIC) Data

5.7.1 This section provides a review of the Personal Injury Collision (PIC) data across the highway network described above. The most recently available seven-year accident data has been obtained from NCC.

5.7.2 **Table 5-4** presents a summary of the PIC data by year and severity while **Figure 5-9** presents the corresponding locations of the collisions.

5.7.3 It is important to note that seven years of PIC data were obtained due to the impact of COVID-19 which hugely reduced the levels of traffic on the highway between 2020 and 2021. It is therefore suggested that the data presented for these years is not fully representative.

Figure 5-9 - Personal Injury Collision Study Area

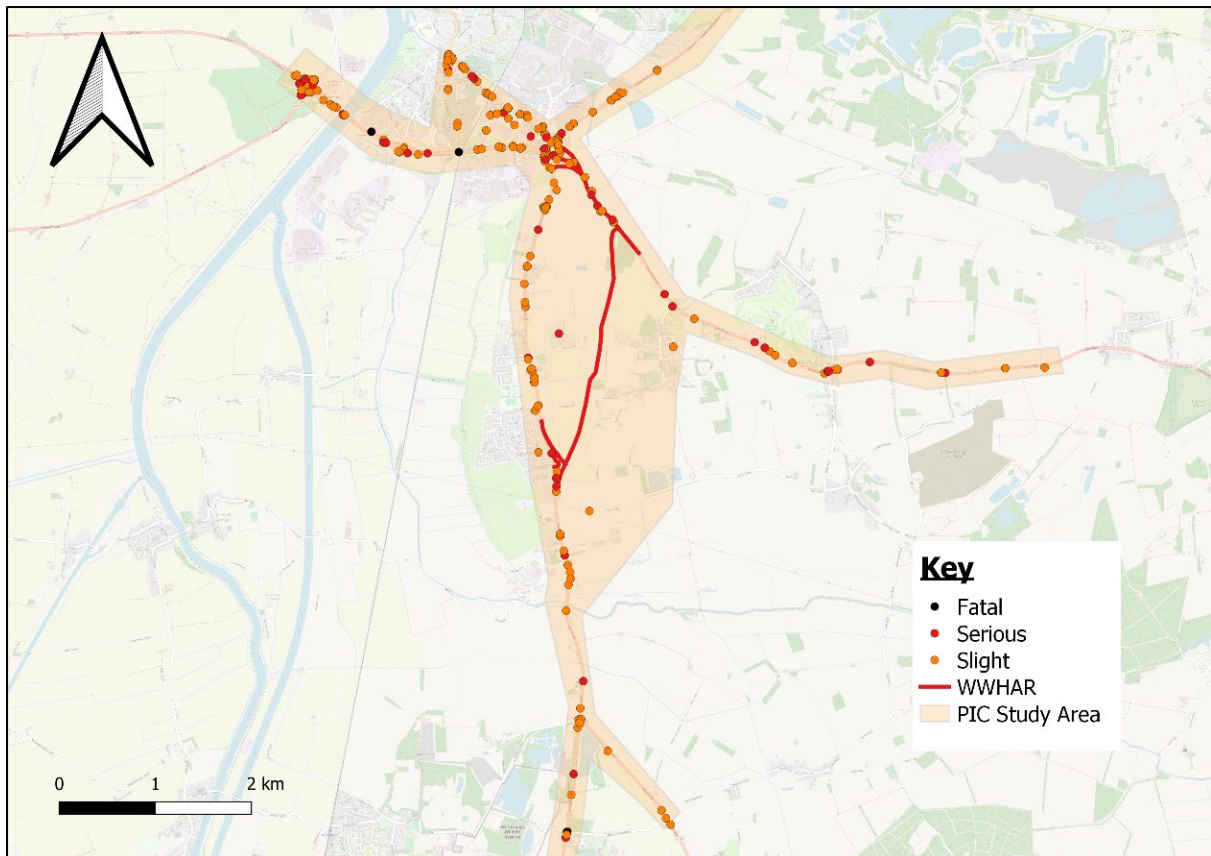




Table 5-4 - PIC Data by Year and Severity

Year	Slight	Serious	Fatal	Total
2016	53	8	1	62
2017	40	6	0	46
2018	38	9	1	48
2019	48	4	0	52
2020	24	8	1	33
2021	17	8	1	26
2022	24	9	0	33
Total	244	52	4	300

5.7.4 **Table 5-4** shows that a total of 300 incidents were recorded on the road network in the 7-year period studied. 244 of these collisions were of slight severity, 52 were reported as serious, and 4 were fatal. It is evident that 2016 experienced the greatest number of collisions (62) and that 2022 received the fewest (33), excluding the COVID-19 lockdown years of 2020 and 2021 which experienced greatly reduced traffic levels.

5.7.5 Of all collisions between 2015 and 2022, 14% occurred during the morning peak period (0700-1000), while 23% occurred during the evening peak period (1600-1900).

5.7.6 Further analysis of the full dataset, shows that 79% of all collisions occurred on a dry carriageway surface, suggesting that the road condition was not a major causal factor of the recorded collisions, although there was a high concentration of accidents located at several junctions within the study area.

5.7.7 Within the 300 collisions that were recorded, there were 425 casualties, of which 84% were slightly injured, 14% were seriously injured, and 1% suffered fatal injuries.

5.7.8 **Table 5-5** provides a summary of the collisions by severity and casualty class.



Table 5-5 - Personal Injury Collision Study Area Information

Casualty Class	Slight	Serious	Fatal	Total
Driver / Rider	254 (84%)	45 (15%)	3 (1%)	302
Passenger / Pillion	93 (88%)	11 (10%)	2 (2%)	106
Pedestrian	12 (71%)	5 (29%)	0 (0%)	17
Total	359	61	5	425

5.7.9 Upon reviewing the casualty class for the collisions within the study area, it is evident that accidents within the last seven years have occurred mostly with drivers / riders. 84% of these accidents were slight, 15% were serious, and 1% were fatal.

5.7.10 Regarding pedestrian casualties within the PIC data study area, it is evident from **Table 5-5** that 17 accidents have occurred which reflects a very small number of casualties in comparison to other casualty classes (4%). This perhaps reflects the rural nature of the area and the low usage of these roads by pedestrians. Importantly over the seven-year period, no fatal accidents have occurred with pedestrians.

5.7.11 No collisions mention the involvement of horses or equestrians.

5.7.12 **Table 5-6** describes the recorded fatal accidents in more detail.



Table 5-6 - Overview of Fatal Accidents

Location	Day/Date	Time/Light	Weather	Road Surface	Vehicles
Saddlebow Interchange, A47	Wed / 19.10.2016	18:45 / Dark	Rain (no wind)	Wet / damp	2 Cars
Constitution Hill, A47	Wed / 17.01.2018	17:21 / Daylight	Fine (no wind)	Wet / damp	1 Van / HGV, 1 Bus / coach
Saddlebow Interchange, A47	Fri / 24.01.2020	06:05 / Dark	Fog or mist	Wet / damp	HGV / Pedal cycle
Watlington Road, A10	Mon / 13.12.2021	06:25 / Dark	Fine (no wind)	Wet / damp	2 Cars

Collision Locations

5.7.13 The data confirms that the collisions within the study area tend to be located at or near junctions on A47 and A10 and on the approach to a number accesses within the study area.

5.7.14 The identified collision locations are listed below:

- Hardwick Roundabout (39) – where 8 serious and 31 slight collisions were reported.
- Pullover Roundabout (46) – where 8 serious and 38 slight collisions were reported.
- A10 (34 – from Hardwick Roundabout to extent of scheme) – where 5 serious and 29 slight collisions were reported.

5.7.15 A number of collisions appear to have occurred due to slow moving traffic and drivers failing to adapt to changing circumstances in appropriate time. At the above sites, highway geometry changes or increased control such as traffic signals and speed control are likely to be required to overcome safety.

5.7.16 There are high numbers of frontage accesses along the A10 which is not ideal for a strategic road. Accidents at frontage accesses along the A10 could



therefore potentially be reduced, with the proposed scheme in place. Lower flows on A10 would assist residents departing their properties with reduced conflict and larger gaps available to enter the flow of traffic.

5.7.17 The Hardwick Interchange existing layout can also be confusing for drivers to negotiate, with users of the Constitution Hill roundabout directed to the east side of the interchange crossing 2-3 traffic lanes in many cases to access A47.

5.7.18 Site observations indicate that drivers often choose the wrong lane and make sudden changes of direction due to difficulties navigating the interchange. This is especially prevalent amongst unfamiliar users (and as the route is located on a tourist route to the coast this is a frequent occurrence).

5.8 Existing Traffic Flows

5.8.1 An extensive data collection programme was undertaken in 2018 to support model development and provide sufficient data to enable the calibration and validation of the Kings Lynn Transport Model (KLTM).

5.8.2 Due to the extension of the Area of Detailed Modelling (ADM) to include West Winch, additional data were also collected in 2019 for the purposes of the KLTM extension.

5.8.3 An October 2022 traffic data collection exercise encompassing all of the ATC locations covered by the 2018 and 2019 surveys was undertaken in order to understand the change in traffic levels which have occurred in the King's Lynn area post-COVID.

5.8.4 The following surveys were undertaken:

- Automatic Number Plate Recognition at 7-8 sites,
- Automatic Traffic Count at 65 sites,
- Junction Turning Count at 34 sites.
- Queue Length at ANPR only or ANPR + JTC sites



5.8.5 The locations of the survey sites are shown in **Appendix 5** (Document Reference **NCC/4.01.05/WWHAR**).

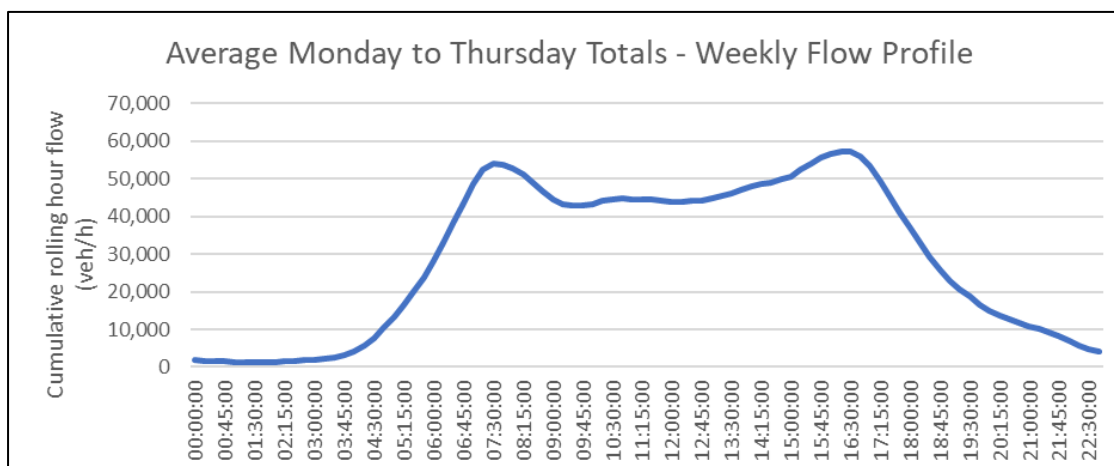
ATC Counts

5.8.6 A total of 65 ATCs were collected between 8th October 2022 and 21st October 2022 in 15-minute intervals on key links and screenlines within the model and record a 2-week period to remove day-to-day variation in traffic flow. **Figure 5-10** shows the 2022 daily traffic profile comparison between the total traffic flow (sum of 45 sites) based on the average weekday traffic from Monday to Thursday.

5.8.7 From the flow profile, it can be clearly seen that the peaks in traffic flow range between the hours of 07:00 and 10:00 and 16:00 and 19:00.

5.8.8 The modelled peak hours were defined based on the ATC data collected over a two-week period. The detailed analysis identifies the AM peak hour as 07:30-08:30, and PM peak hour as 16:15-17:15, almost identical to the results obtained for the 2018 survey. In each case, the peak hour is defined by the busiest consecutive flows recorded at 15-minute intervals.

Figure 5-10 - 2022 Daily Flow Profile



Observed data was compared with peak flows obtained from model to investigate the differences. As set out below in **Table 5-7** a comparison has been made to establish whether the total flows for the periods 08:00 - 09:00 and 17:00-18:00 are significantly different from the total flows for the actual peak hours.



Table 5-7 - 2022 Peak Hour Analysis

AM Hour Start	AM Flow (Vehicles)
07:30 – 08:30	54,078
08:00 – 09:00	52,828
%diff	-2.31%
PM Hour Start	PM Flow (Vehicles)
16:15 – 17:15	57,301
17:00 – 18:00	53,376
%diff	-6.85%

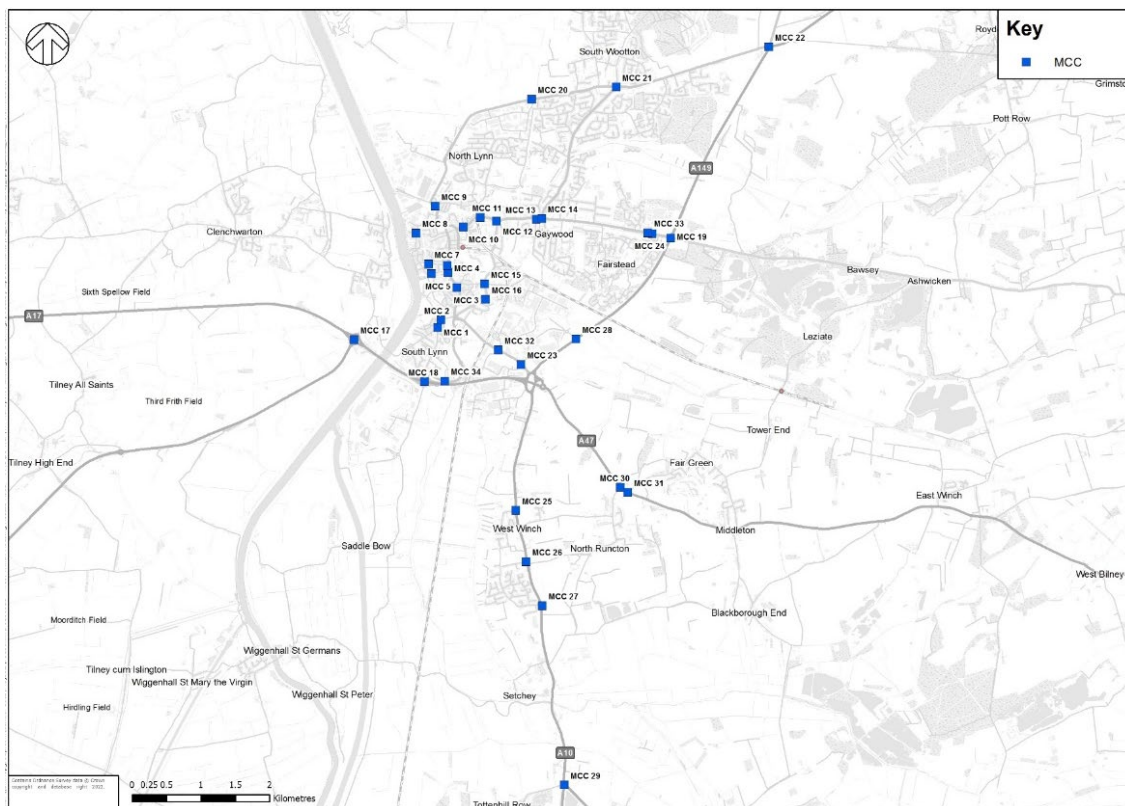
5.8.9 The results of this analysis show that the differences between the examined periods are close to daily variation of traffic which can be +/-10% for the Strategic Road Network.

MCCs

5.8.10 An October 2022 traffic data collection exercise encompassing all of the MCC locations shown in **Figure 5-11** has been undertaken in order to understand the change in traffic levels which have occurred in the King’s Lynn area post-COVID.



Figure 5-11 - 2022 MCC Survey Location Plan



5.8.11 **Appendix 6** (Document References **NCC/4.01.06/WWHAR** and **NCC/4.01.07/WWHAR**) provide the observed count data for each turning count entry and exit by time period and vehicle type for the 2018, 2019 and 2022 data.

5.8.12 **Appendix 7** (Document Reference **NCC/4.01.07/WWHAR**) provides observed traffic flow diagrams applied against the KLTM highway network including both ATC and MCC data.

ATC – MCC Comparison

5.8.13 A comparison between 2022 ATCs and MCCs within close proximity has been undertaken along the A10 to understand the consistency of the observed traffic flows between the multi-day ATCs and single day MCC surveys. This analysis demonstrates an issue with the ATC data, particularly in the northbound direction, whereby the ATC recorded higher traffic flows than the MCC data. This issue persists even if the only ATC observation considered is



from the same day as the MCC surveys. The data is presented below in

Table 5-8 to Table 5-10.

Table 5-8 - ATC44 vs MCC26 – A10 between Long Lane and Rectory Lane

Peak Hour	Direction	MCC	ATC (same day)	ATC (avg Mon-Thu)	Diff ATC minus MCC	Diff ATC (avg) v MCC
AM	Northbound	757	862	908	105	151
AM	Southbound	640	654	731	14	91
PM	Northbound	883	862	859	-21	-24
PM	Southbound	953	996	1026	43	73

Table 5-9 - ATC5 vs MCC25 – A10 between Chapel Lane and Hardwick Interchange

Peak	Direction	MCC	ATC (same day)	ATC (avg Mon-Thu)	Diff ATC minus MCC	Diff ATC (avg) v MCC
AM	Northbound	850	1020	1100	170	250
AM	Southbound	663	685	757	22	94
PM	Northbound	887	919	895	32	8
PM	Southbound	1017	1070	1101	53	84



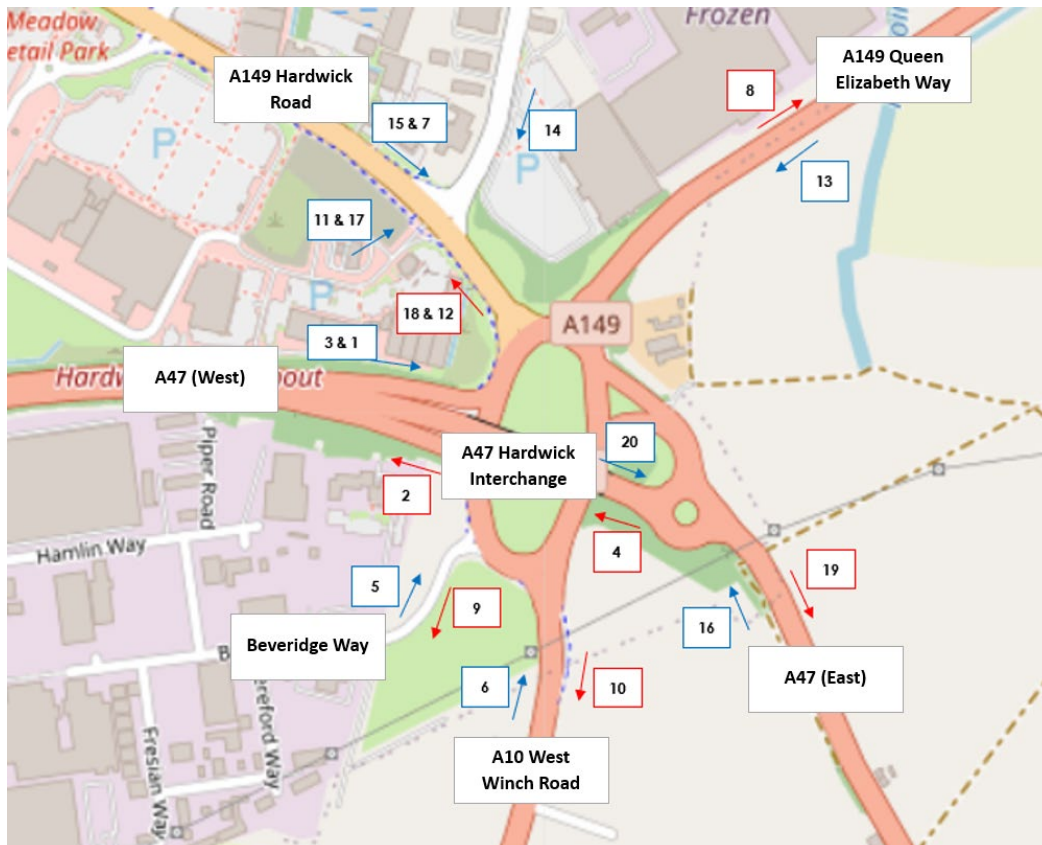
Table 5-10 - ATC18 vs MCC27 – A10 south of Gravelhill Lane

Peak	Direction	MCC	ATC (same day)	ATC (avg Mon-Thu)	Diff ATC minus MCC	Diff ATC (avg) v MCC
AM	Northbound	707	826	850	119	143
AM	Southbound	632	648	714	16	82
PM	Northbound	859	888	821	29	-38
PM	Southbound	850	886	896	36	46

ANPR Survey

5.8.14 An ANPR survey was undertaken on the 20 October 2022 between 07:00 – 19:00 at the Hardwick Interchange to review origin destination movements within the junction. Figure 5-12 shows the location of the ANPR cameras.

Figure 5-12: 2022 ANPR Hardwick Interchange





5.8.15 **Table 5-11** outlines the total AM movements captured within the Hardwick Interchange and Constitution Hill roundabout once the ANPR movements are factored to match the volumes captured by the associated MCC surveys supporting the ANPR survey.

Table 5-11 - Hardwick Interchange / Constitution Hill - 2022 AM Movements

Total	A149 Hardwick Road	A149 Queen Elizabeth Way	A47 (East)	A47 Hardwick Interchange	A10 West Winch Road	Beveridge Way	A47 (West)	Total
A149 Hardwick Road	4	77	170	97	223	53	31	656
A149 Queen Elizabeth Way	19	4	59	311	210	82	133	817
A47 (East)	337	84	3	403	8	31	1	866
A47 Hardwick Interchan ge	4	0	314	1	218	100	3	640
A10 West Winch Road	436	232	8	1	8	37	243	965
Beveridge Way	30	59	19	0	43	21	13	186
A47 (West)	482	646	8	3	27	13	1	1,181
Total	1,312	1,102	580	816	739	337	425	5,311

5.8.16 **Table 5-12** outlines the total PM movements captured within the Hardwick Interchange and Constitution Hill roundabout.



Table 5-12 - Hardwick Interchange / Constitution Hill - 2022 PM Movements

Total	A149 Hardwick Road	A149 Queen Elizabeth Way	A47 (East)	A47 Hardwick Interchange	A10 West Winch Road	Beveridge Way	A47 (West)	Total
A149 Hardwick Road	8	107	329	302	557	40	68	1,411
A149 Queen Elizabeth Way	25	3	58	314	246	19	223	888
A47 (East)	196	53	2	340	11	3	0	605
A47 Hardwick Interchan ge	2	1	287	3	125	32	2	452
A10 West Winch Road	358	232	8	2	2	28	294	923
Beveridge Way	51	158	69	14	106	3	0	402
A47 (West)	268	437	4	3	22	5	0	738
Total	908	991	757	977	1,069	130	588	5,420

5.8.17 The data discussed within this chapter has been used to inform the validation and calibration of the 2019 base year model reported in the Local Model Validation Report (LMVR).

5.8.18 The analyses around differences between pre and post COVID-19 data have also been used to inform adjustments to the KLTM forecasts.

5.8.19 The 2022 ATC data demonstrates a reduction in traffic has occurred when considered against the previous 2018/2019 data. The analysis shows a decrease in traffic has occurred in 2022, most notably in the PM peak hour 1700-1800 and PM peak period 1600-1900.



5.8.20 Further to this, when 24-hour flows are considered, this demonstrates overall that an 8% decrease in traffic data has occurred in 2022 compared to the pre COVID-19 situation. This analysis has been used to inform COVID-19 adjusted forecasts, outlined in the Traffic Forecasting Report.

5.9 Non-Motorised User Movement Surveys and Counts

5.9.1 In order to establish the existing NMU demand along and within proximity of the study area, a data collection exercise has been undertaken formed of four surveys. The data collection consisted of the following surveys:

- Crossing counts for all users at three locations;
- Off-carriageway (PRoW) counts for all users at five locations;
- NMU flows by type and direction at 24 locations; and
- Boarding and alighting counts at ten bus stops for 17 hours.

