A614 – A6097 Major Road Network Junction Improvements

Transport Assessment

FINAL

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Quality information

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Table of Contents

1. Introduction

1.1 Overview

1.1.1 AECOM has been commissioned by VIA East Midlands (on behalf of Nottinghamshire County Council, NCC) to prepare a Transport Assessment (TA) supporting the A614 – A6097 Major Road Network junction improvements.

1.1.2 The scheme is formed of junction improvements at six key locations on the A614 – A6097 corridor. These junctions are:

- A614 / A616 / A6075 roundabout (hereafter referred to as the Ollerton roundabout);
- A614 / Mickledale Lane crossroads (hereafter referred to as Mickledale Lane);
- A614 / Mansfield Road roundabout (hereafter referred to as the White Post roundabout);
- A614 / A6097 priority junction (hereafter referred to as the Warren Hill junction);
- A6097 / A612 Nottingham Road / Southwell Road roundabout (hereafter referred to as the Lowdham Roundabout); and
- A6097 / Kirk Hill signalised crossroads (hereafter referred to as the Kirk Hill junction).

1.1.3 The scheme aims to support planned housing developments along the route in Bilsthorpe, Ollerton and Blidworth; reduce peak period traffic congestion for the benefit of commuters and local businesses; and improve road safety for all users. The locations of the junctions are shown in Figure 1.1, overleaf.

1.2 Purpose of Report

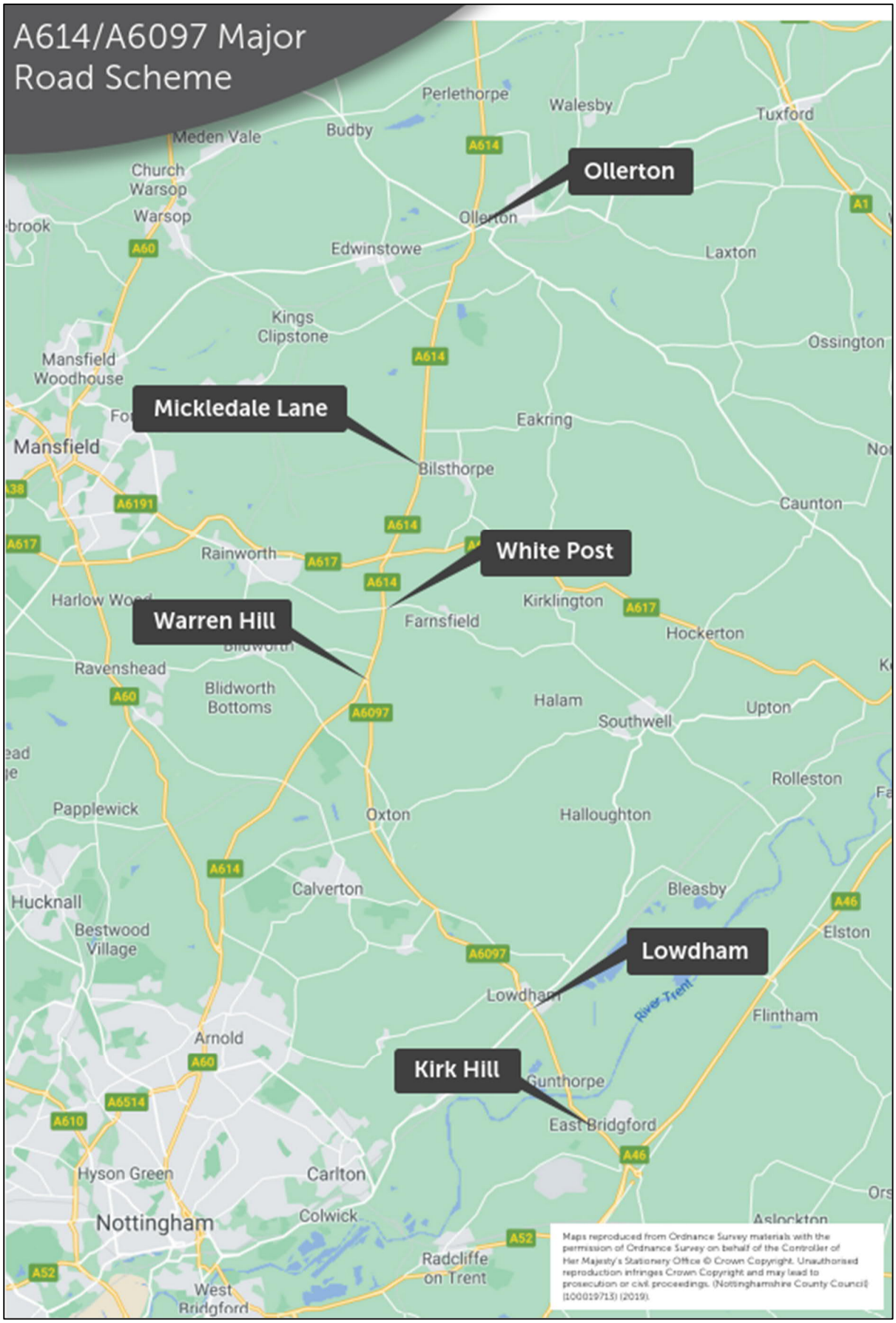
1.2.1 The purpose of this TA is to support the planning application(s) for the junction improvements.