5.9.2 The data was collected during a neutral weekday (Wednesday) and Saturday. The survey types and locations were informed by site visit observations and the proposed alignments for the scheme. The following subsections provide a summary of key findings from each survey. The section will also investigate the latent demand potential by identifying existing patterns and likely trip generation within the study area.

Crossing Counts

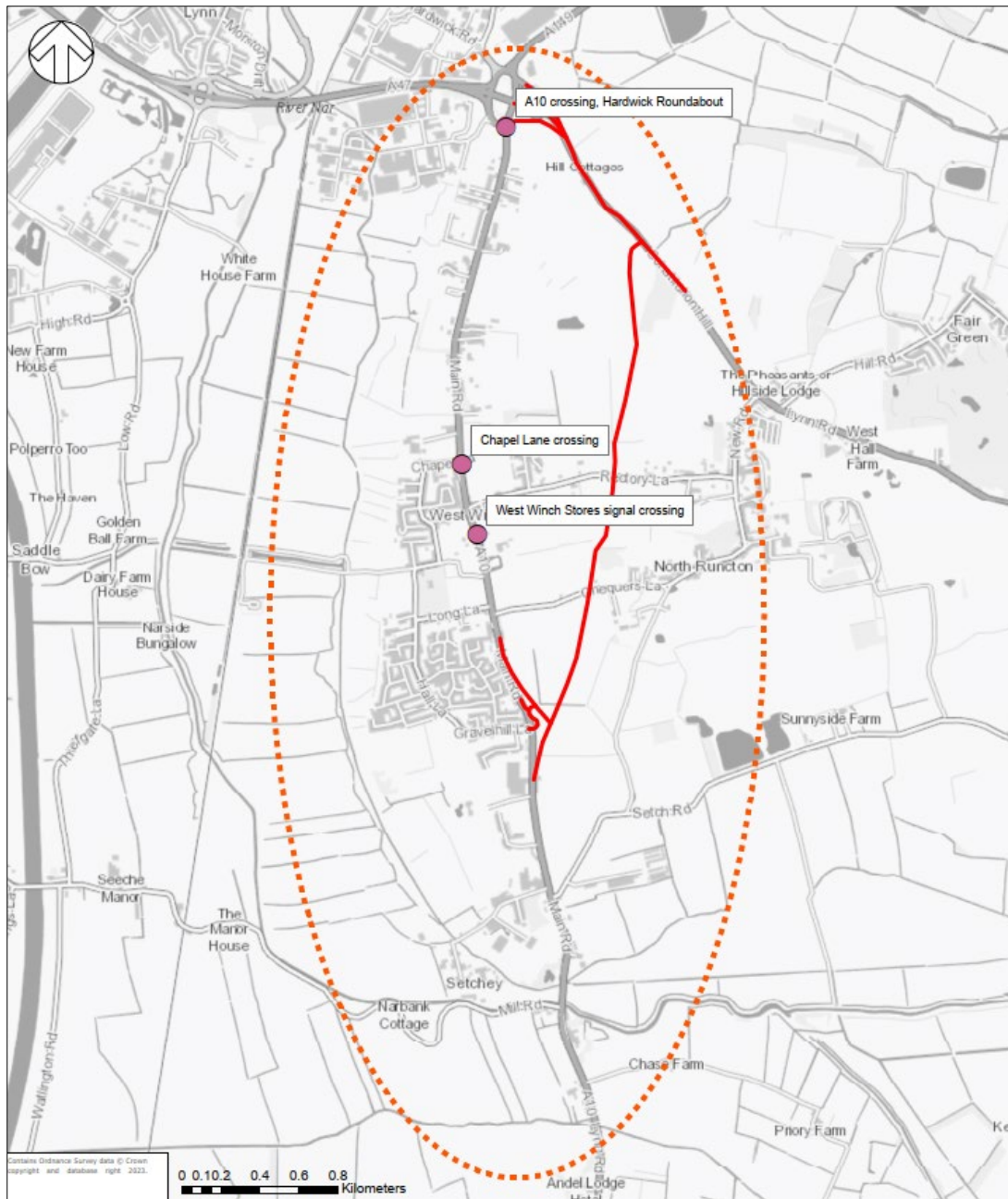
5.9.3 The crossing surveys have been undertaken at the following locations:

- **Crossing 1** – A10 Main Road adjacent to the Esso Petro Filling Station
- **Crossing 2** – A10 Main Road at Chapel Lane junction
- **Crossing 3** – A10 West Winch Road at Hardwick Roundabout

5.9.4 **Figure 5-13** below presents the NMU survey crossing locations.



Figure 5-13 - NMU Survey Crossing Locations



Crossing 1

5.9.5 **Table 5-13** and **Table 5-14** illustrate NMU movement at the A10 Main Road adjacent to the Esso Petrol Filling Station pedestrian crossing over the 17-hour period. The crossing is currently signalled and facilitates east-west movements across the A10 within the proximity of the West Winch primary school.



Table 5-13 - A10 Main Road Crossing (Adjacent to Esso) – User Survey Data, Weekday

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	48	7	0	55
Westbound	55	9	0	64

Table 5-14 - A10 Main Road Crossing (Adjacent to Esso) – User Survey Data, Weekend (Saturday Only)

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	23	2	0	25
Westbound	14	2	0	16

5.9.6 **Table 5-13** and **Table 5-14** demonstrate that no equestrians have been recorded which is anticipated due to the location of the crossings and no bridleways tying into the pedestrian network. A total of 103 pedestrians have been recorded utilising the crossing over a 17-hour period during a weekday and a further 16 cyclist movements. During the weekend the number of pedestrians utilising the crossing decreases to 37. This indicates that the crossing is required to facilitate the pedestrian’s movements between the local amenities including the primary school and the local residential areas.

Crossing 2

5.9.7 **Table 5-15** and **Table 5-16** illustrate NMU movement at the A10 / Chapel Lane pedestrian crossing over the 17-hour period. This is an uncontrolled pedestrian crossing consisting of dropped kerbs and tactile paving.



Table 5-15 - A10 Main Road at Chapel Lane junction - User Survey Data, Weekday

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	8	4	0	12
Westbound	6	5	0	11

Table 5-16 - A10 Main Road at Chapel Lane junction - User Survey Data, Weekend (Saturday Only)

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	7	5	0	12
Westbound	2	2	0	4

5.9.8 **Table 15** and **Table 5-16** illustrate that over the 17-hour period, a limited number of NMU utilised the crossing. A total of 14 pedestrians and nine cyclists utilised the crossing during the weekday over the duration of the survey. Although the demand at the crossing is currently limited, it does indicate that the crossing is required to facilitate the NMU movements.

Crossing 3

5.9.9 **Table 5-17** and **Table 5-18** demonstrate NMU movement at the A10 Hardwick Roundabout crossing during weekdays and weekends over a 14-hour period.

Table 5-17 - A10 Hardwick Roundabout Crossing - User Survey Data, Weekday

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	5	22	0	27
Westbound	2	9	0	11



Table 5-18 - A10 Hardwick Roundabout Crossing - User Survey Data, Weekend (Saturday Only)

Location	Pedestrian	Cyclist	Equestrian	Total
Eastbound	1	10	0	11
Westbound	3	7	0	10

5.9.10 The data shows that the crossing is well utilised by cyclists during the weekday and weekends with 31 and 17 cyclists utilising the crossings, respectively. The pedestrian movements are limited, with seven pedestrians utilising the crossing during the weekday which decreases to four movements over the weekend. The data shows that the crossing has not been utilised by equestrians during the duration of the surveys.

PRoW Counts

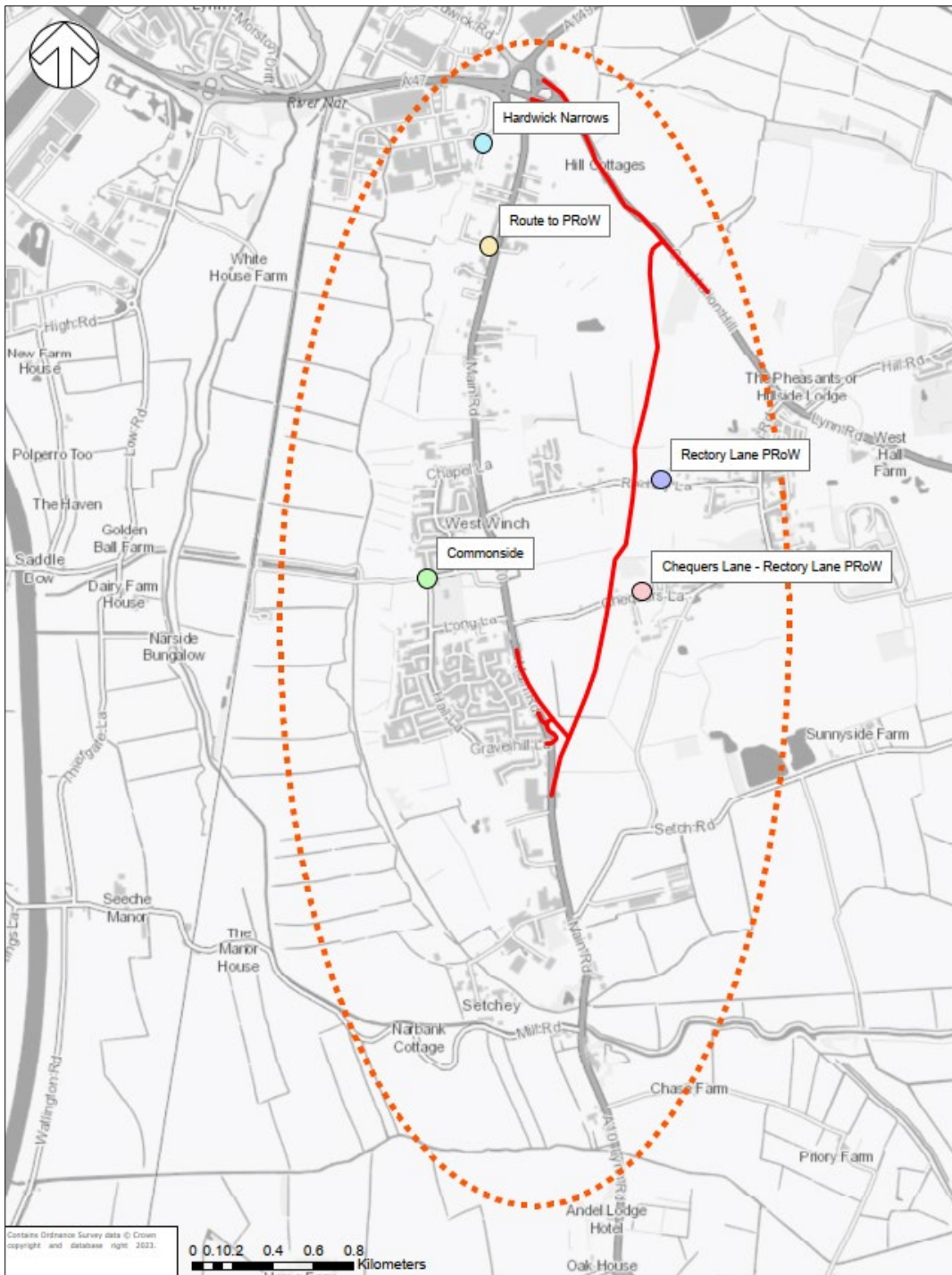
5.9.11 Counts were undertaken for pedestrians, cyclists and horse-riding movements along a series of PRoWs this included:

- Commonside PRoW (North Runcton RB2)
- Hardwick Narrows PRoW (Ref. North Runcton FP1)
- Rectory Lane PRoW (Ref. North Runcton RB3)
- A10 Route to PRoW (Ref. West Winch RB1)
- Chequers Lane – Rectory Lane PRoW (Ref. North Runcton BR4)

5.9.12 The location of PRoW survey locations is illustrated in **Figure 5-14**.



Figure 5-14 - NMU PRow Survey Locations



5.9.13 **Table 5-19** and **Table 5-20** demonstrate NMU movements along the aforementioned PRowS during weekdays and weekends over a 14-hour period.



Table 5-19 - PRow Counts - User Survey Data, Weekday

Location	Pedestrian	Cyclist	Equestrian	Total
Commonside	47	2	0	49
Hardwick Narrows	3	3	0	6
Rectory Lane	14	0	0	14
A10 Route	18	0	0	18
Chequers Lane	22	0	0	22

Table 5-20 - PRow Counts - User Survey Data, Weekend (Saturday Only)

Location	Pedestrian	Cyclist	Equestrian	Total
Commonside	23	0	0	23
Hardwick Narrows	3	0	0	3
Rectory Lane	16	0	4	20
A10 Route	14	0	0	14
Chequers Lane	11	0	1	12

5.9.14 Based on the data presented in **Table 5-19** and **Table 5-20**, the following findings have been derived:

Commonside

- Weekday pedestrian activity is notably higher than on weekends, with 47 pedestrians on weekdays and 23 on Saturdays.
- Weekday cyclist activity is minimal, with only 2 cyclists.
- There is no reported equestrian activity on weekdays or Saturdays.



Hardwick Narrows

- Both weekday and weekend pedestrian and cyclist counts are low, with 3 pedestrians recorded respectively, during the weekday 3 cyclists have been recorded.
- No equestrian activity is reported on either weekdays or Saturdays.

Rectory Lane

- Weekday pedestrian activity is 14, whereas it increases to 16 on Saturdays.
- Equestrian activity is only reported on Saturdays, with 4 equestrians.
- There is no reported weekday cyclist activity.

A10 Route

- Weekday pedestrian activity is slightly higher than on Saturdays, with 18 pedestrians on weekdays and 14 on Saturdays.
- No cyclist or equestrian activity is reported on weekdays or Saturdays.

Chequers Lane

- Weekday pedestrian activity is the highest among the locations, with 22 pedestrians, compared to 11 on Saturdays.
- Equestrian activity is reported on Saturdays, with 1 equestrian.
- No cyclist activity is reported on either weekdays or Saturdays.

Key Findings from PRow Surveys:

- Pedestrian activity generally exceeds other user types (cyclists and equestrians) across all locations and should be incorporated within the scheme.
- Cyclist activity is minimal in most locations during the observed periods, however, should be considered within the extents of the scheme as future proposals may impact the demand.



- Equestrian activity is limited and primarily occurs on weekends.
- Activity levels vary between different locations... – do we have any site visit knowledge that we can make a link to here?

NMU Flows

5.9.15 In addition to the PRow surveys, counts were undertaken for pedestrians, cyclists, and horse-riding movements.

5.9.16 **Table 5-21** and **Table 5-22** illustrate the NMU count over the 14-hour period for the sites outlined above. Due to a camera malfunction, there is no data recorded for Site 3.

Table 5-21 - NMU Counts - User Survey Data, Weekday

Location	Pedestrian	Cyclist	Equestrian	Total
Site 1	239	23	0	262
Site 2	2	1	0	3
Site 3	No data	No data	No data	No data
Site 4	48	2	0	50
Site 5	29	53	0	82
Site 6	156	34	0	190
Site 7	31	23	0	54
Site 8	50	45	0	95
Site 9	30	21	0	51
Site 10	44	24	0	68
Site 11	85	33	0	118
Site 12	18	6	0	24
Site 13	123	26	0	149
Site 14	102	221	0	323
Site 15	33	50	0	83
Site 16	101	212	0	313



Table 5-22 - NMU Counts - User Survey Data, Weekend (Saturday Only)

Location	Pedestrian	Cyclist	Equestrian	Total
Site 1	86	9	0	95
Site 2	0	4	0	4
Site 3	No data	No data	No data	No data
Site 4	28	1	2	31
Site 5	15	30	0	45
Site 6	68	17	0	85
Site 7	30	11	0	41
Site 8	26	21	0	47
Site 9	36	6	0	42
Site 10	32	5	0	37
Site 11	55	14	0	69
Site 12	9	2	0	11
Site 13	42	7	0	49
Site 14	37	54	0	91
Site 15	12	28	0	40
Site 16	43	48	0	91



Site 1: NMU route between A10 and Back Lane

- On weekdays, Site 1 sees significant pedestrian activity with 239 pedestrians.
- Cyclist activity is notable with 23 cyclists during weekdays.
- There's no reported equestrian activity on weekdays.
- On the weekend, pedestrian activity remains high at 86, and cyclist activity is at 9. This presents an opportunity to improve the existing provision.

Site 2: A47 Constitution Hill

- Site 2 reports minimal weekday pedestrian activity with two pedestrians and one cyclist.
- There was no reported equestrian activity on weekdays.
- On weekends, cyclist activity increases to four, while there's no pedestrian activity.

Site 4: A149 Queen Elizabeth Way

- Site 4 sees moderate pedestrian activity with 48 movements, with a decrease of 20 pedestrians over the weekend.
- Cyclist activity is low with only two cyclists recorded over the 14-hour period during the weekday.
- Two equestrians have been recorded on a weekend.

Site 5: A10 South of Hardwick Roundabout

- Site 5 has moderate pedestrian and cyclist activity on both weekdays and weekends.
- The site is well utilised by cyclists with 53 and 30 recorded over the weekday and weekend, respectively.



Site 6: A10 North of West Winch Stores

- Site 6 exhibits substantial pedestrian and cyclist activity, particularly on weekdays with 156 pedestrians and 34 cyclists.
- The footway remains well used over the weekend with 68 pedestrians and 17 cyclists recorded.

Site 7: A10 South of West Winch Stores

- Site 7 shows a good level of pedestrian and cyclist activity, with similar counts on both weekdays and weekends.

Site 8: The Winch, A10

- Site 8 illustrates that the link is well utilised with 95 pedestrians and cyclists recorded over a 14-hour period during a weekday. This reduces to 47 over the weekend, which indicates that the link is well utilised throughout the week.

Site 9: A10 South of Gravelhill Lane

- Site 9 has moderate pedestrian and cyclist activity, with a similar distribution on weekdays and weekends. There is a slight increase in pedestrian counts on the weekend however, there is a noticeable decrease in cyclists. Nevertheless, the link can be considered as well utilised.

Site 10: A10, South of Chequers Lane

- Site 10 shows moderate pedestrian and cyclist activity, with a slightly higher pedestrian count on weekdays.

Site 11: A10 footway, North of Rectory Lane

- Site 11 reports substantial pedestrian and cyclist activity, particularly on weekdays with 118 NMU recorded over the 14-hour period.



Site 12: Nar Valley Way (South of KLIC)

- Site 12 has minimal overall activity over the 14-hour period with 24 and 11 NMU recorded over weekday and weekend periods. Despite the minimal activity recorded over the survey period, the data indicates NMU demand on the link.

Site 13: Rectory Lane

- Site 13 exhibits substantial pedestrian and cyclist activity, especially on weekdays with 149 NMUs recorded over the 14-hour period. The number of NMUs over the weekend was reduced to 49.

Site 14: Hardwick Road

- Site 14 illustrates significant pedestrian and cyclist activity, particularly on weekdays with 102 pedestrians and 221 cyclists recorded over the 14-hour period. This illustrates an opportunity to improve the existing cycling provision.

Site 15: Hardwick Roundabout (between A10 and Beveridge Way)

- Site 15 reports moderate pedestrian and cyclist activity, on both weekdays and weekends with 83 and 40 NMU recorded over the 14-hour period during weekdays and weekends, respectively.

Site 16: Hardwick Roundabout (between Beveridge Way and A47 WB Onslip)

- Site 16 experiences substantial pedestrian and cyclist activity, particularly on weekdays with 101 pedestrians and 212 cyclists over the 14-hour period. This presents an opportunity to improve the existing cycling provision.

Key Findings:

5.9.17 There is significant variation in user activity across different survey sites with some exhibiting minimal activity, while others have substantial usage observed. Nevertheless, the data reveals that the existing links should be maintained and where possible improved and incorporated into the scheme to



help facilitate NMU movements. Pedestrian and cyclist activity varies between weekdays and weekends, with the number of NMUs recorded over the weekend decreasing in the majority of cases.

5.9.18 Equestrian activity is consistently low or absent across all sites.

Boarding and Alighting Counts

5.9.19 A total of ten bus stops have been surveyed at five locations, these are:

- B1 – Coronation Avenue eastbound bus stop (NFOGDPTA)
- B2 - A10 The Winch southbound bus stop (NFOGDPWJ)
- B3 - Coronation Avenue westbound bus stop (NFOGDPTP)
- B4 - A10 The Winch northbound bus stop (NFOGDPWG)
- B5 - Gravelhill Lane northbound bus stop (NFOGMWGD)
- B6 - A10 northbound Chequers Lane bus stop (NFOGDPWT)
- B7 - Rectory Lane northbound bus stop (NFOGDPMP)
- B8 - Gravelhill Lane southbound bus stop (NFOGMWGJ)
- B9 - A10 southbound Chequers Lane bus stop (NFOGDPWP)
- B10 - Rectory Lane southbound bus stop (NFOGDPTW)

5.9.20 A summary of boarding and alighting counts over a 14-hour period is presented in **Table 5-23** and **Table 5-24**.



Table 5-23 - Alighting and Boarding Counts - User Survey Data, Weekday

Location	Alighting	Boarding	Total
B1	1	20	21
B2	0	5	5
B3	14	0	14
B4	0	0	0
B5	2	2	4
B6	0	4	4
B7	1	15	16
B8	1	3	4
B9	2	0	2
B10	19	0	19

Table 5-24 - Alighting and Boarding Counts - User Survey Data, Weekend (Saturday Only)

Location	Alighting	Boarding	Total
B1	0	0	0
B2	0	1	1
B3	0	0	0
B4	1	0	1
B5	0	2	2
B6	1	4	5
B7	0	9	9
B8	7	0	7
B9	2	0	2
B10	9	0	9

5.9.1 As illustrated in **Table 5-23** and **Table 5-24**, the uptake at many of the bus stops is limited during weekdays and weekends in particular at the Winch (sites B2 and B4) bus stops and Chequers Lane (site B9).

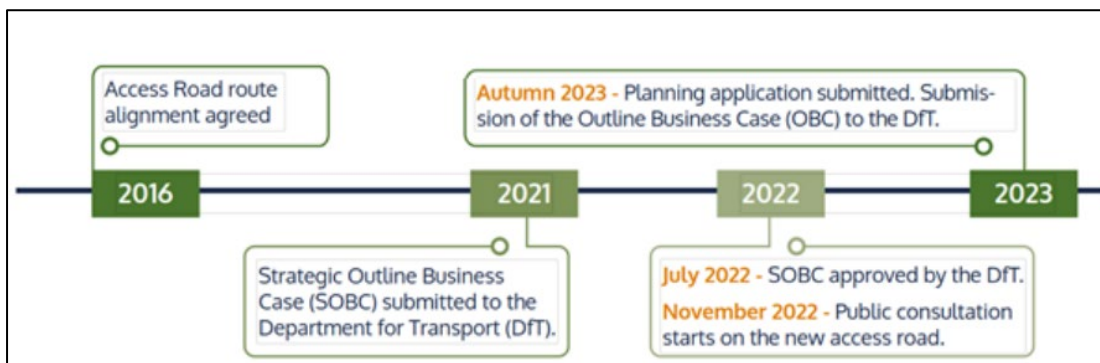
5.9.2 Rectory Lane (site B1 and B7) are the most utilised bus stops in terms of a number of passengers boarding. In terms of alighting, Rectory Lane (Site B3 and B10) bus stops are the most utilised over the 14-hour period.



6 Scheme Development and Consultation

6.1.1 The Proposed Scheme has been developed over the last 8 years, with input from local communities at appropriate stages which has helped shaped the final design proposed for planning. Engagement with transport stakeholders has played a vital role in this as the scheme has developed. **Figure 6-1** shows the timeline of activities that have been completed and opportunities for public engagement since the initial Proposed Scheme route was agreed in 2016. At each stage, there have been opportunities for members of the public to provide their views and review the emerging proposals.

Figure 6-1 Scheme Development Timeline



6.2 West Winch Housing Access Road Public Consultation November 2022

6.2.1 The public consultation for the WWHAR ran for 8 weeks between 14 November 2022 until 8 January 2023 with the aim of maximising participation from the local community.

Feedback

6.2.2 Section 4.6 of the Statement of Community Involvement (SoCI) (Document Reference **NCC/1.03.00/WWHAR**) discusses participant responses to the following question:

‘To what extent to you agree or disagree with the following potential types of measures to improve the existing A10 through West Winch and encourage traffic to use the access road?’



6.2.3 The results suggested that:

- 49% of participants agreed or strongly agreed with a reduced speed limit on the A10;
- 69% of participants agreed or strongly agreed with weight limit restrictions on the A10;
- 74% of participants agreed or strongly agreed with the introduction of new controlled crossing for pedestrians and cyclists on the A10; and
- 44% of participants agreed or strongly agreed with the introduction of traffic calming measures on the A10.

6.2.4 Section 4.7.6 of the SoCL (Document Reference **NCC/1.03.00/WWHAR**) discusses participant responses to the following question:

'We are proposing to include a walking and cycling link parallel with the access road to ensure there is a high-quality connection between the new and existing communities. To what extent do you agree or disagree with this proposal?'

6.2.5 Analysis of the responses showed that more than half of respondents (62%, 89 respondents) stated that they supported to some extent the proposed walking and cycling link parallel to the access road (30%, 43 respondents strongly agreed and 32%, 46 respondents agreed) whilst 13% disagreed to some extent (3%, 5 respondents disagreed and 10%, 14 respondents strongly disagreed).

6.2.6 Further analysis and feedback is considered within the Sustainable Transport Strategy (Document Reference **NCC/4.02.00/WWHAR**)

6.3 South East Kings Lynn Growth Area Framework Public Consultation

6.3.1 This public consultation, which was led by the Borough Council of Kings Lynn and West Norfolk held between Friday 5th August 2022 and ending on Thursday 15th September 2022, considered the proposed West Winch Growth Area Illustrative Masterplan. A copy of the July 2022 Masterplan which



formed the basis of the consultation is shown in **Appendix 2** (Document Reference **NCC/4.01.02/WWHAR**).

- 6.3.2 Feedback from the consultation has been shared with the WWHAR project team to inform the Sustainable Transport Strategy as set out within the STS (Document Reference **NCC/4.02.00/WWHAR**).
- 6.3.3 The scheme has also been developed in collaboration with National Highways and in earlier project stage the option selection report was jointly completed and monthly meetings have been held with NH to develop the design in more detail.
- 6.3.4 From June 2023, Active Travel England became a statutory consultee for major planning applications. The STS document was reviewed by Active Travel England (ATE) in Autumn 2023 and the proposals were discussed with representatives from ATE and DfT (Department for Transport) in November 2023. Comments received from Active Travel England focussed on the form and locations of Non-Motorised User crossings on A10 and at Chequers Lane, plus dimensions of shared use provision.
- 6.3.5 Ad hoc meetings have also been held with the Borough Council of Kings Lynn and West Norfolk as part of the Local Plan Review Examination in Public.
- 6.3.6 The following engagement work has been undertaken to date with third party organisations as shown in **Table 6-1**.



Table 6-1 Stakeholder Engagement Timeline

Stakeholders	Dates and times of consultation and correspondence	Summary of Outcomes
NCC WWHAR Public Consultation	14 November 2022 until 8 January 2023	Feedback informed the design of Non-Motorised User elements of the scheme and offered additional local knowledge about how users interact with the local network which has informed the Transport Assessment and development of Sustainable Transport Strategy
Sustainable Transport Stakeholder workshop	24 March 2023	Feedback informed the development of Sustainable Transport Strategy
NCC passenger Transport Team	Email discussions 26 May 2022 10 Jan 2023	Informed bus strategy to support the future housing development scheme
NCC Active Travel Team	9 February 2023 31 March 2023	Considered the wider network and context of existing and proposed NMU routes around West Winch. Influenced retention of the existing A47 underpass within the Proposed Scheme for future links with the LCWIP proposals.
NCC Development Management Team	7 February 2023 2 May 2023 17 November 2023	Development assumptions for the housing scheme and TA scoping discussions
National Highways Spatial Planning team	2 May 2023 17 November 2023	TA scoping discussions
NCC Signals team and ITS team	14 November 2023	Scania Way junction and signal design
National Highways Signals team	12 June 2023	Hardwick Interchange Signal design and WWHAR roundabout signals. Resulted in removal of A10 signals.
Active Travel England	24 November 2023	Discussed the Sustainable Transport Strategy and NMU design elements of the proposed scheme



6.3.7 Further information on public consultation events held to engage with stakeholders and local residents is included within the **SoCI** (Document Reference **NCC/1.03.00/WWHAR**).

6.4 Proposed Highway Alignment

6.4.1 The Proposed Scheme includes the following elements:

- A single carriageway road, connecting A10 south of West Winch to A47 east of Hardwick Interchange
- The main alignment includes access roundabouts for future housing development
- Shared Use NMU facility along the western boundary of the Classified Road.
- An 'at grade' new WWHAR roundabout junction with the A47;
- Dualling of a section of the existing A47 between Hardwick Interchange and WWHAR.
- A highway bridge carrying Rectory Lane over the Classified Road;
- New pedestrian crossing at Chequers Lane
- Retention of an existing underpass at A47 Constitution Hill;
- Diversion and extension of existing Public Rights of Way and new routes to create a coherent and joined-up network; and
- Surface water drainage - principally infiltration basins, sediment forebays and associated carrier drains / channels.

6.4.2 The scheme also includes landscaping, planting, ancillary works, and significant environmental mitigation work. Environmental enhancement and Biodiversity Net Gain measures are also considered as part of the Proposed Scheme design philosophy.



6.4.3 Further details and description of the scheme and design are provided in **Chapter 3 of the ES** (Document Reference **NCC/3.03.01/WWHAR**) and the **Design and Access Statement** (Document Reference **NCC/1.02.00/WWHAR**).

6.5 Treatment of Side Roads

6.5.1 As set out within the **STS** (Document Reference **NCC/4.02.00/WWHAR**), there are two existing Public Highways which cross the Classified Road alignment at Rectory Lane and Chequers Lane. Changes to these roads to accommodate the proposed Scheme will need to be made via Side Roads Order.

Rectory Lane

6.5.2 Rectory Lane is a rural road connecting the villages of West Winch and North Runcton. It is the most frequently used route crossing the Classified Road, with a wider and straighter alignment than the alternative route via Chequer's Lane to the south.

6.5.3 Rectory Lane will be kept open to all traffic via an overbridge crossing the Proposed Scheme, although it would be closed as necessary during construction. The bridge spanning over the Classified Road would provide sufficient height clearance for all vehicles, with at least 5.3m headroom above the new road.

6.5.4 The proposed bridge will be configured as an online bridge structure (consistent with the current Rectory Lane alignment) with ramps on each side of the Classified Road to provide elevated crossing for all users. A 3m wide segregated footway on one side will allow safe passage of pedestrians with occasional use by cycles and equestrians who also have the option of using the main carriageway.

6.5.5 The proposed Rectory Lane bridge is designed to be accessible, so it is compliant with the requirements of the Equalities Act 2010. The proposed ramps on either side would have a maximum gradient of 1:21 so that all users are able to negotiate the bridge.



6.5.6 Once the Rectory Lane bridge is in place, this will cater for the majority of trips east-west between West Winch and North Runcton, with a grade separated crossing of the Classified Road.

6.5.7 During temporary closures traffic will be diverted to A47 and Chequers Lane alternative routes. Chequers Lane would be available as an alternative diversion route for Non-Motorised Users whilst the Rectory Lane bridge is put in place.

Chequers Lane

6.5.8 Chequers Lane also crosses the Proposed WWHAR Scheme about 550m south of Rectory Lane and provides a connection between the communities at West Winch and North Runcton. The existing road is a narrow rural lane (about 3m wide), with limited forward visibility in places, with low observed traffic flows.

6.5.9 The Proposed Scheme would sever Chequers Lane for all users but a Non-Motorised User crossing would be installed at grade for pedestrians, cyclists and equestrians only. This can be signalled as set out within the Signal Strategy (Document Reference **NCC/2.18.00/WWHAR**). However, the route would be entirely closed to motorised vehicles where Chequers Lane meets WWHAR.

6.5.10 With the permanent closure of Chequers Lane to vehicles proposed as part of the scheme, a small number of vehicles are likely to re-route to Rectory Lane. However, it is expected that the amount of motorised traffic on Rectory Lane would reduce in comparison with 2019 levels with future flows predicted to be less than 1000 vehicles per day. Removal of traffic from Chequers Lane will also improve conditions for walking, cycling and equestrian use.

6.6 Proposed A47 Dualling Works and Proposed WWHAR roundabout

6.6.1 The northern section of the Proposed Scheme includes works to dual the existing A47 at Constitution Hill to the west of the Proposed WWHAR/A47 roundabout.



6.6.2 The existing Constitution Hill roundabout will be removed and a new roundabout installed at the north end of the WWHAR alignment with a dedicated left turn lane from WWHAR to A47 as this would be a dominant traffic movement for strategic through traffic diverted from the existing A10 towards Kings Lynn and the coast. The new WWHAR roundabout would also be signalised to balance traffic movement within the junction, as there would also be a dominant reciprocal right turning flow from A47 to WWHAR in an east and southbound direction.

6.7 Hardwick Roundabout Proposals

6.7.1 Works to the Hardwick Interchange are predominantly focussed on the east and south sides of the junction, with revisions to completely remove the Constitution Hill roundabout which currently requires all A47 traffic to stop and give way. The roundabout would be replaced by direct slip roads from A47 connecting to the east side of the gyratory.

6.8 Construction Access and Phasing

6.8.1 The assumed construction programme duration is two years, with contract award in January 2025 with the road opening to traffic in late 2027.

6.8.2 Site hours of operation are assumed to be 7.30am-5.30pm Mon-Fri and 8am-1pm Saturdays. No works will be carried out on Sundays, without prior agreement with the Local Planning Authority.

6.8.3 There will be four site compounds - two of which would be main site compounds - one at the north end of the WWHAR alignment and the other at the southern junction with A10, where the majority of welfare, car parking and site offices will be located. In addition, two satellite compounds will be located at Hardwick Roundabout and at the Rectory Lane bridge for layout and storage of materials.

6.8.4 The Proposed Scheme main alignment south of A47 will be used as an internal haul route through the site to minimise the requirement for construction vehicles to use the surrounding highway network. This will help



to contain noise, vibration and dust within the scheme boundary as far as reasonably practicable.

- 6.8.5 Further details on construction proposals are provided in **Chapter 3 of the ES** (Document Reference **NCC/3.03.00/WWHAR**) and an assessment of construction traffic effects is provided in Chapter 16 of the ES.



7 Modelling and Forecasting

7.1 Methodology

7.1.1 This section highlights the microsimulation traffic modelling undertaken to assess the highway impact of the proposed scheme on the surrounding network to support the TA.

7.1.2 The model used for this assessment is the West Winch Paramics Discovery Model. This model has been derived from outputs of the strategic SATURN King's Lynn Transport Model (KLTM) used for the WWHAR Outline Business Case (OBC).

7.2 Forecast Network Development

7.2.1 Within the Paramics model, three forecast networks were developed to model a combination of future scenarios with and without the dependent development at the WWGA and with and without the proposed WWHAR scheme. The three forecast networks are:

- DM Scenario: network without the proposed transport scheme and with 300 dwellings at the WWGA.
- DS1 Scenario: network with the proposed transport scheme and with 300 dwellings at the WWGA.
- DS2: network with the proposed transport scheme and with 4,000 dwellings at the WWGA.

7.2.2 Across these three scenarios, three forecast years have been assessed

- 2027 (anticipated WWHAR opening year)
- 2037 (ten years post WWHAR scheme opening)
- 2042 (local plan horizon and 15 years after opening)

7.2.3 This TA will assess the potential impact of the Proposed Scheme in a future year of 2027 (anticipated WWHAR highway opening year) and a design year of 2037 (ten years post WWHAR scheme opening). However, the strategic



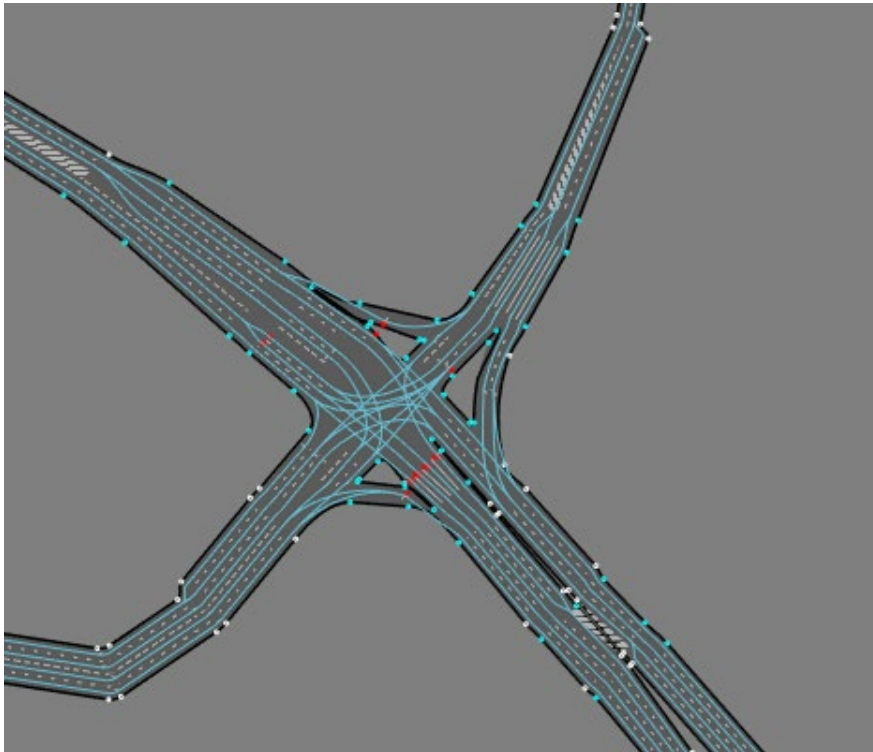
model covers the future years of 2027 and 2042. As a result, 2037 results will be estimated from a direct interpolation between 2027 and 2042 results.

Network Update

- 7.2.4 The existing Paramics model has a base year of 2018 and was developed during 2019 in Paramics v20.0.1. A series of updates to the base year model have been undertaken for the purpose of the TA assessment, as mentioned below.
- 7.2.5 The model has been updated to the latest available version, Paramics Discovery 26.0.3 in order to include the latest software improvements in the model.
- 7.2.6 The existing Paramics model was updated to include A149 / Scania Way junction to the North-West of Hardwick Roundabout (**Figure 7-1**) so that the interaction between this junction and Hardwick Interchange can be assessed. The additional network has been coded based upon Ordnance survey 1:1250 scale mapping and Google maps aerial view.



Figure 7-1: A149/Scania Way Junction



7.2.7 A LinSig model previously developed covering the Hardwick interchange and the A149 / Scania Way junction was used as a basis to code the signals for the Paramics model. Traffic signals were set up at the approaches to the junction in the same way as that of the LinSig model in terms of phases, stages, intergreens and cycle time. Stage green times were slightly tweaked to account for the differences in demand between LinSig and Paramics models.

7.2.8 Other minor updates in base model includes changes in visibility and gap acceptance parameters at Beveridge Way approach to match the observed queues.

Model calibration and validation

7.2.9 The updated model was then calibrated and validated using traffic flow data, queue length surveys and journey time validation in-line with the criteria set out in WebTAG Unit M3.1.



7.2.10 The modelled flows, queues and journey times compared well to the observed data and therefore it was concluded that the 2018 base model is able to replicate the observations and was a good fit for forecast option testing.

7.2.11 The development of each forecast network is outlined below.

DM Scenario

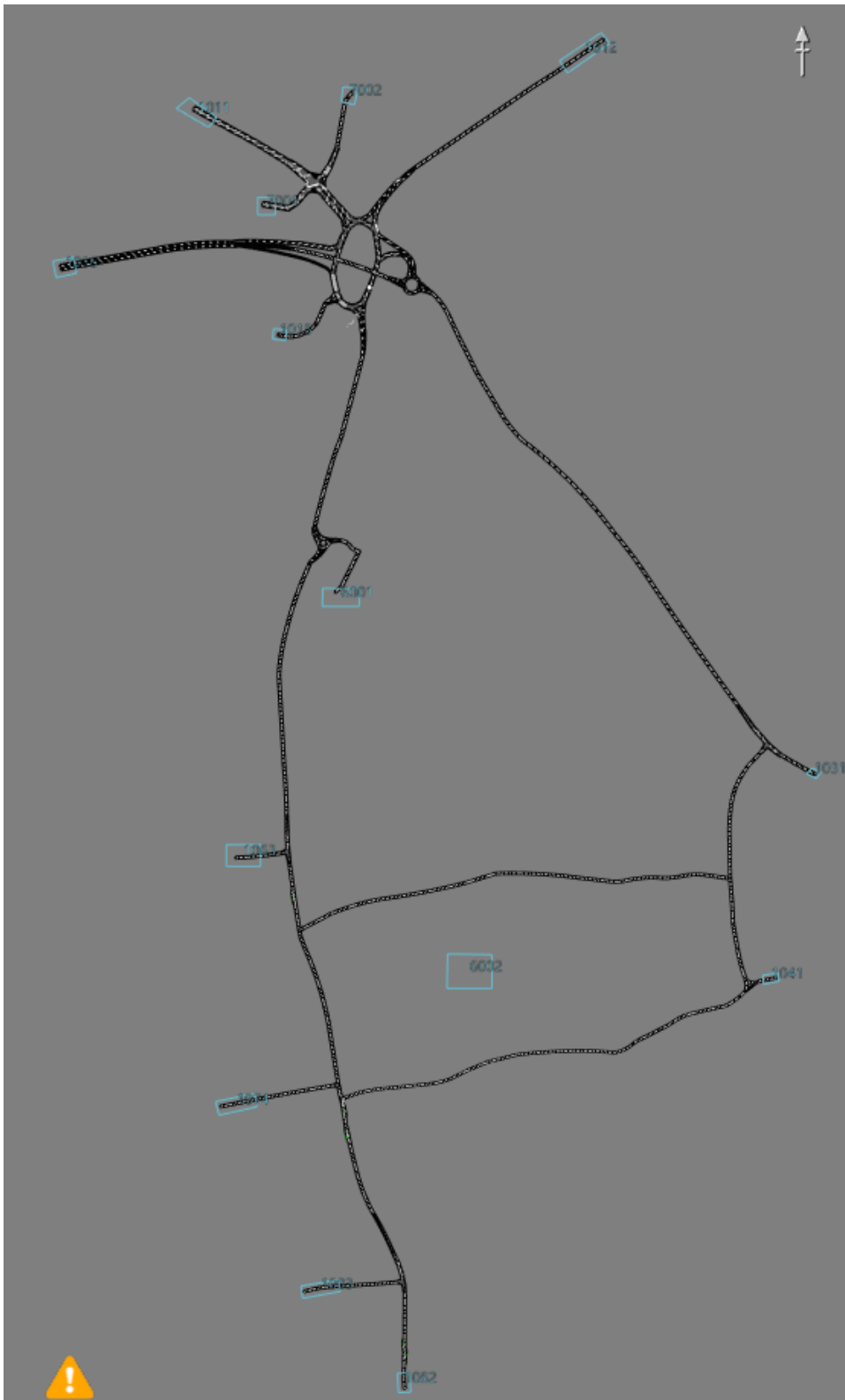
7.2.12 The DM Scenario network does not include the dependant development or the transport scheme. The DM Scenario network was based on the base model, with the following changes:

- A) Addition of Hopkins Roundabout on the A10: a three-arm priority roundabout with an access road (Hopkins Road) to the 300 dwelling WWGA development.

7.2.13 The DM Scenario network is shown in **Figure 7-2** with labels corresponding to the network changes.



Figure 7-2: DM Scenario Paramics Network





DS1 Scenario

7.2.14 The DS1 Scenario network does not include the WWGA development in full but does include the WWHAR transport scheme and the changes associated with the 300 dwelling development at Hopkins Homes.

7.2.15 The DS1 Scenario model was produced with the following changes:

- Addition of the WWHAR: a 40mph urban road which connects with the A47 to the north and the A10 to the south. The WWHAR connects with the A47 via a three-arm roundabout. The A47 approaches are signalised in both forecast years, while the WWHAR approach is unsignalised. There is a segregated left turn lane from the WWHAR to the A47. The WWHAR connects with the A10 via a three-arm priority roundabout. There are three development access roads off the WWHAR and each of these junctions are modelled as three-arm priority roundabouts. The northern section between the Hopkins access roundabout and the A47/WWHAR roundabout is a dual carriageway section, while the rest of the WWHAR is single carriageway.
- At the Hardwick Interchange, the signals at the A10 approach have been removed due to concerns about the signal operation in conjunction with the A47 off-slip node. The Beveridge Way approach has instead been signalised since previous Paramics tests showed significant congestion when the approach is operated as a priority junction. Signal timings in the AM and PM have been optimised to minimise delay on each approach.
- Constitution Hill Roundabout has been removed and replaced with a westbound off slip from the A47 to Hardwick Roundabout, and an eastbound on slip from Hardwick Roundabout to the A47. The dualled section of the A47 – between Hardwick Roundabout and the WWHAR – is modelled with a speed limit of 40mph.

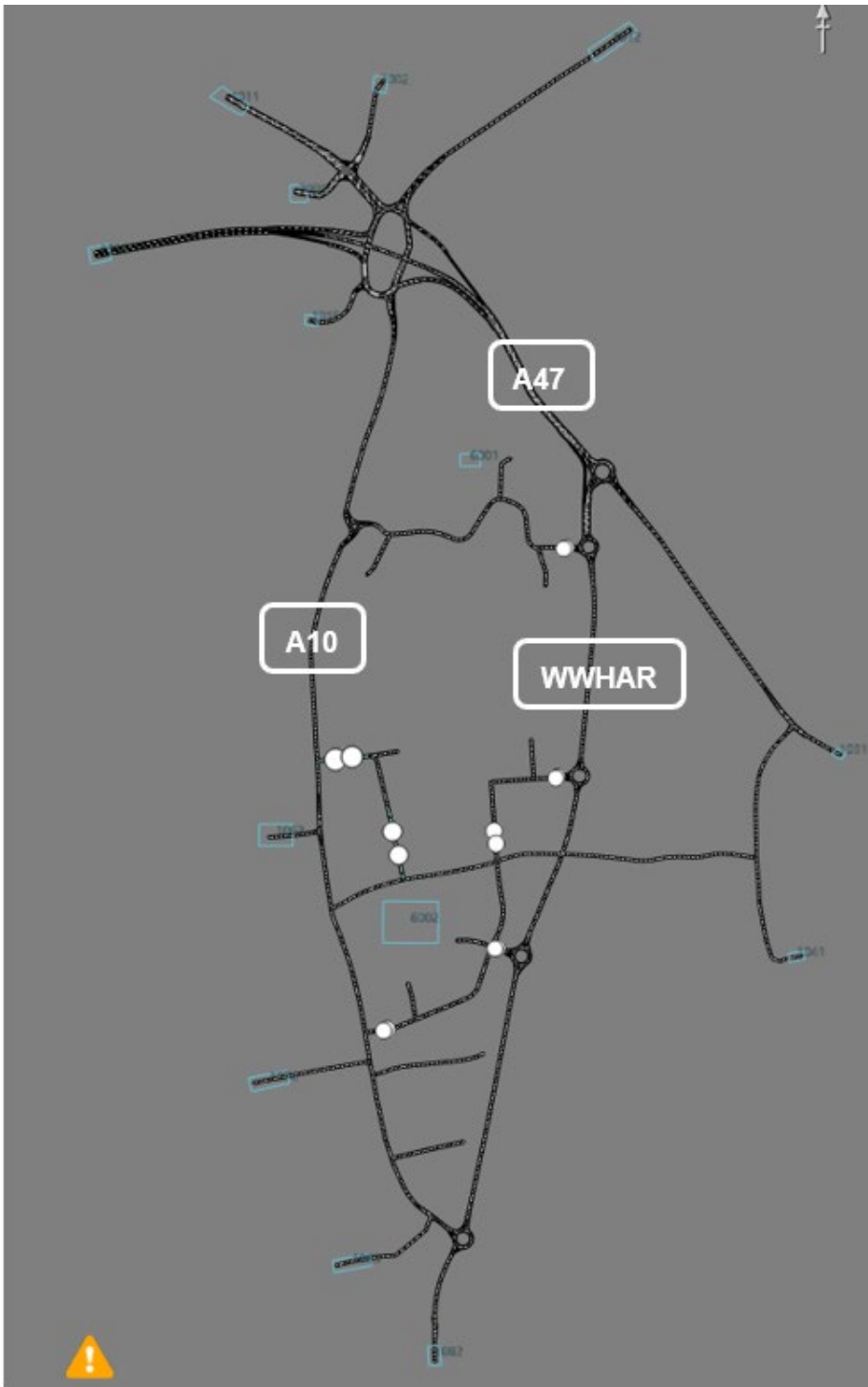


- Addition of Hopkins Road through the Hopkins development, which connects with the A10 to the west via a three-arm priority roundabout, and with the WWHAR to the east via a three-arm priority roundabout.
- Sustainable transport measures on the A10. Along the A10, the speed limit has been reduced to 30mph, with a section of 20mph through the centre of West Winch. The bus stops have been moved inside the carriageway, and six signalised pedestrian crossings have been introduced along the corridor.

7.2.16 The DS1 Scenario network is shown in **Figure 7-3**. The white circles indicate the links which have a restricted movement (closure).



Figure 7-3: DS1 Scenario Paramics Network





DS2

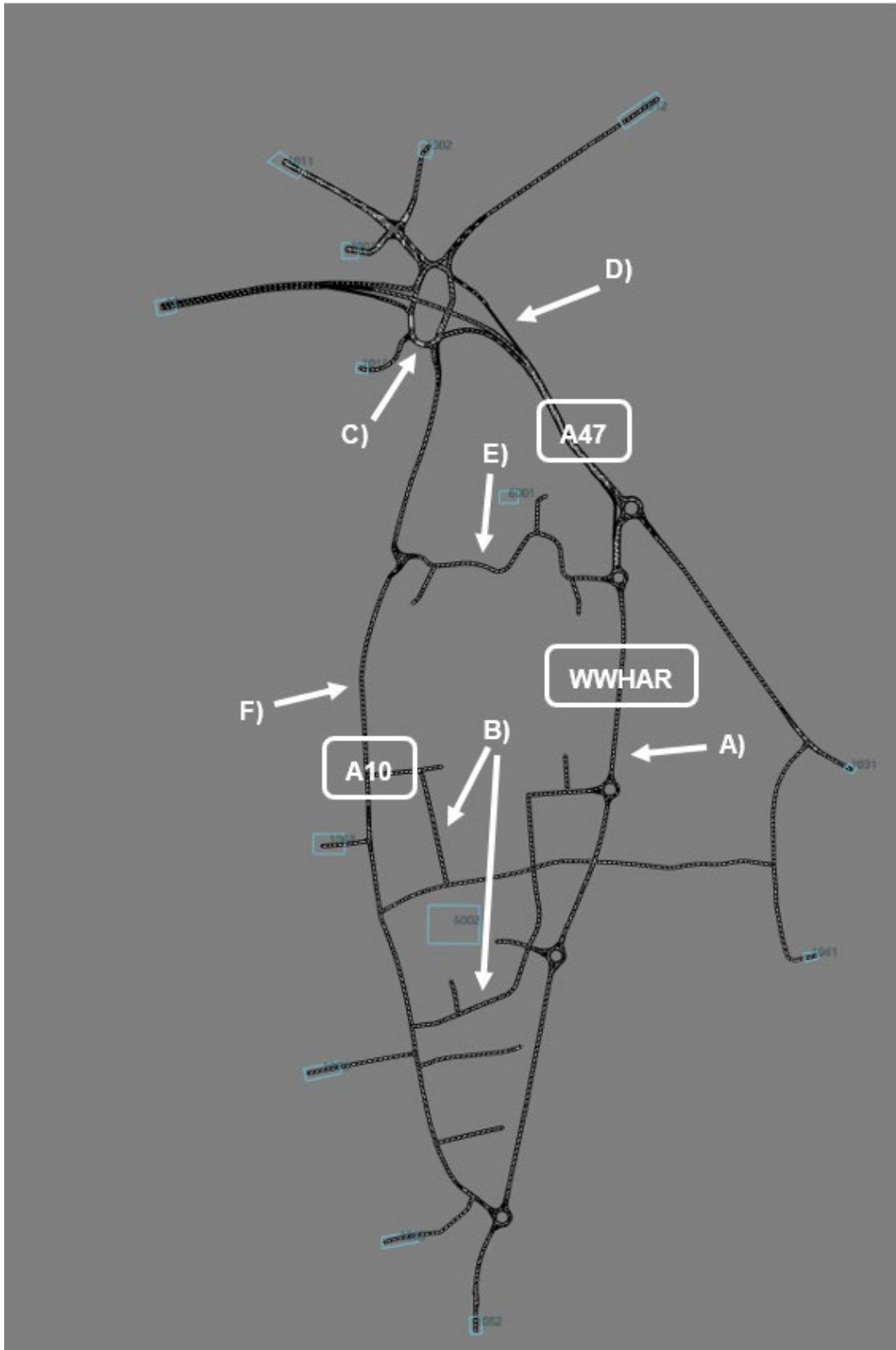
7.2.17 The DS2 network includes the WWHAR, as outlined above, as well as the infrastructure required to deliver 4,000 dwellings at the WWGA. The following changes have been made to model S to produce DS2:

- The main internal roads within the WWGA have been included in the model, including three access roads off the A10 and three access roads off Rectory Lane (all modelled as priority junctions). These roads were modelled with a 20mph speed limit.

7.2.18 The DS2 network is shown in **Figure 7-4** with labels corresponding to the network changes.



Figure 7-4: DS2 Paramics Network





8 Future Baseline Conditions

8.1 Introduction

- 8.1.1 This section of the TA sets out the predicted future baseline transport conditions (i.e. without the proposed development) on the local highway network in the future baseline assessment year of 2037, taking into account background growth and committed development surrounding the highway network.
- 8.1.2 These elements are modelled within the Do Minimum (DM) scenario within the King's Lynn Strategic Traffic Model to understand the wider impact on the strategic network, before later being modelled in PARAMICS using the West Winch Paramics Discovery Model.
- 8.1.3 Strategic modelling using the KLTM (Kings Lynn Traffic Model) that was undertaken in accordance with DfT TAG Guidance as part of the Outline Business Case has informed this assessment. This was used as the starting point for a more detailed assessment using a Paramics Discovery model focussed on the network within the scope of assessment for this TA. Details on how the Paramics microsimulation modelling was undertaken to assess the highway impact on the surrounding network can be found within **Appendix 5** (Document Reference **NCC/4.01.05/WWHAR**).
- 8.1.4 The impact of the Proposed Scheme in comparison with the baseline Do Minimum scenario in 2027 opening year and 2037 future horizon year with and without the future WWGA housing development in place is outlined in Chapter 12 of this TA under Impact Assessment.

8.2 TEMPro Growth

- 8.2.1 TEMPro forecasting is used to control the district-wide growth totals for each local authority area. The NTEM (National Trip End Model, traffic forecasts as published by DfT) v8.0 is taken as the District wide totals with the core planning assumptions for houses and jobs as the basis for applying a constraint on background development growth across the strategic model



areas. For the future years of 2027 and 2042 the specific major development sites to be considered have been added separately with new development zones and centroid connectors added where necessary, so that traffic is loaded onto the network in the immediate vicinity of the site. The NTEM forecast totals of houses and jobs for each District have been adjusted to exclude these specific sites to avoid double counting.

8.2.2 The matrix is constrained at the full matrix level. Given the extent of the model the majority of the trips fall within Norfolk and therefore this has been selected as the area from which to obtain the trip end growth factors and apply them to the whole matrix at user class level. Planning assumptions in this case have not been modified as the level of household and job growth seems realistic and future housing information for the whole of the county is not readily available. This approach is desirable as it does not alter what is stated in NTEM 8.0. **Table 8-1** shows the planning data growth between 2022 (post-COVID) and the forecast years.

Table 8-1 - NTEM 8.0 (Core) Norfolk Planning Data Growth

Year	County	<16	16-74	75+	HHs	Jobs	Workers
2022 – 2027	Norfolk	-6,013	-773	15,891	10,247	15,001	11,570
2022 – 2042	Norfolk	-10,753	-165	52,348	40,961	26,757	21,122

8.2.3 These factors were applied to the car user classes only, given TEMPro considers Car only. LGV and HGV growth factors were determined using National Road Traffic Projections (NRTP) 2022. These are presented in **Table 8-2** and **Table 8-3** for 2019 – 2027 and 2018 – 2042.



Table 8-2 - LGV and HGV Growth factors (2019 - 2027)

Locality	LGV	HGV
East of England	1.161	1.045

Table 8-3 - LGV and HGV Growth Factors (2018 - 2042)

Locality	LGV	HGV
East of England	1.351	1.135

8.3 Committed Development

8.3.1 This section of the TA considers the major developments in close proximity of the development proposals at West Winch. The Uncertainty Log sets out the committed developments in the study area for the King’s Lynn Transport Model (KLTm) model.

8.3.2 WSP were provided with development information by BCKLWN and NCC and this enabled the preparation of an uncertainty log.

8.3.3 For each development, the following information was provided:

- Number of households (for developments with a residential element);
- Size and type of land-use (for non-residential developments);
- Proposed year of completion.

8.3.4 Where relevant, information about highway infrastructure changes associated with developments were gathered from Transport Assessments. These changes have been included in the forecast networks.

8.3.5 Developments and improvements were categorised by uncertainty in line with TAG Unit M4 *Forecasting and Uncertainty*:

- Near Certain;
- More Than Likely;
- Reasonably Foreseeable; and



- Hypothetical.

8.3.6 Only developments deemed to be ‘Near Certain’ or ‘More Than Likely’ were included as explicitly modelled developments in the Uncertainty Log. Residential developments were also filtered to include only developments with 50 or more dwellings. Smaller developments are modelled as part of the background growth.

8.3.7 The following committed developments in the uncertainty log presented below in **Table 8-4** have highway network changes associated with them. These changes have been incorporated into the forecast networks for 2027 and 2042.

Table 8-4 Committed Developments

Site Address	Planning Reference	Planning Proposal
Hall Lane	17/01106/OM	Main site access on Nursery Lane and secondary site access on Meadow Road.
Hall Lane	17/01151/OM	Site access via new 4-arm roundabout on Edward Benefer Way.
Land West of Knights Hill Village, Grimston Road, South Wootton	16/02231/OM	New access via a new roundabout off the A148 (Grimston Road), upgrade of the existing access from Ullswater Avenue via Sandy Lane, signalisation of Langley Road/Grimston Road junction.
South of Parkway	21/01873/FM	Site access via two new priority T-junctions off Parkway and implementation of a new 20mph Zone on Parkway, Queen Mary Road and Queensway.
Morston Point	14/01114/OM	Site access roundabout and site access priority junction.

8.3.8 For further information on which developments were explicitly modelled as part of developing our future baseline scenarios, please see our uncertainty log in **Appendix 8** (Document Reference **NCC/4.01.08/WWHAR**).



8.4 Committed Transport Infrastructure

- 8.4.1 The King's Lynn Sustainable Travel and Regeneration Scheme received funding from the Department for Transport (DfT) in January 2023. The scheme has the aim to support sustainable economic growth in King's Lynn by revitalising outdated infrastructure to promote active travel and connect the town's primary entry point with housing and commercial sites.
- 8.4.2 The STARS project comprises of two parts – the Gyratory scheme in the town centre and the Southgates scheme which aims to reconfigure the road network around the Southgates junction. The proposed scheme layouts are shown in **Figure 8-1** and **Figure 8-2** below.
- 8.4.3 The STARS schemes have been included in all strategic forecast networks used within the traffic modelling underpinning this assessment.



a significant impact on travel patterns and volumes, and these have remained after the ease of lockdown measures. The document provides guidance on the impact of COVID-19 in transport models and how to account for it in calibrated models with base years prior to the pandemic. The guidance suggests a proportionate approach to accounting for COVID-19 impact and suggests three potential approaches:

- Creating a forecast to the present day based on observed data;
- Applying adjustments to a forecast year model; or,
- Applying the adjustment globally to model results.

8.5.2 An October 2022 traffic data collection exercise encompassing all of the ATC and MCTC locations has been undertaken in order to understand the change in traffic levels which have occurred in the King's Lynn area post-COVID.

8.5.3 Given that a post COVID-19 survey has been undertaken at the same locations as the pre COVID-19 survey, all the three potential approaches highlighted in TAG M4 are available. However, the second approach which applies adjustments to the forecast year models has been deemed the most proportionate approach for this assessment. Following this approach, the 2019 base year model will be maintained, a factor between 2019 and 2022 has been calculated by time period from the survey data used for the model screenlines and applied globally to all car user classes in the base year matrices to take into account the impact of COVID-19. **Table 8-5** shows the factors used to adjust the base year matrix for the COVID-19 impact. Further analysis has been undertaken on time periods (rather than peaks) and daily flows to ensure a similar pattern is observed across these periods as well.



Table 8-5: 2019 – 2022 Factors

Period	AM	IP	PM
2019 - 2022	0.954	0.926	0.902

8.5.4 Growth between 2022 and the forecast years for the assessment (2027 and 2042) will be taken from NTEM v8.0 Core scenario.

8.5.5 LGV and HGV growth has not been adjusted for COVID-19 and will be taken directly from NRTP 2022.

Explicitly Modelled Developments

Uncertainty Log

8.5.6 A list with all the developments considered in the uncertainty log together with their trip generation, SATURN zone and year and time period is included within **Appendix 8** (Document Reference **NCC/4.01.08/WWHAR**). Any sites not included on these lists are modelled through the background growth.

8.5.7 **Figure 8-3, Figure 8-4 and Figure 8-5** below show the locations of the explicitly modelled developments included in the uncertainty log.



Figure 8-3 - Explicit development locations (King's Lynn area)

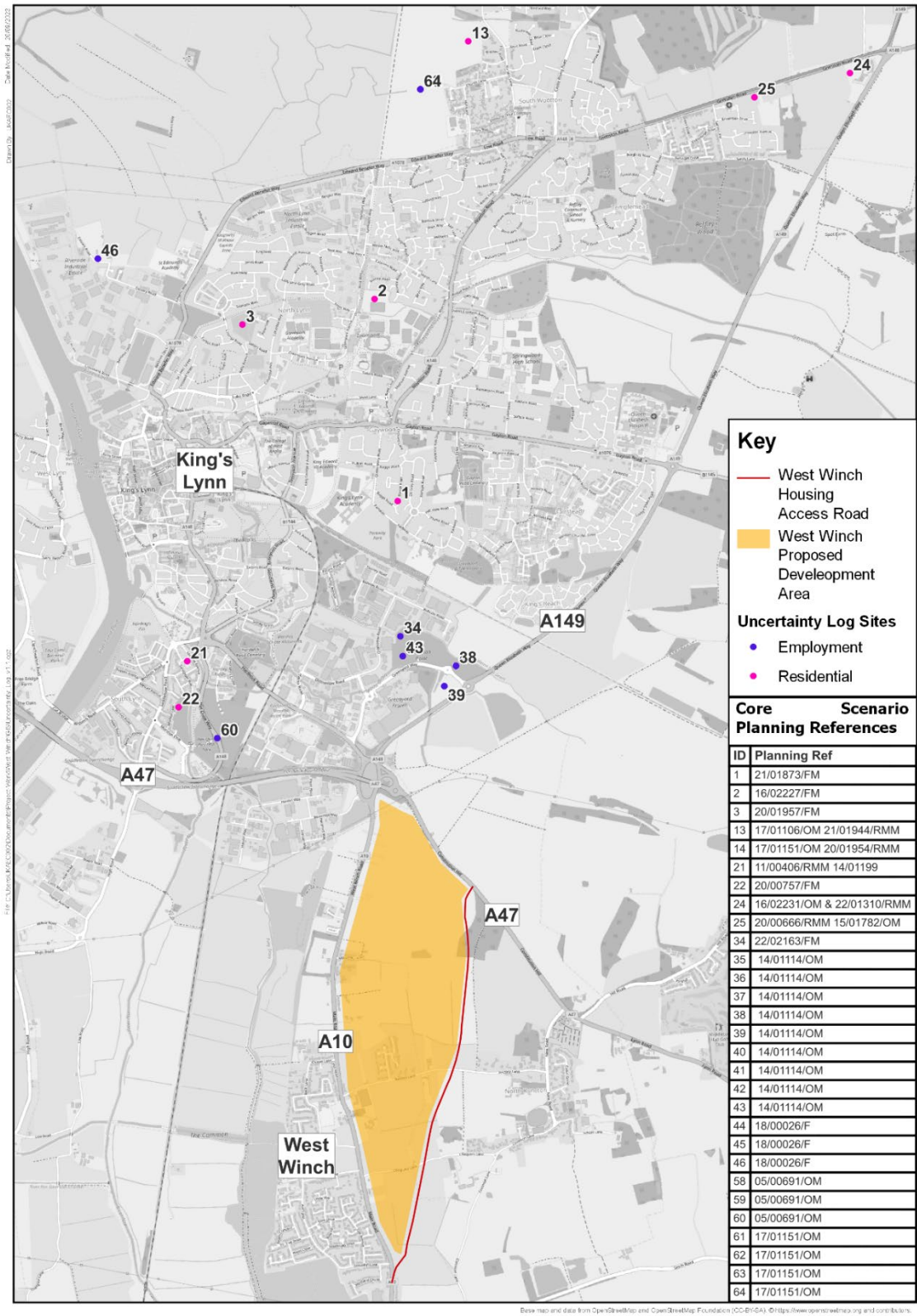




Figure 8-4 - Explicit development locations (Hunstanton area)



Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA) © https://www.openstreetmap.org and contributors.



Figure 8-5 - Explicit development locations (Downham Market area)



8.6 Development Trip Rates

8.6.1 For the majority of the specifically modelled developments within King’s Lynn and West Norfolk, trip rates were generated using TRICS Version 7.10.1 and applied to the development quantum.

8.6.2 For some key developments, the trip generation was extracted from the latest Transport Assessment and applied to the quantum instead of the TRICS based trip rate Sites application,

8.6.3 These trip rates were applied to the developments in the uncertainty log to obtain the total trip generation of each development, in each of the forecast years.

TRICS Trip Rates

8.6.4 Trip rates were derived using the TRICS dataset version 7.10.1, obtaining trip rates for the AM, IP and PM Peak, and for both housing and employment



developments. These trip rates are shown below in **Table 8-6 & Table 8-7** respectively.

Table 8-6: Forecast Housing Trip Rates per dwelling

Land Use	Origin (AM)	Destination (PM)	Origin (AM)	Destination (PM)	Origin (AM)	Destination (PM)
Residential - Urban	0.272	0.077	0.085	0.096	0.121	0.234
Residential - Rural	0.348	0.123	0.123	0.130	0.144	0.292

Table 8-7: Forecast Employment Trip Rates per 100sqm

Land Use	Origin (AM)	Destination (PM)	Origin (AM)	Destination (PM)	Origin (AM)	Destination (PM)
B1 Office	0.148	1.466	0.309	0.282	1.333	0.119
B1 Light Industry	0.066	0.344	0.168	0.137	0.287	0.053
B2 General Industry	0.167	0.407	0.249	0.232	0.372	0.112
B8 Warehousing (Commercial)	0.061	0.111	0.089	0.079	0.106	0.073

Site Specific Trip Rates

8.6.5 Key sites in the uncertainty log have also been treated as an exception in terms of their trip generation. In these particular cases, trip rates have been derived from their respective Transport Assessments. These Transport Assessments generally break down the development into the different land uses that make up the development and assign a different trip rate to each of them. The trip rates used for all site-specific developments are presented in **Table 8-8** below.



- The AM Peak hour runs from 8:00AM – 9:00AM
- The Inter-Peak (IP) is an average of hourly flow between 10:00AM - 16:00PM
- The PM Peak hour runs from 17:00PM – 18:00PM

Table 8-8: Transport Assessment Trip Rates

Reference	Metric	Origin (AM)	Destination (AM)	Origin (IP)	Destination (IP)	Origin (PM)	Destination (PM)
West Winch Growth Area (WWGA)	Per dwelling	0.450	0.152	0.188	0.209	0.242	0.424
Hall Lane (17/01106/OM)	Per dwelling	0.476	0.095	0.145	0.171	0.167	0.476
Hall Lane (17/01151/OM)	Per dwelling	0.402	0.152	0.181	0.192	0.219	0.353
Land West of Knights Hill Village Grimston Road South Wootton	Per dwelling	0.426	0.145	0.188	0.209	0.241	0.412
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - B1	Per 100 sqm	0.230	1.870	0.235	0.229	1.630	0.210



Reference	Metric	Origin (AM)	Destination (AM)	Origin (IP)	Destination (IP)	Origin (PM)	Destination (PM)
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - A1	Per 100 sqm	0.550	0.855	2.716	2.781	2.425	2.119
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - A3	Per 100 sqm	0.000	0.000	1.034	1.239	1.900	1.660
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - A3/A5 (Access C)	Per 100 sqm	10.000	10.900	12.019	11.880	11.350	12.370
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - A4	Per 100 sqm	0.000	0.000	2.104	2.332	3.510	4.980



Reference	Metric	Origin (AM)	Destination (AM)	Origin (IP)	Destination (IP)	Origin (PM)	Destination (PM)
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - C1	Per 100 sqm	0.590	0.450	0.303	0.281	0.330	0.480
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - D2	Per 100 sqm	0.240	0.146	0.460	0.613	1.118	1.909
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - Sui Generis	Per 100 sqm	0.440	1.000	0.765	0.756	0.750	0.370
Land E of 160 And W of Roundabout Bexwell Road Downham Market Norfolk - E	Per 100 sqm	2.716	4.121	6.034	6.021	6.093	5.877



Reference	Metric	Origin (AM)	Destination (AM)	Origin (IP)	Destination (IP)	Origin (PM)	Destination (PM)
Land S of Hunstanton Commercial Park And E King's Lynn Road Hunstanton Norfolk	per care resident	0.025	0.050	0.072	0.061	0.050	0.058
Hall Lane (17/01151/OM) - A1 Discount Food Store	Per 100 sqm	0.148	0.185	1.019	1.022	1.082	0.934
Hall Lane (17/01151/OM) - A3/A4 Pub/Restaurant	Per 100 sqm	0.000	0.000	1.420	1.634	1.868	3.852
Hall Lane (17/01151/OM) - Local Centre	Per 100 sqm	0.000	0.000	0.000	0.000	0.000	0.000
Hall Lane (17/01151/OM) - B1 Office	Per 100 sqm	0.292	2.071	0.502	0.520	2.094	0.184
Morston Point Hardwick Industrial Estate King's Lynn Norfolk - A3/A5 (Access B)	Per 100 sqm	10.778	11.377	12.019	11.880	4.192	4.192



Reference	Metric	Origin (AM)	Destination (AM)	Origin (IP)	Destination (IP)	Origin (PM)	Destination (PM)
Land At 161 Bexwell Road Downham Market Norfolk - A3/A5	Per 100 sqm	2.381	2.552	2.862	2.781	2.703	2.896

8.7 West Winch Growth Area

8.7.1 The West Winch Growth Area, highlighted in **Figure 2-2**, is an area allocated within the local plan to deliver a total of 4,000 houses. Whilst some of this growth area has already seen planning applications, with associated Transport Assessments, brought forward, no houses are yet to be delivered.

8.7.2 Of note is the Transport Assessment prepared by Atkins for Hopkins Homes Limited to support Hardwick Green, North Runcton, dated November 2017. This considers up to 1,110 homes and provided a robust trip generation estimate for these homes. The trip rate information contained in this Transport Assessment has formed the basis of the trip generation for all WWGA homes to be modelled as part of the West Winch Development.

8.8 WWGA Trip Generation

8.8.1 Trip rates from TRICS set out within the Hopkins Homes Transport Assessment dated 2017 (part of Outline Planning Application 13/01615/OM) formed the basis of the trip generation for the WWGA housing development at West Winch. The trip rates have been agreed with NCC Development Management Team and are being used consistently across all of the sites within West Winch generation. The same trip rates are used in the Do Minimum Scenario for the 300 non-dependent dwellings. The Trips rates by land use are set out within **Appendix 4** (Document Reference **NCC/4.01.04/WWHAR**).



8.8.2 For the future year assessment, a mode shift reduction was not additionally applied to the vehicle trip rates assuming that the proposed Sustainable Transport Strategy is in place as a robust assessment.

User Class Proportions

8.8.3 The trips generated by the developments have no associated user classes attributed to them, so they need to be distributed between the 5 car specific user classes. The user class proportions have been obtained from the 2019 base year model for each of the time periods respectively. The resultant proportions are shown in **Table 8-9**.

Table 8-9: User Class for Trip Generation Split

ID	User Class Name	AM Peak % split	Inter Peak % split	PM Peak % split
1	HBW – Home Based Work	47%	19%	45%
2	HBEB – Home Based Education & Personal Business	7%	4%	5%
3	HBO – Home Based Other	32%	55%	38%
4	NHEB – Non-Home Based Education & Personal Business	5%	7%	4%
5	NHBO – Non-Home Based Other	8%	16%	9%

Overall Generation

8.8.4 **Table 8-10** and **Table 8-11** show the overall development trips by user class used within the model. These tables present the full development growth level, as required for DS2.



Table 8-10: Total Development Trip Generation by User Class 2027 (DS2)

User Class	AM Peak (08:00-09:00)	Inter Peak (10:00-16:00)	PM Peak (17:00-18:00)
UC1	562	176	643
UC2	83	37	64
UC3	383	524	536
UC4	62	63	57
UC5	98	151	124
UC6	0	0	0
UC7	0	0	0
Total	1188	952	1425

Table 8-11: Total Development Trip Generation by User Class 2042 (DS2)

User Class	AM Peak (08:00-09:00)	Inter Peak (10:00-16:00)	PM Peak (17:00-18:00)
UC1	2287	647	2492
UC2	337	136	249
UC3	1560	1923	2077
UC4	250	233	222
UC5	397	555	481
UC6	0	0	0
UC7	0	0	0
Total	4831	3494	5521

8.9 Trip Distribution

8.9.1 A gravity model has been used to distribute the forecast trip ends between origins and destinations into estimates of the trips expected per OD pair in the matrix. The gravity model has been calibrated at time period and user class level against the trip length distribution from the validated base year model. Costs for the gravity model are based on cost skims from the base year model. Deterrence functions have been chosen between Log Normal and Tanner depending on which one provided the best fit to the distribution after optimising their respective parameters in an iterative process.



8.9.2 The calibrated gravity model is then used to distribute the forecast trip ends. First, a balance procedure is applied to reconcile the origin and destination trip ends as these might differ from each other as part of the trip generation process. Once balanced, the trips are distributed following a furnishing process with a double constraint, ensuring the origin and destination trip ends are constant. These trips were then applied to West Winch Paramics Discovery Model for 300 dwellings in the Do Minimum scenario and for the full quantum of development in the DS2 scenario. The DS1 scenario does not include the housing growth beyond the non-dependent development of 300 units.

8.10 Forecast Model Results

8.10.1 Hourly modelled turning flows have been extracted from the DM, DS1 and DS2 scenarios and presented as flow diagrams in **Appendix 7** (Document Reference **NCC/4.01.07/WWHAR**).

8.10.2 Traffic flows have been extracted from the model for the 2018 Base Scenario, and future year DM Scenario, DS1 Scenario and DS2 for the modelled years of 2027 and 2042. Results for 2037 are also presented, calculated as the linear interpolation between the 2027 and 2042 results. Results for the AM and PM modelled peak hours are presented within this TA and AADT flows taken from the SATURN model are considered within the ES Chapter on Traffic and Transport (Document Reference **NCC/3.16.00/WWHAR**).

WWHAR Select Link Analysis

8.10.3 Select link analysis has been carried out at two locations as shown in **Figure 8-6** to identify the origins and destinations of the trips using the WWHAR. The first location is at the start of the housing access road and the second location is at the end of network at A10 Lynn Road.



Figure 8-6 Select Link Analysis Locations



8.10.4 The analysis showed that for Southbound trips in the AM Peak on the WWHAR, the majority of trips are originating from the A149, Hardwick Road and the A47 and are continuing south on the A10. For northbound trips in the AM Peak, the majority of trips are originating from the A10 South and heading towards the A47, Hardwick Road and the A149.

8.10.5 In the PM peak, the select link analysis tells a similar story, where the majority of origins/destinations are focussed on the A47, Hardwick Road and the A149.



8.10.6 Whilst this analysis provides sufficient evidence to suggest that the WWHAR will be used as a strategic alternative route to the A10, it is important to stress that the WWHAR will also act as the main point of access for the WWGA.

8.11 Junction Capacity Assessment

8.11.1 To assess junction capacity, model outputs for each scenario and year are assessed on the approach arms to each key junction in the network. These junctions include:

- A47/A10/A149 Hardwick Roundabout
- A149 Hardwick Road/Scania Way
- A10/Rectory Lane
- A10/Chequers Lane/Long Lane
- A10 Hopkins Roundabout – Non-dependent housing site access on A10
- A47/New Road
- A10/Gravelhill Lane
- A47/WWHAR (DS1 & DS2 Scenario only)
- WWHAR Roundabout 1 (DS1 & DS2 Scenario only)
- WWHAR Roundabout 2 (DS1 & DS2 Scenario only)
- WWHAR Roundabout 3 (DS1 & DS2 Scenario only)
- WWHAR Roundabout 4 (DS1 & DS2 Scenario only)

8.11.2 The outputs assessed include maximum queue and average queue lengths in metres, average delay in seconds, and Level of Service (LOS). The LOS is a quantitative measure defined in the Highway Capacity Manual used in the United States of America. Although this LOS definition is not included in UK guidance, it has been included in this assessment for reference as it provides the non-technical audience with a more intuitive way to assess junction



performance. The LOS represents a value between A and F which corresponds with the amount of delay experienced by a driver, as shown in **Table 8-12**. LOS A represents free-flow conditions, while LOS F represents over capacity.

Table 8-12: Level of Service

Level of Service	Signalised Junction	Unsignalised Junction
A	≤ 10 seconds	≤ 10 seconds
B	11 - 20 seconds	11 – 15 seconds
C	21 - 35 seconds	16 - 25 seconds
D	36 - 55 seconds	26 - 35 seconds
E	56 - 80 seconds	36 - 50 seconds
F	≥ 81 seconds	≥ 51 seconds

8.11.3 The results presented in this section represent an average of 10 simulation runs. The results have been collected for AM and PM peak hours only (07:30-08:30 and 16:45-17:45 respectively) rather than the whole modelled period, as this represents the busiest time within the model.

8.11.4 The delay at the junction approaches was calculated by subtracting the journey times along each arm when there is no congestion (free flow conditions) from the journey times along each arm in the full demand conditions of each scenario. To replicate free flow conditions, the model was run for four simulations with only 10% of the full vehicle demand and the average of the resulting journey times on each arm were used.

8.11.5 The results for 2037 are the linear interpolation between the 2027 and 2042 strategic model output results.



2018 Base Year

8.11.6 **Table 8-13** to **Table 8-26** sets out the performance results for the 2018 Base Scenario network junctions during both the AM and PM peak.

Table 8-13: Base Scenario: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	66	58	16	B
A149 Queen Elizabeth Way	101	91	21	C
A47 Constitution Hill	60	52	15	B
A10 West Winch Road	273	173	59	E
Beveridge Way	45	31	12	B
A47 (West)	127	115	35	C

Table 8-14: Base Scenario: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	155	114	33	C
A149 Queen Elizabeth Way	102	94	15	B
A47 Constitution Hill	53	42	19	B
A10 West Winch Road	73	54	14	B
Beveridge Way	78	51	17	C
A47 (West)	96	88	23	C

Table 8-15: Base Scenario: Hardwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	80	75	45	D
Campbells Meadow	61	55	46	D
Scania Way SB	60	50	49	D
Scania Way EB	60	39	14	B
A149 SE	78	74	22	C



Table 8-16: Base Scenario: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	119	110	36	D
Campbells Meadow	96	90	43	D
Scania Way SB	181	108	76	E
Scania Way EB	160	110	43	D
A149 SE	68	63	33	C

Table 8-17: Base Scenario: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	58	36	34	D
Chequers Lane	0	0	10	A
A10 S	0	0	17	C
A10 N	0	0	17	C

Table 8-18: Base Scenario: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	16	8	23	C
Chequers Lane	6	1	10	A
A10 S	0	0	0	A
A10 N	0	0	22	C

Table 8-19: Base Scenario: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	25	13	7	A
A47 (W)	3	0	0	A



Table 8-20: Base Scenario: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	6	1	5	A
A47 (W)	8	2	0	A

Table 8-21: Base Scenario: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	10	3	No results	No results
Gravelhill Lane	35	26	No results	No results

Table 8-22: Base Scenario: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	17	8	No results	No results
Gravelhill Lane	18	14	No results	No results

Table 8-23: Base Scenario: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	No results	No results
A10 Main Road (S)	39	23	No results	No results



Table 8-24: Base Scenario: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	No results	No results
A10 Main Road (S)	10	3	No results	No results

DM Scenario (2027)

8.11.7 **Table 8-27** to **Table 8-42** sets out the performance results for the 2027 DM Scenario network junctions during both the AM and PM peak.

Table 8-25: DM Scenario 2027: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	66	58	14	B
A149 Queen Elizabeth Way	123	104	25	C
A47 Constitution Hill	55	47	15	B
A10 West Winch Road	386	258	103	F
Beveridge Way	44	34	15	B
A47 (West)	140	115	27	C

Table 8-26: DM Scenario 2027: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	130	108	31	C
A149 Queen Elizabeth Way	119	108	18	B
A47 Constitution Hill	50	42	19	B
A10 West Winch Road	66	58	13	B
Beveridge Way	96	58	26	D
A47 (West)	100	92	25	C



Table 8-27: DM Scenario 2027: Hardwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	95	80	48	D
Campbells Meadow	69	64	54	D
Scania Way SB	68	52	56	E
Scania Way EB	61	47	18	B
A149 SE	87	73	25	C

Table 8-28: DM Scenario 2027: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	125	115	38	D
Campbells Meadow	99	94	52	D
Scania Way SB	157	96	80	E
Scania Way EB	137	95	42	D
A149 SE	75	64	41	D

Table 8-29: DM Scenario 2027: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	45	32	30	D
Chequers Lane	0	0	9	A
A10 S	55	18	1	A
A10 N	65	49	13	B



Table 8-30: DM Scenario 2027: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	13	7	22	C
Chequers Lane	0	0	11	B
A10 S	0	0	0	A
A10 N	162	137	20	C

Table 8-31: DM Scenario 2027: Hopkins Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	10	4	2	A
A10 South	27	19	1	A
Hopkins Road	22	15	7	A

Table 8-32: DM Scenario 2027: Hopkins Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	30	14	4	A
A10 South	23	12	2	A
Hopkins Road	29	16	20	C

Table 8-33: DM Scenario 2027: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	87	34	14	B
A47 (W)	5	1	0	A



Table 8-34: DM Scenario 2027: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	5	1	5	A
A47 (W)	3	0	0	A

Table 8-35: DM Scenario 2027: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	7	2	No results	No results
Gravelhill Lane	37	28	No results	No results

Table 8-36: DM Scenario 2027: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	17	8	No results	No results
Gravelhill Lane	17	10	No results	No results

Table 8-37: DM Scenario 2027: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	7	A
A10 Main Road (S)	128	59	8	A



Table 8-38: DM Scenario 2027: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	7	C
A10 Main Road (S)	3	0	1	A

DM Scenario (2037)

8.11.8 **Table 8-43** to **Table 8-58** sets out the performance results for the 2027 DM Scenario network junctions during both the AM and PM peak.

Table 8-39: DM Scenario 2037: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	71	63	15	B
A149 Queen Elizabeth Way	124	110	27	C
A47 Constitution Hill	59	51	15	B
A10 West Winch Road	380	291	115	F
Beveridge Way	53	38	21	C
A47 (West)	164	128	36	D

Table 8-40: DM Scenario 2037: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	132	116	45	D
A149 Queen Elizabeth Way	117	107	18	B
A47 Constitution Hill	50	44	19	B
A10 West Winch Road	71	62	14	B
Beveridge Way	111	64	31	D
A47 (West)	105	96	27	C



Table 8-41: DM Scenario 2037: Harwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	96	83	48	D
Campbells Meadow	74	66	55	E
Scania Way SB	62	51	55	D
Scania Way EB	67	48	17	B
A149 SE	88	76	25	C

Table 8-42: DM Scenario 2037: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	129	118	39	D
Campbells Meadow	107	98	59	E
Scania Way SB	198	119	91	F
Scania Way EB	193	126	56	E
A149 SE	77	68	41	D

Table 8-43: DM Scenario 2037: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	58	35	31	D
Chequers Lane	0	0	8	A
A10 S	76	34	3	A
A10 N	68	55	15	B



Table 8-44: DM Scenario 2037: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	14	8	23	C
Chequers Lane	6	1	12	B
A10 S	7	1	0	A
A10 N	163	136	21	C

Table 8-45: DM Scenario 2037: Hopkins Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	12	5	2	A
A10 South	30	22	2	A
Hopkins Road	24	18	8	A

Table 8-46: DM Scenario 2037: Hopkins Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	36	19	4	A
A10 South	19	12	2	A
Hopkins Road	29	17	22	C

Table 8-47: DM Scenario 2037: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	99	54	33	D
A47 (W)	7	1	0	A



Table 8-48: DM Scenario 2037: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	5	1	6	A
A47 (W)	8	1	0	A

Table 8-49: DM Scenario 2037: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	6	2	No results	No results
Gravelhill Lane	44	31	No results	No results

Table 8-50: DM Scenario 2037: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	17	8	No results	No results
Gravelhill Lane	24	11	No results	No results

Table 8-51: DM Scenario 2037: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	10	A
A10 Main Road (S)	150	87	15	C



Table 8-52: DM Scenario 2037: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	21	C
A10 Main Road (S)	12	3	1	A

8.11.9 The results show that in DM Scenario, maximum and average queues and delays generally increase between 2027 and 2037.

8.11.10 For DM Scenario (2027), the largest average queue length, 258 metres, was predicted at the A10 approach to the Hardwick Interchange. This level of queuing equates to approximately 43 vehicles (assuming an average queuing vehicle length of 6m).

8.11.11 By 2037, the largest average queue length at the A10 approach to the Hardwick interchange for DM Scenario is forecast to increase to 291 metres, adding a further 6 vehicles to the average queuing vehicle length. This increase suggests that significant queues can be expected on the A10 approach of Hardwick Roundabout in all modelled years in DM Scenario. This is reflected in the LOS of F expected on this approach in 2037, which reflects delay longer than 80 seconds at signalised junctions.

8.11.12 The longest modelled delay at the Hardwick Interchange of 115 seconds in the 2037 AM peak significantly exceeds this threshold and is almost double the delay which is currently modelled on this approach in the AM peak for the 2018 Base Scenario (59 seconds).

8.11.13 In the PM peak, the largest queues and delays are expected at the Hardwick Road/Scania Way junction. In 2037 a maximum queue of 193 metres is modelled on Scania Way EB, which is equal to 32 vehicles, while an average queue of 126 metres is modelled, which is equal to approximately 21 vehicles. The delay on this approach in the 2037 PM peak is equivalent to an LOS of E, but delay of 91 seconds is expected on Scania Way SB, which is equivalent to an LOS of F. In the 2018 Base Scenario, the LOS in the PM peak on these



approaches were D and E respectively, so the junction has not become significantly worse between these years.

8.11.14 Other changes to the amount of queuing and delay between DM Scenario and the Base Scenario is modelled at the A47/New Road junction, where delay increases in the AM peak from an LOS of A in the AM Base Scenario to an LOS of D on the New Road approach. This could be attributed to vehicles travelling northbound along the A10 rerouting via Rectory Lane and Chequers Lane to avoid the significant delay on the A10 approach of Hardwick Roundabout during the AM peak. This is supported by the expected increase in delay on the A10 approaches of the A10/Rectory Lane and A10/Chequers Lane junctions in the AM peak between 2027 and 2037.

9 Impact Assessment

9.1 DS1/DS2 Scenario (2027)

9.1.1 **Table 9-1** to **Table 9-24** sets out the performance results for the network junctions in DS1 Scenario which for 2027 is also the same as the DS2 Scenario (as no extra housing would have been delivered in the WWGA by 2027) during both the AM and PM peak.

9.1.2 These scenarios are the same for 2027 as the additional housing associated with the WWGA is yet to be added to the network.

9.1.3 The effect of the additional housing and the difference between DS1 Scenario and DS2 will be picked up later when comparing 2037 outputs.

Table 9-1: DS1/DS2 Scenario 2027: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	81	77	27	C
A149 Queen Elizabeth Way	108	99	20	B
A47 Constitution Hill	74	69	12	B
A10 West Winch Road	55	47	9	A



Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Beveridge Way	58	51	25	C
A47 (West)	129	119	34	C

Table 9-2: DS1/DS2 Scenario 2027: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	87	72	12	B
A149 Queen Elizabeth Way	117	111	19	B
A47 Constitution Hill	63	59	12	B
A10 West Winch Road	42	36	17	C
Beveridge Way	89	71	30	C
A47 (West)	97	88	25	C

Table 9-3: DS1/DS2 Scenario 2027: Hardwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	97	87	49	D
Campbells Meadow	74	65	55	D
Scania Way SB	62	50	53	D
Scania Way EB	66	45	17	B
A149 SE	86	76	27	C

Table 9-4: DS1/DS2 Scenario 2027: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	126	113	37	D



Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Campbells Meadow	99	93	52	D
Scania Way SB	138	88	63	E
Scania Way EB	143	98	38	D
A149 SE	77	68	47	D

Table 9-5: DS1/DS2 Scenario 2027: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	4	1	0	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	0	0	0	A

Table 9-6: DS1/DS2 Scenario 2027: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	3	1	1	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	5	3	0	A



Table 9-7: DS1/DS2 Scenario 2027: Hopkins Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	0	0	0	A
A10 South	12	2	0	A
Hopkins Road	2	1	0	A

Table 9-8: DS1/DS2 Scenario 2027: Hopkins Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	5	1	0	A
A10 South	2	0	0	A
Hopkins Road	4	1	1	A

Table 9-9: DS1/DS2 Scenario 2027: A47/WWHAR, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	125	107	16	B
A47 South	69	61	14	B
WWHAR	15	9	4	A

Table 9-10: DS1/DS2 Scenario 2027: A47/WWHAR, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	90	79	9	A
A47 South	67	61	15	B
WWHAR	12	6	3	A



Table 9-11: DS1/DS2 Scenario 2027: WWHAR Roundabout 1, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	0	0	2	A
WWHAR South	0	0	2	A
Hopkins Road	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027

Table 9-12: DS1/DS2 Scenario 2027: WWHAR Roundabout 1, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	0	0	1	A
WWHAR South	0	0	1	A
Hopkins Road	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027

Table 9-13: DS1/DS2 Scenario 2027: WWHAR Roundabout 2, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027
WWHAR SB	0	0	4	A
WWHAR NB	3	0	1	A



Table 9-14: DS1/DS2 Scenario 2027: WWHAR Roundabout 2, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027
WWHAR SB	0	0	4	A
WWHAR NB	0	0	1	A

Table 9-15: DS1/DS2 Scenario 2027: WWHAR Roundabout 3, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027
WWHAR SB	0	0	1	A
WWHAR NB	0	0	0	A

Table 9-16: DS1/DS2 Scenario 2027: WWHAR Roundabout 3, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	No Access in 2027	No Access in 2027	No Access in 2027	No Access in 2027
WWHAR SB	0	0	1	A
WWHAR NB	0	0	0	A



Table 9-17: DS1/DS2 Scenario 2027: WWHAR Roundabout 4, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	43	30	3	A
A10 North	28	16	3	A
WWHAR	33	20	7	A

Table 9-18: DS1/DS2 Scenario 2027: WWHAR Roundabout 4, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	49	42	4	A
A10 North	11	3	3	A
WWHAR	54	21	3	A

Table 9-19: DS1/DS2 Scenario 2027: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	5	1	1	A
A47 (W)	3	0	0	A

Table 9-20: DS1/DS2 Scenario 2027: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	2	0	1	A
A47 (W)	0	0	0	A



Table 9-21: DS1/DS2 Scenario 2027: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	0	0	0	A
Gravelhill Lane	0	0	1	A

Table 9-22: DS1/DS2 Scenario 2027: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	0	0	0	A
Gravelhill Lane	0	0	0	A

Table 9-23: DS1/DS2 Scenario 2027: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	1	A
A10 Main Road (S)	0	0	1	A

Table 9-24: DS1/DS2 Scenario 2027: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	0	A
A10 Main Road (S)	0	0	1	A

DS1 Scenario (2037)

9.1.4 **Table 9-25** to **Table 9-48** sets out the performance results for the 2037 DS1 Scenario network junctions with the proposed WWHAR Scheme but no extra housing during the AM and PM peak hours.



Table 9-25: DS1 Scenario 2037: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	88	81	30	C
A149 Queen Elizabeth Way	111	101	21	C
A47 Constitution Hill	78	72	12	B
A10 West Winch Road	56	49	14	B
Beveridge Way	60	52	26	C
A47 (West)	132	122	37	D

Table 9-26: DS1 Scenario 2037: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	94	78	15	B
A149 Queen Elizabeth Way	118	109	18	B
A47 Constitution Hill	68	62	13	B
A10 West Winch Road	46	36	18	C
Beveridge Way	94	72	31	C
A47 (West)	102	93	28	C

Table 9-27: DS1 Scenario 2037: Hardwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	101	89	48	D
Campbells Meadow	75	67	56	E
Scania Way SB	62	49	55	D
Scania Way EB	68	49	17	B
A149 SE	84	77	26	C



Table 9-28: DS1 Scenario 2037: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	118	107	37	D
Campbells Meadow	102	94	53	D
Scania Way SB	225	129	82	F
Scania Way EB	227	137	51	D
A149 SE	80	71	48	D

Table 9-29: DS1 Scenario 2037: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	6	2	0	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	0	0	0	A

Table 9-30: DS1 Scenario 2037: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	6	1	1	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	6	3	0	A



Table 9-31: DS1 Scenario 2037: Hopkins Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	0	0	0	A
A10 South	12	3	1	A
Hopkins Road	4	1	0	A

Table 9-32: DS1 Scenario 2037: Hopkins Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	4	1	0	A
A10 South	2	0	0	A
Hopkins Road	3	1	0	A

Table 9-33: DS1 Scenario 2037: A47/WWHAR, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	129	116	17	B
A47 South	74	66	15	B
WWHAR	19	12	5	A

Table 9-34: DS1 Scenario 2037: A47/WWHAR, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	106	85	10	B
A47 South	72	63	15	B
WWHAR	16	6	3	A



Table 9-35: DS1 Scenario 2037: WWHAR Roundabout 1, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	0	0	2	A
WWHAR South	0	0	2	A
Hopkins Road	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S

Table 9-36: DS1 Scenario 2037: WWHAR Roundabout 1, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	0	0	2	A
WWHAR South	0	0	1	A
Hopkins Road	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S

Table 9-37: DS1 Scenario 2037: WWHAR Roundabout 2, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S
WWHAR SB	0	0	4	A
WWHAR NB	5	1	1	A

Table 9-38: DS1 Scenario 2037: WWHAR Roundabout 2, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S
WWHAR SB	0	0	4	A
WWHAR NB	2	0	1	A



Table 9-39: DS1 Scenario 2037: WWHAR Roundabout 3, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S
WWHAR SB	0	0	1	A
WWHAR NB	0	0	0	A

Table 9-40: DS1 Scenario 2037: WWHAR Roundabout 3, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	No Access in Sc S	No Access in Sc S	No Access in Sc S	No Access in Sc S
WWHAR SB	0	0	1	A
WWHAR NB	0	0	0	A

Table 9-41: DS1 Scenario 2037: WWHAR Roundabout 4, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	45	30	4	A
A10 North	32	20	3	A
WWHAR	33	22	8	A

Table 9-42: DS1 Scenario 2037: WWHAR Roundabout 4, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	51	43	5	A
A10 North	10	4	4	A
WWHAR	46	22	4	A



Table 9-43: DS1 Scenario 2037: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	5	1	1	A
A47 (W)	3	1	0	A

Table 9-44: DS1 Scenario 2037: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	3	1	1	A
A47 (W)	0	0	0	A

Table 9-45: DS1 Scenario 2037: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	0	0	0	A
Gravelhill Lane	0	0	1	A

Table 9-46: DS1 Scenario 2037: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	0	0	0	A
Gravelhill Lane	0	0	1	A

Table 9-47: DS1 Scenario 2037: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	1	A
A10 Main Road (S)	1	0	0	A



Table 9-48: DS1 Scenario 2037: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	1	A
A10 Main Road (S)	0	0	0	A

9.1.5 The results show that the maximum queues, average queues, and delay at the network junctions increase between 2027 and 2037.

9.1.6 In DS1 Scenario, Hardwick Roundabout performs similarly or better than in DM Scenario. The approaches at this junction generally achieve an LOS value between B and D in all the modelled years. The worst performing approaches from DM Scenario have improved in DS1 Scenario: from an LOS of F on the A10 approach in DM Scenario 2037 AM peak, to an LOS of B in DS1 Scenario; and from an LOS of D on the A149 Hardwick Road in the DM Scenario 2037 PM peak to an LOS of B in DS1 Scenario. This is caused by the optimisation of the signals at Hardwick Roundabout, and the reduction in demand on the A10 West Winch Road due vehicles rerouting via the WWHAR.

9.1.7 The longest maximum queue of 132 metres is expected on the A47 W approach in the 2037 AM peak, which is equal to approximately 22 vehicles. The longest average queue of 122 metres is also expected on this approach in the 2037 AM peak, which is equal to approximately 20 vehicles. The maximum and average queues modelled on this approach are not considered to be significant on a signalised arm of a major junction such as Hardwick Roundabout.

9.1.8 The Hardwick Road / Scania Way junction is the worst performing junction in DS1 Scenario, particularly in the PM peak. Scania Way SB and Scania Way EB are again the worst performing approaches, with a maximum queue of 227 metres modelled on the Scania Way EB in the 2037 PM peak (equivalent to approximately 38 vehicles), and the longest average queue of 137 metres



modelled on Scania Way EB in the 2037 PM peak (equivalent to approximately 23 vehicles). The approaches for Scania Way SB and Scania Way EB have an LOS of F and D respectively in the 2037 PM peak, which is a slight improvement on the LOS achieved on each approach in the DM Scenario 2037 PM peak, which achieved an LOS of F and E respectively.

9.1.9 The junctions on the WWHAR perform well in all DS1 Scenario modelled years, scoring an LOS of A or B in the AM and PM peaks, with minimal queuing expected. A minimal amount of queueing and delay is expected elsewhere on the network, with all other junctions elsewhere on the network achieving an LOS of A in all the modelled years, an improvement on junction performance presented in DM Scenario, caused by the extra network capacity introduced by the WWHAR.

DS2 (2037)

9.1.10 **Table 9-49** to **Table 9-72** sets out the performance results for the 2037 DS1 Scenario network junctions during both the AM and PM peak.

Table 9-49: DS2 2037: Hardwick Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	87	83	31	C
A149 Queen Elizabeth Way	120	111	25	C
A47 Constitution Hill	81	73	12	B
A10 West Winch Road	69	59	23	C
Beveridge Way	61	52	25	C
A47 (West)	122	113	32	C



Table 9-50: DS2 2037: Hardwick Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 Hardwick Road	111	87	19	B
A149 Queen Elizabeth Way	135	123	25	C
A47 Constitution Hill	80	73	14	B
A10 West Winch Road	72	55	43	E
Beveridge Way	91	73	31	C
A47 (West)	94	88	26	C

Table 9-51: DS2 2037: Hardwick Road/Scania Way, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	100	90	48	D
Campbells Meadow	75	67	55	D
Scania Way SB	55	47	54	D
Scania Way EB	67	48	16	B
A149 SE	87	80	26	C

Table 9-52: DS2 2037: Hardwick Road/Scania Way, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A149 NW	134	118	38	D
Campbells Meadow	122	110	71	E
Scania Way SB	225	126	80	E
Scania Way EB	234	139	50	D
A149 SE	83	73	50	D



Table 9-53: DS2 2037: A10/Chequers Lane/Long Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	13	7	1	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	5	2	1	A

Table 9-54: DS2 2037: A10/Chequers Lane/Long Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Long Lane (W)	10	4	3	A
Chequers Lane	0	0	0	A
A10 S	0	0	0	A
A10 N	19	8	2	A

Table 9-55: DS2 2037: Hopkins Roundabout, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	2	0	0	A
A10 South	18	7	1	A
Hopkins Road	7	4	1	A



Table 9-56: DS2 2037: Hopkins Roundabout, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 North	9	4	1	A
A10 South	5	2	0	A
Hopkins Road	6	3	3	A

Table 9-57: DS2 2037: A47/WWHAR, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	155	129	19	B
A47 South	71	63	14	B
WWHAR	34	25	5	A

Table 9-58: DS2 2037: A47/WWHAR, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A47 North	105	92	12	B
A47 South	74	64	15	B
WWHAR	15	9	3	A

Table 9-59: DS2 2037: WWHAR Roundabout 1, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	24	13	2	A
WWHAR South	36	28	4	A
Hopkins Road	30	26	13	B



Table 9-60: DS2 2037: WWHAR Roundabout 1, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
WWHAR North	25	16	2	A
WWHAR South	47	41	6	A
Hopkins Road	15	12	4	A

Table 9-61: DS2 2037: WWHAR Roundabout 2, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	32	24	12	B
WWHAR SB	17	8	5	A
WWHAR NB	42	32	4	A

Table 9-62: DS2 2037: WWHAR Roundabout 2, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access North	17	10	4	A
WWHAR SB	19	9	5	A
WWHAR NB	86	52	12	B



Table 9-63: DS2 2037: WWHAR Roundabout 3, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	32	26	5	A
WWHAR SB	14	10	1	A
WWHAR NB	34	30	3	A

Table 9-64: DS2 2037: WWHAR Roundabout 3, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Dev Access South	18	12	3	A
WWHAR SB	11	7	1	A
WWHAR NB	80	46	15	B

Table 9-65: DS2 2037: WWHAR Roundabout 4, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	44	29	3	A
A10 North	36	27	3	A
WWHAR	41	31	7	A

Table 9-66: DS2 2037: WWHAR Roundabout 4, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 South	53	46	5	A
A10 North	16	8	2	A
WWHAR	40	22	4	A



Table 9-67: DS2 2037: A47/New Road, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	9	4	2	A
A47 (W)	4	1	0	A

Table 9-68: DS2 2037: A47/New Road, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
New Road	2	0	1	A
A47 (W)	0	0	0	A

Table 9-69: DS2 2037: A10/Gravelhill Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	0	0	0	A
Gravelhill Lane	1	0	1	A

Table 9-70: DS2 2037: A10/Gravelhill Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
A10 Main Road (N)	1	0	1	A
Gravelhill Lane	0	0	1	A

Table 9-71: DS2 2037: A10/Rectory Lane, AM Peak (07:30-08:30)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	1	0	2	A
A10 Main Road (S)	2	0	1	A



Table 9-72: DS2 2037: A10/Rectory Lane, PM Peak (16:45-17:45)

Approach	Max Queue (m)	Average Queue (m)	Average Delay (s)	LOS
Rectory Lane	0	0	1	A
A10 Main Road (S)	0	0	1	A

9.1.11 The results show that for DS2, the maximum queues, average queues, and delay at the junctions increase between 2027 and 2037.

9.1.12 At the Hardwick Roundabout in DS2 2037, the junction performs very similarly to DS1 Scenario 2037, meaning that the junction is capable of accommodating the additional traffic associated with the WWGA.

9.1.13 The largest increase in queuing and delay between the S and R scenarios at this junction is expected at the A10 approach, which achieves an LOS of C in the AM peak and E in the PM peak. The maximum queue expected at this approach is 69 metres in the AM peak and 72 metres in the PM peak, equal to approximately 11 vehicles and 12 vehicles respectively, which is not considered to be significant on an unsignalised arm of a major junction such as the Hardwick Roundabout.

9.1.14 The results show that in DS2, the junction with the largest delay is Hardwick Road/Scania Road, particularly in the PM peak. Maximum queue lengths of 225 metres and 234 metres are expected on Scania Way SB and Scania Way EB respectively in the PM peak, which is equal to approximately 38 and 39 vehicles respectively. The average queue lengths at this approach are 126 metres on Scania Way SB and 139 metres on Scania Way EB, which is equal to approximately 21 and 23 vehicles respectively.

9.1.15 The junctions along the WWHAR generally perform well in all modelled years for Scenario DS2, generally scoring an LOS of A or B in the AM and PM peaks, with minimal queuing expected. In the AM peak, more delay is expected on the development access arms of the junctions, while in the PM peak more delay is expected on the northbound approach arms of the junctions.



9.2 Summary and conclusions

9.2.1 Paramics modelling of the West Winch Growth Area was undertaken to assess the network performance under three future scenarios: Do Minimum (DM) Scenario with 300 dwellings at the WWGA and without the WWHAR; Do-Something 1 (DS1) Scenario with 300 dwellings at the WWGA and with the WWHAR; and Do-Something 2 (DS2) Scenario with additional dwellings built out and occupied at the WWGA as well as including the Proposed WWHAR Scheme. Two future years were presented for the AM and PM peak hours, 2027 and 2037. In 2027, the DS1 and DS2 scenarios are essentially identical as no additional housing is assumed to be built out by 2027 over and above the 300 non-dependent dwellings.

9.2.2 The outputs from the Paramics model were analysed to assess the expected peak hour traffic flows around the West Winch highway network. The movement of traffic across the network has been compared using select link analysis and the performance of individual junctions has been considered in detail. The following high-level conclusions can be drawn from the Paramics model results:

- The rerouting of strategic traffic from the A10 to the WWHAR in DS1 Scenario and DS2 is further demonstrated by the select link analysis, which showed that the majority of trips on the WWHAR originate from the A149, Hardwick Road, the A47, or the A10 (S); and have the same destinations.
- The junction with the highest level of delay is the Hardwick Road / Scania Way signalised junction, where the Scania Way southbound approach is over capacity in the PM peak. However, this approach is already at capacity in the base year. Seeking to mitigate this effect, signal timings are proposed to be optimised and additional SCOOT re-validation is also recommended. In some circumstances, SCOOT re-validation can have the effect of increasing junction operation by up to 13% in comparison with modelled predictions. However, this effect has



not been taken into account in the model results presented within this report.

- The junctions which are part of the proposed development at the WWGA (including WWHAR junctions and A10 access junctions) are predicted to operate well within capacity and are not expected to cause significant levels of queueing or delay in any of the forecast scenarios in either of the highway peak hours.



10 Sustainable Transport Strategy

10.1 Overview

10.1.1 A Sustainable Transport Strategy has been developed to accompany the Proposed WWHAR Scheme as set out within the STS (Document Reference **NCC/4.02.00/WWHAR**). This chapter describes the proposed package of measures that was shortlisted taking into account feedback from stakeholder engagement and public consultation.

10.2 Developing the Active Travel Strategy

10.2.1 The intention of the STS is to offer increased opportunities for walking, cycling and horse riding in the immediate vicinity of the WWHAR route, as well as improving connectivity of existing Public Rights of Way and encouraging healthy and active travel by non-car modes, particularly for shorter trips of 2km and below.

10.2.2 This strategy has been developed based on existing policy/guidance, engagement with local communities and stakeholders, and opportunities identified through work completed to date. These have been used to frame the Guiding Principles set out below.

10.2.3 The Option Development process identified a shortlist of opportunities for improving connectivity and quality of existing Public Rights of Way in the vicinity of the scheme. The current provision is fragmented and does not function as a coherent network.

10.2.4 The STS aims to connect up existing routes, make them more usable through infrastructure enhancements and mitigate potential severance issues caused by the provision the new WWHAR.

10.3 Guiding Principles – Non Motorised Users

10.3.1 Through previous engagement, examination of policy and the use of appropriate design standards/guidance, a set of guiding principles were developed to guide the development of the NMU proposals. These were:



- Aim to retain and enhance PROWs where possible;
- Diversion routes to be kept at a reasonable length and development in accordance with the DfT guidance [CD143];
- Seek to improve surfacing and accessibility, especially for wheelchair users where possible aligned with Sustrans and British Horse Society guidance. Where possible the Sustrans Traffic-free routes and greenways design guidance (November 2019) should be used to inform design for shared-used cyclists, pedestrian, and equestrian facilities;
- Avoid or minimise disturbance to adjacent landowners and farm operations;
- Proposed maintenance tracks can be utilised as new links between PROWs and local roads;
- Around the Hardwick roundabout, the design and development of NMU routes should be coordinated with National Highways to create a joined-up strategy;
- Landscaping proposals will consider security of footpath users, particularly in remote rural areas, promoting enjoyment of routes where possible with appropriate landscape mitigation where routes pass close to noisy edges of the project, A47 or A10 routes;
- Wayfinding and signage should be provided in accordance with Sustrans guidance; and
- Any lighting proposed would need to be minimised to comply with the NCC Dark Skies policy applicable to the local area. Lighting is only installed in Norfolk where necessary in the interests of highway safety and general street lights are typically switched off in the early hours when in low utilisation to save energy.



10.4 Proposed Non-Motorised User Strategy Opportunities

10.4.1 The proposed Strategy includes a mix of active travel infrastructure improvements in order to improve active travel network connectivity and to provide improved crossings across the A10 and across the new scheme. It is also aimed to enable the PROW network to be preserved and enhanced as part of the scheme. The proposed NMU enhancement opportunities are explained below.

Opportunity 1: New Raised Table and Crossing at West Winch Stores

10.4.2 Improved signalised crossing facilities on the existing A10 close to West Winch Stores. An improved crossing across the A10 would allow for better access to the West Winch Stores between the existing homes and proposed development on the east side of West Winch and the existing facilities, services, and residential areas in the west.

10.4.3 A raised table (an elevated crossing point at the same height as the footway) may also help to encourage lower speeds and encourage through-traffic to re-route via the WWHAR rather than using the existing A10, reducing demand and the perceived severance between both sides of the A10. The raised table would also help to encourage lower speeds and support the implementation of a 20mph speed limit through this section. This could be positioned slightly north of the West Winch stores away from dwellings to avoid vibration effects. Desire lines from surveys carried out in summer 2023 indicate that this would still intercept the majority of trips seeking to cross in this location. Desire Lines are shown in Appendix 3 of the STS (Document Reference **NCC/4.02.03/WWHAR**).

Opportunity 1A: New Raised Table and Crossing Close to West Winch Stores

10.4.4 Due to concerns with the deliverability and suitability of Option 1, an alternative opportunity has been identified, where new crossing facilities and a raised table across the A10 are proposed close to West Winch Stores.

10.4.5 The improved crossing across the A10 would allow for better access to the West Winch Stores between the existing homes and proposed development on the east side of West Winch and the existing facilities, services, and



residential areas in the west. The raised tables may also help to encourage lower speeds and encourage through-traffic to re-route via the WWHAR rather than using the existing A10, reducing demand and the perceived severance between both sides of the A10.

10.4.6 The raised table would also help to encourage lower speeds and support the implementation of a 20mph speed limit through this section.

Opportunity 2: A10 Crossing Facilities

10.4.7 Additional controlled and uncontrolled crossing facilities are proposed along the existing A10. Raised tables could be considered at all controlled crossing points.

10.4.8 New crossing facilities would help to improve pedestrian and cycle accessibility across the A10 and connect local services and residential areas along the existing A10 between Hardwick Roundabout and the WWHAR. During stakeholder events and previous public consultation, traffic speeds and volume on the existing A10, limited NMU segregation from traffic and safety concerns have been identified as barriers to active travel.

10.4.9 The proposed crossings have been located at/close to existing PRowS and proposed West Winch development site accesses. The increased number of crossings and raised tables would also help to encourage lower speeds on the existing A10.

Opportunity 3: Shared Use Route Along the WWHAR

10.4.10 There is an opportunity to provide a pedestrian and cycle route alongside the proposed WWHAR route. This would provide a more direct route away from the development area where crossing and junction conflicts between vehicles and pedestrians/cyclists are reduced. The shared route would connect with the existing route on the A10 in the south, Chequers Lane and Rectory Lane via Opportunity 6.

10.4.11 The connection to Chequers Lane would also improve connectivity between West Winch, King's Lynn and North Runcton.



Opportunity 4: New Non-Motorised User Route to Hardwick Industrial Estate

10.4.12 Analysis of existing routes and connections in the wider area, has highlighted there is no direct connection between West Winch and the Hardwick Industrial Estate. NMUs are required to continue up to Hardwick Roundabout, cross and use the northern footway on Beveridge Way. Cyclists have to cycle on the Beveridge Way carriageway.

10.4.13 There is an opportunity to provide a more direct NMU route from West Winch to Hardwick Industrial Estate by undertaking improvements to the PRow's that run parallel to the A10 such as FP1, RB2 and FP2. These routes are currently hard to follow, have poor signage, are subject to flooding, and often have locked gates prevented movement.

10.4.14 An alternative route could be provided between the A10 in West Winch and Hardwick Industrial Estate via the existing route opposite Babingley Place, to the rear of properties connecting with Hardwick Narrows.

10.4.15 Improved connectivity could also be provided along the southern side of Beveridge Way, where there is no existing provision.

10.4.16 These opportunities would provide a connection between the large employment area to the west and a number of local services and the existing residential areas as well as the proposed new developments east of A10.

Opportunity 5: New Non-Motorised User Routes Between West Winch Development and The A10

10.4.17 The proposed development at West Winch, particularly to the east of the A10 provides an opportunity to provide new, segregated links for walkers and wheelers between the main development areas and the existing crossing facilities and routes to local services.

10.4.18 Based on the current development masterplan, a number of opportunities have been identified to fill in the gaps in the routes proposed as part of the development. These are new routes between the northern extent of the development and the existing shared route on the A10, the existing crossings



at the Hardwick Roundabout and the proposed crossings identified within the STS.

10.4.19 The potential routes include passing directly across the area to the north-west of the development site, joining the A10 at the existing layby or by passing behind the existing development on Hunters Rise, joining the A10 opposite Regent Avenue.

Opportunity 6: New NMU Green Links Between Rectory Lane and WWHAR

10.4.20 The proposed WWHAR and adjoining shared use route (Opportunity 3) are anticipated to intersect Rectory Lane and Chequers Lane. At Rectory Lane, an overbridge is proposed to maintain connectivity across the WWHAR. Crossing facilities connecting with Chequers Lane, for non-motorised users are also proposed.

10.4.21 Based on the current proposals, there is no connection between Rectory Lane and the WWHAR shared route. Connections between the WWHAR shared route and Rectory Lane would enable pedestrians and cyclists to switch between the shared route and the quiet routes that lead into existing and proposed development.

10.4.22 A connection at Rectory Lane would help to provide grade separated connectivity between West Winch and North Runcton, similarly, a crossing facility for NMUs is needed to retain connectivity at Chequers Lane to minimise the need for travel by vehicle.

10.4.23 Improved connectivity between areas of the development and with local services would help encourage greater active travel and help to resolve some of the severance and connectivity issues currently experienced by the local population.

Opportunity 7: Crossings and NMU Routes On the Southern WWHAR

10.4.24 The proposed development in the southern part of West Winch is on both sides of the A10, this includes a new primary school. New crossing facilities and new/improved routes that connect between the proposed development, the existing A10, the proposed WWHAR shared use route and local facilities



could be provided. This would provide safe active travel routes between the main West Winch development area, existing residential areas, and local services.

Opportunity 8: Non-Motorised User Connections to Watlington

10.4.25 There is an existing shared surface cycleway/footway along the eastern verge of A10 continuing south of West Winch, passing through Setchey and connecting to the Watlington roundabout. There are at grade crossing facilities at the roundabout enabling NMUs to access Watlington Road but the existing route currently terminates at the north edge of Watlington Road and whilst users can continue on carriageway towards Watlington there is an opportunity for improving the quality of connections to Watlington, the rail station and the NCN11 route on the west side of the village. One option would be to remove traffic in one direction from Watlington Road, allowing road space to be reallocated to NMUs.

Opportunity 9: West Winch Mobility Hub

10.4.26 The proposed housing development in the area combined with the existing communities in the area provide an opportunity to provide a mobility hub in the West Winch area. The mobility hub (enhanced bus stop with additional facilities) would incorporate local amenities, such as bike storage facilities, e-scooter hire, bus stop, EV parking, disabled parking bays and micro-mobility charging facilities. This would be located in the centre of the community, close to existing and new residents and crossing facilities as well as West Winch Stores. This would embed micro-mobility and sustainable transport choices at the heart of the community and improve opportunities for local interchange. There is potentially space to achieve this within the existing public highway extents close to the junction of Chapel Lane with A10.

Opportunity 10: Existing A10 Traffic Management

10.4.27 HGVs on the existing A10 were also noted as a concern for local residents in the public consultation feedback. With the new WWHAR in place there is an opportunity to remove HGVs from the village. A weight restriction (except for those accessing destinations within West Winch) is therefore proposed along



a section of the existing A10 to minimise HGV movement and improve residential amenity.

10.4.28 A traffic management opportunity has been identified to support the delivery of the NMU and public transport opportunities identified within the STS. This includes reduced speed limits on the A10, including a 20mph speed limit through the core of the village. The purpose of these measures will be to support delivery of the NMU and public transport opportunities in the area, improve safety and encourage strategic / through traffic to use the Highway Access Road rather than the existing A10.

Aspiration 1: New West Winch Active Travel Northern Corridor

10.4.29 The King's Lynn LCWIP identifies a long-term aspirational route to the north of the West Winch development plan. Potential connections to this future route are proposed within the STS given the desire to provide a route.

10.4.30 A segregated active travel route to King's Lynn via the old railway alignment, could be provided. There are a number of opportunities to connect with the LCWIP route, this includes at grade routes around Hardwick Roundabout, or alternative routes across, under or over the A47.

10.4.31 There is also potential for onward connectivity to Hardwick Road employment area and Bawsey Country Park.

10.4.32 These routes would provide traffic-free NMU routes between West Winch and King's Lynn, removing the existing barriers to active travel in the area.

Aspiration 2: West Winch To Nar Valley Way Active Travel Route

10.4.33 The Nar Valley Way is a signed PRow following the River Nar. Improvements to the route to support use by all pedestrian user groups and cyclists could help to provide improved connectivity for all NMUs. The existing route is a high-quality surface to the north of the A47 and at Lings Lynn Innovation Centre.

10.4.34 Improved connectivity with and along the Nar Valley Way open up an NMU-only route between West Winch and Southern King's Lynn.



Aspiration 3: New Active Travel Route Between Oakwood Corner Roundabout and Watlington Railway Station

10.4.35 There is an existing shared route alongside the A10 between the Hardwick Roundabout and the Oakwood Corner Roundabout. Signs indicate that the cycle route to Watlington Station continues along Watlington Road. There is no formal provision for cyclists.

10.4.36 A new route or improved/increased signage advising of cyclists using this route could help encourage increased cycling to the railway station. This may help remove some of the barriers to active travel choices when travelling to/from Watlington.

10.5 Developing the Bus Strategy

10.5.1 The commercial viability of bus services was noted as a key factor in identifying new and improved bus services within an area. The proposed level of development within the West Winch area combined with nearby employment sites and proximity to King's Lynn are seen to provide opportunities to improve bus service provision within the West Winch area. Proximity to key routes such as the A10, A47 and the proposed WWHAR would support the delivery of new through-services, subject to demand.

10.5.2 This strategy has been developed based on existing policy/guidance, engagement with local communities and stakeholders, and opportunities identified through work completed to date.

10.5.3 The purpose of the bus improvements would be to support mode shift predominantly targeting car users travelling from West Winch into King's Lynn. The strategy aims to increase priority for bus to make sustainable options more attractive and visible to encourage uptake.

10.5.4 The proposed developments at West Winch would substantially increase the bus catchment and make services more viable. However, due to the scale of development proposed it is likely to take a number of years to build out all of the housing. Development phasing is anticipated to be key to understanding the viability of new/revised bus routes and to achieving mode shift.



10.6 Guiding Principles – Public Transport

10.6.1 The LTP identifies a number of improvements to public transport within Norfolk. These have been used to form the basis of the guiding design principles in developing the public transport elements of the strategy. These are:

- Where possible, providing dedicated, segregated lanes for public transport and / or cycling on certain corridors in urban areas.
- Favour improving conditions for public transport through the implementation of measures such as bus priority lanes, giving priority to buses at traffic signals and restrictions of general traffic.
- Growing encouragement for the usage of public transport, cycling, walking and electric vehicles (EVs).
- To make public transport more reliable and possibly change people's perceptions of public transport, prompting greater uptake in its usage.
- Making sure road and rail capacity can cope with growth and that public transport options are available.
- Priority to reducing emissions through public transport and active travel.
- To improve public transport services in rural areas and barriers to improving these services.
- Ensure access by sustainable modes (public transport, walking and cycling) is considered as part of any new housing developments. The need to better integrate public transport with school transport and provide travel training so more young people can access this.



10.7 Public Transport Interventions

10.7.1 The proposed strategy for public transport includes a mix of public transport infrastructure improvements and new public transport services. The combination of new / improved routes, infrastructure improvements and bus prioritisation measures are anticipated to help achieve mode shift and improve connectivity.

10.7.2 The identified public transport improvements are shown in Appendix 4 of the STS (Document Reference **NCC/4.02.04/WWHAR**) and set out in more detail below.

Convert A10 Bus Stops in Bus Laybys to On-Carriageway Stops

10.7.3 The existing A10 is a busy strategic route and suffers from high flows and congestion, a number of bus stop laybys are provided for buses to stop in, maintaining traffic flow.

10.7.4 To provide increased bus priority, reduce the strategic route feeling of the A10 following implementation of the WWHAR and improve connectivity, accessibility, and bus journey reliability, it is proposed to remove the existing bus laybys and provide facilities for buses to stop within the live traffic lane. This will show clear priority to bus as cars will need to wait whilst buses stop to pick up passengers. This will also offer a change of character along the existing A10 once the WWHAR is in place.

10.7.5 This will remove the difficulty that buses currently face when trying to pull back out into traffic and reduce delays to bus services as well as enhancing journey reliability. It would also make the route less desirable for car users, slowing traffic and encouraging through-traffic to use the new WWHAR route. The space currently provided by the laybys could be used to improve facilities at the bus stops or widen footways, this could also make more space for improved bus shelters, with sustainable design, real-time information screens, seating and accessible bus stop facilities.



Rerouting Bus Services to Serve the Development

10.7.6 The proposed changes to the highway network in delivering the WWHAR may result in changes being needed to the existing bus services in West Winch.

The delivery of 4,000 houses may also increase the demand for bus travel within West Winch.

10.7.7 Changes to the existing bus service routes to serve the new development could be considered given the new demand potential. The changes to Rectory Lane necessitate a change in route, this could use the WWHAR and/or serve the new development.

10.7.8 There would also be opportunities to improve bus services to/from North Runcton, that connect with the new development and re-routed services.

New Bus Services / Increased Service Frequency Between West Winch and King's Lynn

10.7.9 The proposed level of development within the West Winch area is likely to result in a significant increase in the local population. Due to its location, it is anticipated that there is likely to be demand between West Winch and King's Lynn for commuting, leisure and onward travel needs. This provides opportunities to provide new dedicated, direct bus services between West Winch and King's Lynn.

10.7.10 Changes to the service frequency and times of operation, giving increased peak time and weekend coverage would also help residents to use public transport for travel to King's Lynn.

10.7.11 There would also be opportunities to improve bus services to/from North Runcton, that connect with the new development and the high-frequency services proposed here.

10.7.12 It is noted the potential demand will be based on delivery and build-out of the development site. This is not currently known. A slower or delayed delivery may result in less sustainable travel choices being adopted before the sustainable measures being implemented.



Regular Bus Service Between West Winch and Watlington

10.7.13 Currently there is only a daily service (service 37) between West Winch and Watlington. As a result, there is limited sustainable travel choices between West Winch and Watlington and limited connectivity with rail services at Watlington Railway Station.

10.7.14 Whilst active travel options have been signed, the distance and nature of provision may be a barrier for some users. A higher frequency bus service may therefore provide an alternative option to travelling to King's Lynn for onward travel by train, where bus travel into King's Lynn may be susceptible to congestion, delay, and journey reliability issues.

10.7.15 Connections to rail services are also available via Watlington. The overall rail journey via Watlington may also be quicker than via King's Lynn railway station and closer to the desire lines for rail passengers as all rail destinations are south of Kings Lynn, so it would be more efficient for rail passengers originating in West Winch to travel south to Watlington.

Bus Services Serving West Winch and the Hardwick Industrial Estate

10.7.16 The Hardwick Industrial Estate is located close to West Winch on the southern side of the Hardwick Roundabout and the A47. There are currently no bus services directly connecting to the industrial estate and the nearest bus stop is in West Winch, approximately 700m from the first business premises within the industrial estate. This is beyond the typical 400m walking catchment for bus stops, so there is an opportunity to enhance bus access to this area.

10.7.17 The new development within West Winch may include workers at the Industrial Estate. As indicated earlier, the new development may also present opportunities for new or re-routed bus services. The proximity of the industrial estate and West Winch development may present opportunities for services to serve the industrial estate. Options for serving the industrial estate directly by bus are limited as it is a long cul-de-sac with no opportunity for through movement for bus. However, a potential solution would be to place stops in closer proximity. Options include a new bus only link to Hardwick Roundabout



connecting A10 with Beveridge Way which is proposed to be signalised as part of the WWHAR proposals. A new bus stop could be placed along the link with a non-motorised user connection also offering more direct connections.

10.7.18 This would allow northbound bus services to avoid the A10 approach to the roundabout, plus a new southbound bus stop further north on the A10 that would help to reduce the walking distance to connect passengers to and from the employment site. This would require third party land and buses would still encounter queues on the Beveridge Way approach in the PM peak hours but keep clear marking could enable buses to enter the flow of traffic to access the signalised arm approach.

10.8 A10 Proposed Measures

10.8.1 The STS Appendix 4 (Document Reference **NCC/4.02.04/WWHAR**) includes a variety of interventions along the existing A10 through West Winch, seeking to enhance opportunities to make the route through West Winch less attractive so that through traffic travelling longer distances is encouraged to use the WWHAR.

10.8.2 Active Travel is encouraged via additional and relocated crossing facilities with localised widening of footways on approach. A variety of signalised and uncontrolled crossings are proposed along the A10 where key desire lines cross the road. These are also designed to coincide and interface with the future masterplan for the WWGA housing.

10.8.3 The A10 package of measures also enhance opportunities for improved access to bus services and improved bus priority with bus stops positioned on carriageway rather than in laybys as currently configured.

10.9 Impact of A10 Proposed Measures

10.9.1 The extent to which A10 traffic diverts to the WWHAR with and without measures on A10 has been tested within the Paramics model as a sensitivity test. This shows that the measures make a significant difference to how much traffic uses the A10 but without them the WWHAR still provides a more



attractive route than A10 for through traffic, even trips heading north and west still use WWHAR without the A10 measures.

10.9.2 The most significant change as a result of the proposed measures affects A10 southbound trips in the AM peak hour where the southbound flows would otherwise be evenly split between A10 and WWHAR without measures on the A10. The sensitivity test showed that without A10 measures 408 SB AM trips use A10 whilst 409 use WWHAR. This is approximately a 50:50 split.

10.9.3 With the proposed A10 measures 111 Southbound AM peak hour trips would use A10 and 706 would use WWHAR. This changes the split so that 86% of AM peak southbound traffic uses the proposed WWHAR.

10.9.4 Based on the results, the scheme is not fully reliant on the A10 measures as traffic would still use WWHAR without the measures but it does make a substantial difference to the extent of diversion of trips and traffic relief offered to the A10.



11 Construction Traffic Impact

11.1 Introduction

11.1.1 This chapter provides an overview of the construction plans and assumptions on HGV and LGV/staff movements to site during the construction period as currently envisaged. Further work will be carried out to develop the construction details beyond the submission of the planning application.

11.1.2 At this stage an Outline Construction Environmental Management Plan (OCEMP) has been prepared as set out within Appendix 3.1 of the ES (Document Reference **NCC/3.03.01/WWHAR**). The OCEMP provides the framework at this for developing the construction proposals and appropriate mitigation measures in more detail.

11.1.3 In advance of appointment of a main contractor to provide early guidance on construction, the Environmental Statement has been prepared on the basis of an assumed construction methodology which is expected to offer a feasible scenario that could be undertaken. However, the detail of the full Construction Environmental Management Plan will be worked up during the determination period of the planning application.

11.2 Construction Phasing

11.2.1 The assumed programme duration is two years, with contract award in January 2025 with the road opening to traffic in late 2027. Site clearance and establishment of compounds is assumed to occur before end of March 2025. The majority of the Proposed scheme (WWHAR road element) can be constructed offline through open countryside in a predominantly rural area to help minimise disruption.

11.2.2 The construction works are split into four distinct sections with the following main areas of work:

- WWHAR main alignment
- Rectory Lane Bridge to offer grade separated crossing over the WWHAR alignment



- A47 dualling between WWHAR and Hardwick Interchange
- Hardwick Interchange works to replace Constitution Hill roundabout with direct slip roads

11.2.3 The works will be carried out in phases, with appropriate traffic management measures in place to facilitate safe construction access. Measures and restrictions will also be put in place on the surrounding network to protect members of the public from highway safety issues where there is increased risk of conflict with construction vehicles.

11.2.4 The WWHAR link from A47 to A10 is assumed to be constructed to base course prior to the A47 dualling works and Hardwick roundabout works. The WWHAR alignment itself can then be used as an internal haul road for import of construction materials and export of arisings and waste with minimal construction traffic impact on West Winch village.

11.2.5 There is a proposed online roundabout is to be located at the interface between WWHAR and A47. This will need to be constructed with traffic management in place to allow shuttle working whilst the carriageway is reduced to single lane working at times.

11.2.6 Intermediate roundabouts along the Proposed Scheme main alignment would be constructed as the scheme is built out.

11.2.7 Public Rights of Way (PRoW) and roads crossing the scheme will be subject to temporary closures at times during construction. Appropriate traffic management measures and signage will be installed on A47 and locations close to the construction site accesses for the Proposed Scheme. However, access will be retained where possible for those with land in the immediate vicinity of the site.

11.3 Defining the Peak Construction Phase

11.3.1 This assessment is based on the peak period of construction (referred to as the busy period). This is assumed to occur during the first main earthworks season when about 70-80% of earthwork volume is assumed to be shifted



to/from site. The optimum time of year for earthworks is expected to be April to September. The remaining 20-30% of imported fill and arisings are assumed to be transported on or off site in the second earthworks season in the same months the following year.

11.3.2 Site hours of operation are generally assumed to be 7.30am-5.30pm Mon-Fri and 8am-1pm Saturdays. No works will be carried out on Sundays, without prior agreement with the Local Planning Authority. The number of staff required on site would comprise a basic team of 14-16 full time equivalent office staff, increasing to 35 with part time and temporary staff to supervise major activities.

11.3.3 As a worst-case scenario, all staff working at the site and all LGV movements are assumed to travel to site between 7am and 9am on a typical weekday during the peak construction phase and depart from the site between 4pm and 6pm. All HGV movements are assumed to be spread evenly across the site working hours covering a 10 hour day. HGV routes will be restricted to designated HGV suitable routes including A10, A47, A17, A1 and A149.

11.4 Construction Access Routes

11.4.1 The main internal haul road will occupy the footprint of the Proposed Scheme main carriageway south of A47. This will connect the A47 to A10 south of West Winch, allowing materials to be delivered and moved, with minimal impact on the minor roads within the surrounding highway network. The permitted construction traffic access routes are shown in **Figure 11-1**.

11.4.2 For imported materials to supply the capping layer materials, various potential local suppliers have been identified close to the site to the east of West Winch. The typical vehicle for transporting capping material are assumed to carry 20 Tonnes per vehicle as standard loads. The associated vehicle movements will be routed via A47 east.

11.4.3 Other imported materials during the peak construction period are assumed to be imported from sites in the west for example Grantham via A47, A17 and A1.



11.4.4 There are various licenced recycling companies located to the east of the site in the A47 corridor, where exported material can also be disposed of. Vehicle movements to and from the site are expected to have a standard maximum load capacity of 20T assumed. The associated vehicle movements will be routed via A47 to access the local quarry sites.

11.4.5 The existing A10 will need to be used for a short period at the start of construction for access to the south of the Proposed Scheme main alignment. However, reliance on the A10 will be minimised once the WWHAR internal haul route and Rectory Lane bridge is in place. For access to Rectory Lane construction compound, the WWHAR haul road will be used with minimal use of Rectory Lane within the village of West Winch.

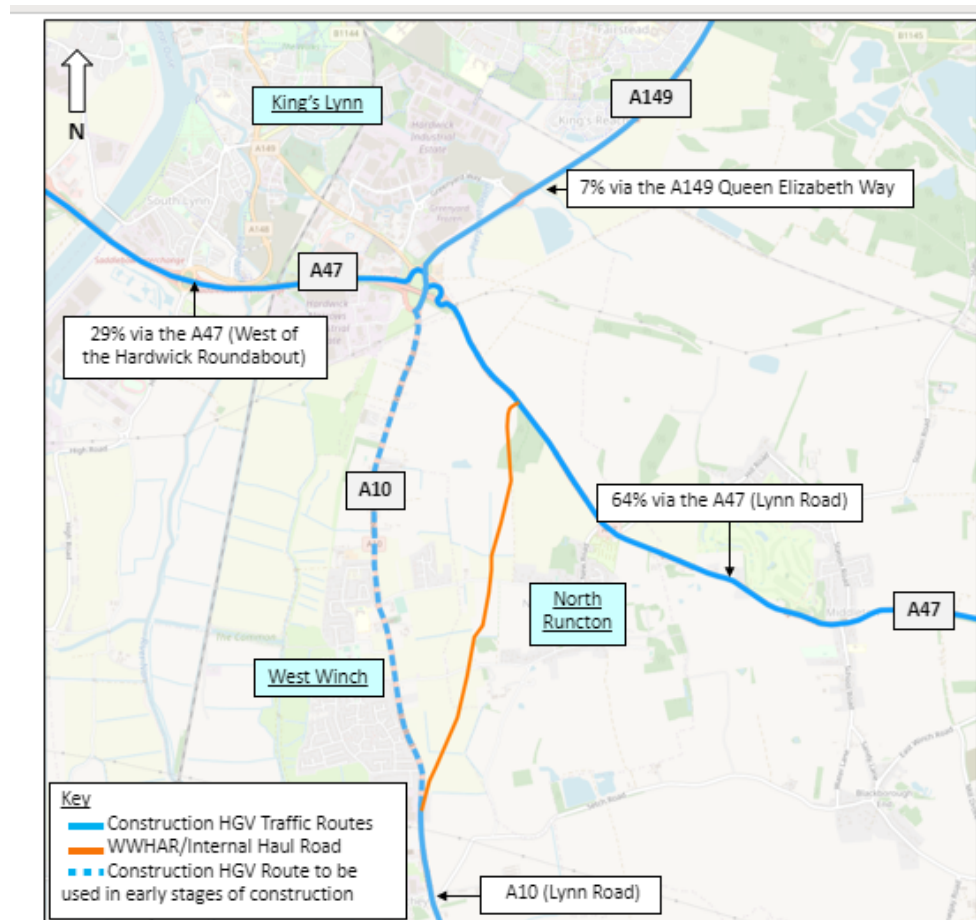
11.4.6 Chequers Lane can be used for east-west movement between West Winch and North Runcton during the Rectory Lane bridge works, then once the Rectory Lane bridge is in place, Chequers Lane users can be diverted to Rectory Lane.

11.4.7 Based on a review of potential material source locations and discussions with the Contractor it has been assumed that for the duration of construction, the following split of construction HGV movements will occur once the WWHAR internal haul road is in place:

- 64% of construction vehicles will access the Proposed Scheme site via the A47 (approaching from the east of the site).
- 29% of construction vehicles will access the Proposed Scheme site via the A47 (approaching from the west of Hardwick Roundabout)
- 7% of construction vehicles will access the Proposed Scheme site via the A149 Queen Elizabeth Way.



Figure 11-1 Proposed HGV Access Routes



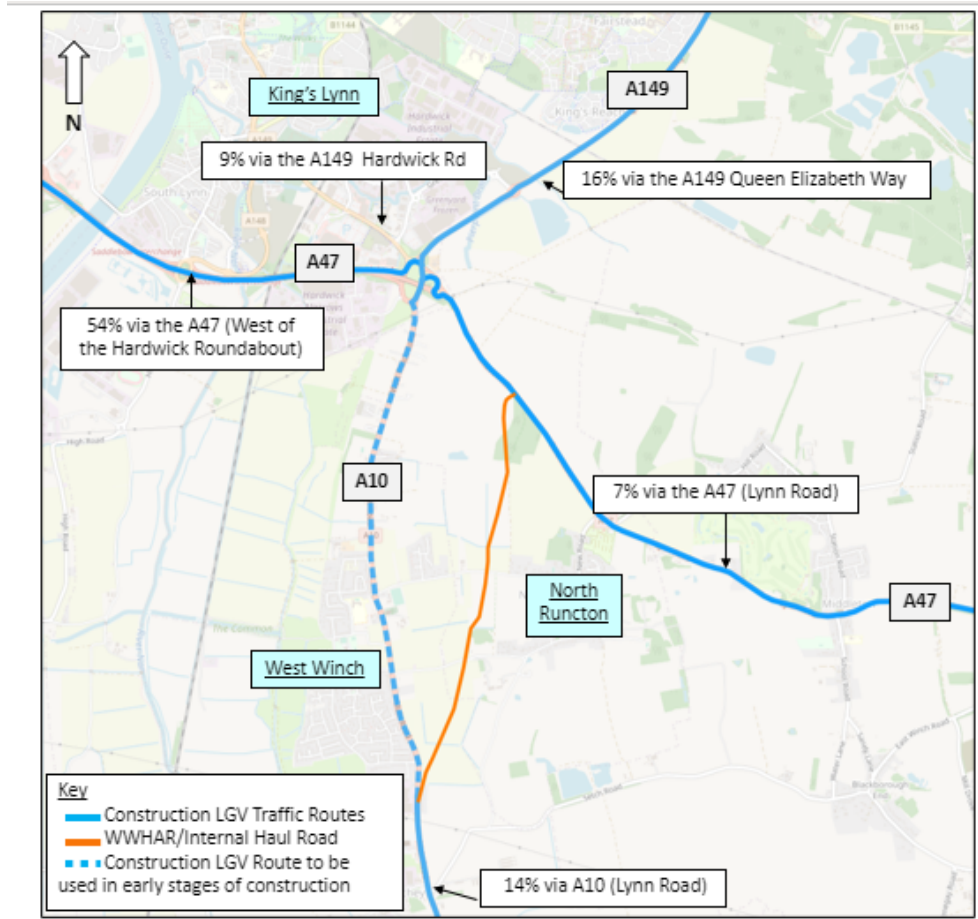
11.4.8 Staff travel to site and LGV movements on the network are predicted to be assigned to the local network as follows (shown in **Figure 11-2**):

- 7% of construction worker and LGV vehicles will access the Proposed Scheme site via the A47 (approaching from the east of the site).
- 54% of construction worker and LGV vehicles will access the Proposed Scheme site via the A47 (approaching from the west of Hardwick Roundabout).
- 16% of construction worker and LGV vehicles will access the Proposed Scheme site via the A149 Queen Elizabeth Way.
- 14% construction worker and LGV vehicles will access the Proposed Scheme site via the A10 West Winch Road/Lynn Road.



- 9% construction worker and LGV vehicles will access the Proposed Scheme site via the A149 Hardwick Road.

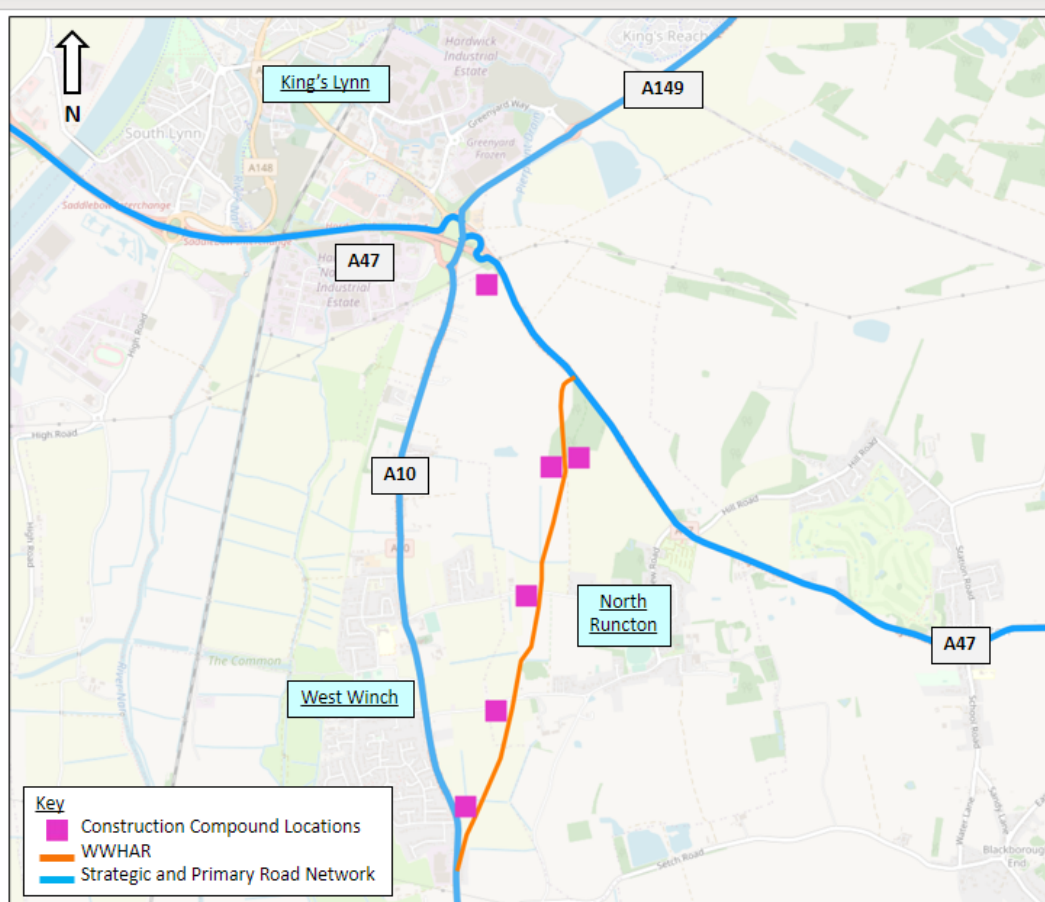
Figure 11-2 Proposed Staff and LGV Access Routes



11.4.9 There will be various site compounds as shown pink in **Figure 11-3** below, two of which would be main site compounds - one at the north end of the WWHAR alignment and the other at the southern junction with A10, where the majority of welfare, car parking and site offices will be located. In addition, two satellite compounds will be located at Hardwick Roundabout and at the Rectory Lane bridge for layout and storage of materials.



Figure 11-3: Proposed Site Compound Locations



11.5 A47 Works and Temporary Overnight Closure

11.5.1 The Applicant has worked closely with National Highways throughout the development of the Proposed WWHAR Scheme and Option design and selection stages of the project.

11.5.2 National Highways have stipulated that the A47 as part of the strategic road Network will need to remain open throughout the day from 6am-8pm but overnight works may be carried out overnight and occasional weekend closures may also be required to achieve tie in works.

11.5.3 There will be traffic disruption whilst the Constitution Hill roundabout is being removed and new slip roads installed. It is anticipated that the existing roundabout could be converted temporarily to a signalised 'T' junction whilst the roundabout is revised. Twelve weekend closures of the A47 will be required for the slip road works at Hardwick Roundabout.



11.6 Construction Traffic Impact

11.6.1 Construction traffic for the project is separated into contractor vehicles (personal vehicles for travelling to site, bringing tools and box vans) which fall under the Light Goods Vehicle (LGV) category, and Heavy Goods Vehicles (HGV) which are generally used for transporting materials and heavy machinery to and from site.

Non-Motorised User impacts

11.6.2 Non-Motorised User (NMU) impacts of construction traffic are considered in the ES Chapter on Traffic and Transport (Document Reference **NCC/3.16.00/WWHAR**). However, as all of the routes proposed for HGV movement on the surrounding road network are currently part of the Strategic Road Network or primary A Roads in the NCC local road hierarchy, they have zero or very low levels of NMU usage or have adequately wide footways, so not sensitive.

11.6.3 Impacts on Rectory Lane and Chequers Lane are able to be avoided by virtue of the WWHAR main alignment being used as a haul route during construction. This minimises the need for HGV to access the Rectory Lane bridge site through the village of West Winch.

11.6.4 The existing NMU routes around the Hardwick Interchange are predominantly to the west side of the junction, and whilst these links may experience some minor disruption during the works, the existing routes are located away from the Constitution Hill works on the east side of the junction, so conflicts with NMUs will be minimised.

Vehicular traffic impacts

11.6.5 The proposed construction traffic effects, based on the above assumptions are considered in comparison with the 2018 modelled base year flows which is sooner than the peak period of construction in 2025 but offers a robust basis for assessment. The total peak hour vehicle flows during the busy period of construction have been added to the 2019 base year flows.



11.6.6 A flow diagram showing the average daily and peak daily construction traffic is enclosed in **Appendix 9** (Document Reference **NCC/4.01.09/WWHAR**).

11.6.7 Projected peak construction related movements have been assigned to the local network based on approved construction routing and likely site access points.

11.6.8 Construction traffic is assumed to use the Strategic Road Network on its journey to site on approach via A47 and A17 west or A47 east or A149 north east which function as part of the primary route network and are suitable for HGV movement. It is considered appropriate that construction traffic may arrive via these routes.

11.6.9 The peak hour construction traffic flows for both AM and PM peak periods is shown in **Table 11-1** and shows that A47 Access points are expected to experience minor increases in HGV and LGV movement as these are the proposed locations of the main site accesses for construction traffic. As the majority of HGV movement has origins and destinations to the east of the site or routed via the WWHAR internal haul road, there is greater impact on the A47 east of Hardwick Interchange. However, these locations are not immediately adjacent to residential properties and other sensitive land uses such as schools or residential care homes, so are not considered to be sensitive links.



Table 11-1 Construction Traffic – Busy Period Maximum Peak Hour Vehicle Movements (two-way) comparison with 2019 Base Flows

Link	2019 Base (All Vehicles)	HGV	LGV	Total	Impact
A47 (West of Hardwick Roundabout)	4522	7	23	30	0.67%
A47 (Hardwick Roundabout)	2592	7	23	30	1.17%
A149 Queen Elizabeth Way	3211	1	7	8	0.25%
A10 West Winch Road	2769	4	17	21	0.77%
A47 Constitution Hill (North of New Road)	2273	4	17	21	0.93%
A47 Constitution Hill (South of New Road)	2273	16	3	19	0.84%
A10 Lynn Road (south of Rectory Lane)	2573	4	17	21	0.82%
A10 Lynn Road (south of Chequers Lane)	2321	4	17	21	0.91%
A10 Lynn Road (North of Setch Road)	2338	0	6	6	0.26%
A149 Hardwick Road (East of Railway)	2294	0	4	4	0.17%
A47 (East of North Runcton)	2223	16	3	19	0.85%
A149 Hardwick Road (West of Railway)	2815	0	4	4	0.14%

11.6.10 The 2-way busy period total peak hour flows for HGVs, LGVs and total vehicles, as a result of construction of the Proposed Scheme, is provided in **Table 11-1** above.

11.6.11 **Table 11-2** below shows the HGV component as a percentage of total HGVs for an average hour of the day, assuming 10 hours per day site operation.



Table 11-2 Construction Traffic – Busy Period Average Hour HGV Movements (two-way) comparison with 2019 Base Flows

Link	2019 Base (All Vehicles)	HGV	Impact
A47 (West of Hardwick Roundabout)	408	7	1.81%
A47 (Hardwick Roundabout)	213	7	3.48%
A149 Queen Elizabeth Way	172	1	0.58%
A10 West Winch Road	267	4	1.57%
A47 Constitution Hill (North of New Road)	150	4	2.80%
A47 Constitution Hill (South east of New Road)	150	16	10.68%
A10 Lynn Road (south of Rectory Lane)	266	4	1.58%
A10 Lynn Road (south of Chequers Lane)	263	4	1.59%
A10 Lynn Road (North of Setch Road)	265	0	0.00%
A149 Hardwick Road (East of Railway)	114	0	0.00%
A47 (East of North Runcton)	150	16	10.68%
A149 Hardwick Road (West of Railway)	98	0	0.00%

11.6.12 A 10 hour working day is assumed, with an equal hourly split of HGV movements throughout the day. However, LGV and workforce arrivals and departures are more likely to occur at the start and end of the day, with 50% assumed to arrive or depart in each of the AM and PM two hour period, so approximately 25% of staff and LGV construction vehicles would be on the network during either of the highway peak hours.

11.6.13 To understand the relative impacts of the construction traffic increases, the additional construction traffic volumes have been added to the base year 2019 traffic flows.

11.7 Construction Traffic Impacts and Mitigation

11.7.1 Based on this analysis it is evident that the total increase in construction traffic movements on the strategic ‘A’ roads at peak times would be within typical daily variation of traffic (+/- 10%) for primary and Strategic roads, so would be



a tolerable impact that is unlikely to cause concern or create significant operational effects on the network.

11.7.2 Impacts are expected to be higher to the east of the site on A47 as this is assumed to be where the majority of materials imported will be taken from and the majority of arisings which cannot be re-used on site would be taken to for disposal.

11.7.3 According to the Norfolk Minerals and Waste Development Framework (2017), the East Winch site is estimated to generate 3 million tonnes of sand and silica. As this is already a locally permitted site which is expected to generate a significant amount of HGVs directly accessed via A47, impact on the local and Strategic Road Network would be unlikely to be noticeable.

11.7.4 The magnitude of change is therefore not realistically expected to be noticeable as the quarry site would already be generating many HGV movements per day as part of its permitted activity and many of these would be routed via A47 in any case. The sensitivity of the link is also very low as such the effect will be minor.

11.7.5 The roads affected are all designated HGV routes and there are very few residential properties close to this route so it should be suitable for tolerating the anticipated level of additional HGV movement during construction at peak times. The predicted effects of construction are expected to be managed adequately with the appropriate traffic management, scheduling and monitoring that will be explained in the detailed Construction Environmental Management Plan (CEMP) during the later stages of works planning.

11.8 Road Safety Impact during construction

11.8.1 A review of Personal Injury Accidents in the last five years has been carried out for the construction access routes set out above. Three locations were identified as having high levels of accidents:

- Hardwick Roundabout (39) – where 8 serious and 31 slight collisions were reported.



- Pullover Roundabout (46) – where 8 serious and 38 slight collisions were reported.
- A10 (34 – from Hardwick Roundabout to extent of scheme) – where 5 serious and 29 slight collisions were reported.

11.8.2 Impacts on the above sites will be minimised with the majority of construction vehicle movements routed to and from the east of the site and those from the west able to use the main carriageway of A47, so would avoid the Pullover and Hardwick Interchanges, so only A149 and A10 HGVs would be routed via the main gyratory of the Hardwick Interchange. Once the WWHAR internal haul road is in place, the existing A10 north of Gravelhill Lane would also have low utilisation by construction HGVs.

11.8.3 Traffic management measures will be imposed on A47 during construction of the Proposed Scheme – this is likely to include signal control at junctions and a temporary reduced speed limit will be put in place. These measures should minimise highway safety risk on A47. Traffic management on A10 at the southern end of the Proposed Scheme would also ensure safe access and egress from the proposed compounds.

11.9 Construction Environmental Management Plan

11.9.1 To mitigate the traffic and transport effects of the construction of the proposed development the full CEMP will include a Construction Traffic Management Plan (CTMP). As set out within the OCEMP Appendix 3.1 of the ES (Document Reference **NCC/3.03.01/WWHAR**) the full CEMP and associated CTMP will be secured by planning condition. The full CEMP will set out measures that the contractor will be required to comply with, including:

- Construction Traffic Routing Restrictions;
- Finalised maximum daily vehicle flows for HGVs and LGV movements
- Details of abnormal loads planned
- Hours of operation;



- Site Clearance;
- Vehicle Cleaning Facilities;
- Site Access and Amenities plan;
- Contractor parking;
- Construction Period, Phasing and Hours of Site Operation;
- Laydown areas;
- Scheduling; and,
- Monitoring and Review.

11.10 A47 Traffic Management Measures

11.10.1 During the proposed A47 dualling works, traffic management (TM) and a temporary speed limit reduction will be in place for a period of around 1 year,

11.10.2 Shuttle working with traffic signals would also enable the safe construction of the proposed new online WWHAR roundabout. The A47 works can commence once the WWHAR proposed highway alignment is in place and changes to the Hardwick Interchange have been made.

11.11 Abnormal Loads

11.11.1 A small number (4-6) escorted abnormal loads (due to length or width exceeding the standard legal articulated vehicle parameters) would be required for the delivery of bridge components at Rectory Lane. Where possible, these will be carried out during times of low traffic movement on the surrounding highway network.

11.11.2 Abnormal Loads, for example viaduct sections and crane installation equipment, should arrive and depart from site at times of day when the local highway network is otherwise uncongested and specifically avoiding busier highway periods of 7am-10am and 3pm-7pm on weekdays and 10am-4pm on Saturdays. Overnight delivery of abnormal loads will be carried out where



possible to minimise conflicts with other road users from a highway capacity and safety point of view.

11.11.3 Any such abnormal loads would need to be routed via the A47 which is part of the SRN (Strategic Road Network), and to a lesser extent the A10 and the internal haul road. A specialist abnormal loads contractor assessment would need to be carried out on the suitability of the routes prior to finalising any applications for abnormal loads.

11.11.4 Where possible the number and category of abnormal loads would be minimised by dividing loads into smaller components and assembly on site will also be considered.

11.11.5 The movement of large (abnormal) loads is regulated by National Highways and will be subject to separate agreement with the relevant highway authorities and police through the Electronic Service Delivery for Abnormal Loads (ESDAL) system.

11.11.6 The contractor will be required to comply with statutory regulations and consult with the relevant highway authority, bridge owners, and the police as required.

11.11.7 The contractor must give sufficient advance warning to obtain the necessary clearances from the police, highway, and bridge authorities. Those abnormal loads applications falling under the Special Order category must be completed ten weeks before the scheduled date of the move.

11.11.8 The notification requirements differ depending on the weight, length, and width of the abnormal loads which will be determined prior to making an application.

11.11.9 Prior to notification, the contractor must carry out topographical surveys, swept path analysis and condition surveys as required to plan and inform the application process.

11.11.10 The timing of the abnormal load deliveries will be discussed and agreed with the highway authority to minimise delay for other road users and to minimise



risk to highway users. The highway authority will dictate the timing of the abnormal load deliveries along the highway, and this may be during overnight periods.

- 11.11.11 The weight, length, and width of the abnormal loads will be communicated to the highway authority, and the routing of deliveries will be agreed with the Highway Authority prior to any movements on the local road network.
- 11.11.12 The delivery of abnormal loads would typically be undertaken in convoy and under escort. Where abnormal loads require the full width of the carriageway or for unusual manoeuvres at junctions, appropriate temporary road closures and traffic management will be put in place as appropriate to maintain the safety of other road users and minimise delay.
- 11.11.13 Where abnormal loads movements to the Site are planned to occur outside of core working hours, and in areas of high sensitivity (i.e. through residential areas or in close proximity to residential properties), the need for additional specific management measures, their nature, locations and timings will be discussed and agreed with the Highway Authority and the relevant planning authority environmental health officer.
- 11.11.14 In the interests of sustainable construction, there is a need to re-use excavated earthwork material on site, where it is suitable for re-use. The design and constructability of the Proposed Scheme has been considered seeking to achieve an overall balance of cut and fill to minimise the need to import or export material. Excavated material will be stockpiled on site and moved within the site using the internal haul road where possible. Sustainable waste management practices will also be employed on site to minimise the off-site movements required to dispose of materials.

11.12 Minimising Construction Staff Travel to Site

- 11.12.1 In order to manage staff travel to site, a Construction worker travel Plan (CWTP) will be put in place. The Principal Contractor will consider options such as the provision of a shuttle bus or initiatives to promote car sharing as



reasonably practicable. The suitability of this as a solution depends on worker home locations. Where possible, staff will car share to minimise the number of LGV vehicles travelling to and from site and optimise the space on site needed for vehicle parking. This will also help minimise traffic impacts of worker travel to site. Due to the site operating hours and shift patterns, peak hours for staff travel to site are generally outside of the AM and PM highway peak hours on the surrounding road network.



12 Summary and Conclusions

12.1 Summary

12.1.1 A Transport Assessment (TA) has been prepared for the Proposed West Winch Housing Access Road (WWHAR) Scheme to consider the traffic and transport implication of the Proposed Scheme on the surrounding highway and multi-modal transport network. The scope of the Transport Assessment was discussed with the Local Highway Authority and National Highways. The approach accords with the Safe Sustainable Development methodology published by Norfolk County Council (2022) and DfT Circular 01/22.

12.1.2 Applicable local and national transport and sustainable development policies have been reviewed and taken into account within the assessment. These include NPPF 2021 and recently published DfT guidance such as Decarbonisation of Transport and Gear Change as well as local policies which are enshrined within the Sustainable Transport Strategy for the scheme (Document Reference **NCC/4.02.00/WWHAR**).

12.1.3 The NCC Safe Sustainable Development guidance July 2022 sets out the following principal Aims that the scheme should be measured against. below outlines how these aims have been addressed by the proposed scheme:

Table 12-1 Alignment with NCC Safe Sustainable Development Guidance

Number	Aim	Scheme Fit
1	Climate change & Net Zero - New development and its travel impacts need to contribute to the county council's commitment to decarbonisation.	The Schemes commitment to addressing decarbonisation is addressed within Chapter 5 of the Environmental Statement (Document Reference NCC/3.05.00/WWHAR .)



Number	Aim	Scheme Fit
2	<p>Transport Sustainability - Minimising travel to ensure people can access facilities they need by appropriate transport modes, encouraging walking, cycling and public transport use and reducing the use of private cars especially for shorter journeys</p>	<p>Methods to encourage walking, cycling and public transport use are outlined within the WWHAR's Sustainable Transport Strategy and wider mitigation strategy (Document Reference NCC/4.02.00/WWHAR).</p>
3	<p>Transport Sustainability - To encourage residents to explore active and healthier ways to travel.</p>	<p>Methods to encourage walking, cycling and public transport use are outlined within the WWHAR's Sustainable Transport Strategy and wider mitigation strategy (Document Reference NCC/4.02.00/WWHAR).</p>
4	<p>Rural Diversification - To support agricultural enterprises and the rural economy, by encouraging other appropriate forms of development.</p>	<p>By providing a more suitable highway alignment for large vehicle movement, access to rural farms will be enhanced.</p>
5	<p>To support national targets relating to the percentage of electricity that should be provided by renewable energy</p>	<p>Not applicable</p>
6	<p>To keep commercial vehicles away from areas where their presence would result in danger/unacceptable disruption to the highway/or cause irreparable damage.</p>	<p>The WWHAR provides a more suitable alternative for large commercial vehicles to access King's Lynn and the A47 from the A10 without having to route through the village of West Winch. Construction traffic will also be confined to strategic roads and primary road network links (A47, A10, A149, A17) which are suitable for HGV movement.</p>



Number	Aim	Scheme Fit
7	Development needs to be serviced in a safe manner which does not result in any detriment to the free flow of traffic or public safety. In accordance with the NPPF, it also needs to allow for the efficient delivery of goods.	The WWHAR will improve the efficiency of commercial deliveries in Norfolk by providing additional capacity to the strategic road network and providing a more intuitive layout that is easier to navigate at the Hardwick Interchange.
8	To ensure development conforms to parking policies and standards which take into account strategic and local objectives.	Not applicable
9	To ensure the Major Road Network and Principal Road Network (PRN) can safely cater for sustainable development, which, if not suitably addressed, would otherwise cause fundamental road safety and accessibility concerns.	This TA has demonstrated that the WWHAR can accommodate for future development growth of up to 4,000 additional dwellings at the WWGA (Do-Something Scenario 2). Without the WWHAR in place, 3,700 of the dwellings would not be possible.
10	New development within Norfolk of regional/national importance shall promote the use of rail and water.	Opportunities for improved access to the Watlington and Kings Lynn rail stations are considered in the STS (Document Reference NCC/4.02.00/WWHAR)

12.1.4 DfT Circular 01/22 also states in paragraph 12 that ‘New development should be facilitating a reduction in the need to travel by private car and focused on locations that are or can be made sustainable. In this regard, recent research on the location of development found that walking times between new homes and a range of key amenities regularly exceeded 30 minutes, reinforcing car dependency. Developments in the right places and served by the right sustainable infrastructure delivered alongside or ahead of occupancy must be a key consideration when planning for growth in all local authority areas’.



- 12.1.5 Aligned with the above, the Proposed WWHAR Scheme helps to unlock and enable delivery of strategic housing growth at West Winch which is a sustainable location for growth because it is located within 30 minute walking and cycling catchment of the majority of jobs across the district – a high concentration of which are located on the south east edge of Kings Lynn. This should make the future housing growth as accessible as possible by a wide range of modes, especially when supported by the Sustainable Transport Strategy measures in addition to the Proposed WWHAR itself.
- 12.1.6 A Traffic Impact Assessment has been carried out using the strategic KLTM transport model to identify the potential rerouting of traffic in response to the scheme. The Kings Lynn Transport Model (KLTM) is an existing SATURN model which has been updated to a 2019 base year with comprehensive surveys across Kings Lynn and West Winch with further surveys carried out in October 2019.
- 12.1.7 The KLTM model shows how traffic will be likely to re-route and alter existing journey patterns. These traffic flows were then added into a Paramics model, which has been used to identify whether any measures are necessary to mitigate the traffic impacts of the scheme.
- 12.1.8 The TA considers a design year of 2037 which is 10 years after opening for consistency with the Local Transport Plan 4 which was recently adopted by NCC and has a horizon year of 2036.
- 12.1.9 Turning movement data has been extracted and reviewed for each of the junctions within the TA scope to understand how the highway network performs with and without the Proposed Scheme in place.
- 12.1.10 Across two forecast years (2027 & 2037), three scenarios and two time periods for assessment have been considered:
- DM Scenario: network without the proposed transport scheme and with 300 dwellings at the WWGA.



- DS1 Scenario: network with the proposed transport scheme and with 300 dwellings at the WWGA.
- DS2: network with the proposed transport scheme and with 4,000 dwellings at the WWGA.

12.1.11 The Do Something 1 scenario has been compared with the Do Minimum scenario to understand the impact of the proposed scheme on the surrounding highway network with only the non-dependant development (300 dwellings) at WWGA in place.

12.1.12 The Do Something 2 scenario has been compared with the Do Something 1 scenario and the Do Minimum Scenario to understand the impact of the WWGA on the surrounding highway network and whether the proposed scheme provides sufficient capacity to support the additional 3,700 dependent dwellings at the WWGA.

12.2 Key findings

12.2.1 The junction modelling for the Do Minimum forecast scenario in 2037 shows that the A10 approach to the Hardwick Interchange will experience capacity issues with poor levels of service at peak times. Delays are also likely to increase on the A47 which is a vital part of the Strategic Road Network.

12.2.2 The Proposed Scheme therefore offers the opportunity to improve the operation of the local and Strategic Road Network going forward, as well as providing a new route for some traffic to avoid the Hardwick Interchange.

12.2.3 The detailed junction assessments demonstrate that the majority of junctions within the TA scope are forecast to operate acceptably in the 2037 future year 10 years after opening of the WWHAR. A sensitivity test has also been carried out with the full housing development of 4000 dwellings within the WWGA and this also continues to operate acceptably.

12.2.4 The junctions assessed in the vicinity of the proposed scheme are shown to operate more efficiently with the Proposed WWHAR Scheme in place. The only junction which is predicted to worsen in capacity performance is the



Scania Way junction with A149 Hardwick Road signalised crossroads which already exceeds capacity in the baseline Do Minimum Scenario without the proposed scheme in place. Signal optimisation is proposed to offer some improvement to the junction and a SCOOT re-validation exercise is also proposed, seeking further enhancement to the efficiency of signal operation on the ground.

12.2.5 An Outline Construction Environmental Management Plan (OCEMP) is appended to the Environmental Statement (Document Reference **NCC/3.03.01/WWHAR**). Construction effects have been considered and a mitigation strategy has been defined which can be developed further with more detail to be supplied within the CTMP which would form part of the full CEMP.

12.2.6 The programme for construction is assumed to have a duration of about 24 months starting in early 2025 and ending in early 2027. The construction access routes are predominantly Primary A Roads and links that form part of the Strategic road Network including A10, A47 A149 and A17. Impacts on local roads can be minimised by the provision of an internal haul road route along the main alignment of the Proposed WWHAR Scheme. Once this is in place, the majority of HGV construction traffic will be able to avoid travelling through the village of West Winch, including for access to the Rectory Lane bridge construction site.

12.2.7 The suitability of approach routes to the site compounds have been considered as well as the sensitivity of the links for Non-Motorised Users. With the majority of access routes being located away from pedestrian and cyclist desire lines the risk to NMUs is expected to be low.

12.2.8 Disruption to the Strategic Road Network can also be minimised during working hours and via a small number of overnight closures and weekend works over 12 weekends. Traffic management measures and reduced speed limits will be in place to limit highway safety impacts during construction. With



the proposed measures in place the situation is expected to be suitable for the number of construction HGV and LGV movements travelling to site per day.

12.3 Meeting Scheme Objectives

12.3.1 There are a number of existing transport problems that form the high-level objectives that the Proposed Scheme has been developed to address. These include:

- Supporting housing delivery and employment growth in the region to drive economic growth.
- Enhance the A10's role as a strategic link to support the wider King's Lynn economy.
- Provide a more resilient highway network to improve journey time reliability and safety for all users.
- Reduce the volume of non-local traffic through the village to improve the quality of life of residents of West Winch
- Provide better conditions in West Winch and along the A10 for travel by non-motorised modes to support healthy, inclusive, and sustainable growth.
- Seek to minimise transport-related environmental impacts of the WWGA.

12.3.2 The proposed scheme will offer a more attractive route to and from the A47 than the existing A10 through West Winch. The extent to which this is effective can also be reinforced and more strongly influenced with the inclusion of measures along the existing A10.

12.4 Conclusions

12.4.1 Overall, the TA finds that the proposed scheme is likely to provide operational and capacity benefits to the wider highway network and a Sustainable



Transport Strategy (**Document Reference NCC/4.02.00**) has been prepared to assist with the delivery of the intended scheme objectives.

12.4.2 Therefore, in the context of the NPPF 2023 planning policy requirements, there should be no reason in highways and transport terms for the scheme not to proceed.

12.4.3 Taking into account the above, the TA concludes that the Proposed Scheme should be considered acceptable in terms of highways and transport impact.