1.2.2 Prior to preparing this TA, a series of technical reports were prepared to support the Outline Business Case (OBC) that was submitted to the Department for Transport in December 2020. These reports included an Options Assessment Report (OAR), Traffic and Economic Assessment Report (TEAR), Wider Economic Impact Assessment, and overall scheme Business Case[1].

1.2.3 Each of these individual reports are available elsewhere; however, for the purposes of the planning application they have been summarised into this single TA document for ease of use by stakeholders and decision makers.

[1] All documents are available to view here: https://www.nottinghamshire.gov.uk/transport/roads/a614

Figure 1.1: Locations of the Scheme Junctions



1.3 Scheme Objectives

1.3.1 The scheme objectives are to:

- reduce congestion;
- support economic growth and housing delivery;
- support the SRN;
- reduce journey time delays and variability; and
- support all other road users.

1.3.2 **Reduce congestion and journey time delays:** A number of intersections along the A614/A6097 currently suffer from significant levels of congestion, particularly at peak time periods. The capacity improvements that are proposed along this corridor will improve journey times, lessen delays and improve journey time reliability.

1.3.3 **Support economic growth and housing delivery:** The scheme package will increase capacity along the corridor which in turn can accommodate new and additional trips arising from significant housing developments that are to be constructed in future years.

1.3.4 The A614/A6097 MRN corridor is a strategic priority at both the county and district level, with a commitment to overcome the adverse effects of congestion currently being observed at the major junctions. Without significant investment to address these congestion problems, the A614 / A6097 corridor will struggle to support economic growth, housing growth and new employment opportunities.

1.3.5 Improved journey times on the A614/ A6097 MRN corridor is also expected to lead to increased economic efficiencies and improved competitiveness for businesses through cost savings, as well as increased certainty and ability to plan as traffic conditions on the local road network becomes more reliable. The businesses currently based in Bilsthorpe will undoubtedly benefit from improved access and reliability to the A614/A6097 MRN corridor.

1.3.6 **Support the Strategic Road Network:** The scheme will add resilience to the route which will support the SRN during major works or incidents on the M1, A1 and A46.

1.3.7 **Support all other road users:** The scheme will improve crossing facilities for pedestrians and cyclists. At present there is no positive provision at either the Ollerton and Lowdham roundabouts. The Scheme includes traffic signal controlled crossings (Toucan crossings - for both pedestrians and cyclists) at Lowdham and Ollerton junctions, and provides an improved bridleway link and Pegasus crossing (i.e. which can be used by equestrians) at Kirk Hill junction.

1.4 Policy Background

1.4.1 **National Planning Policy Framework, 2021:** The NPPF outlines a focus on building a strong and competitive economy, acknowledges the role of transport in facilitating development and contributing to wider economic growth, sustainability and health objectives. Additionally, the NPPF has a focus on the support of sustainable travel, enabling a reduction in congestion.

1.4.2 The NPPF document confirms that the purpose of the planning system is to contribute to the achievement of sustainable development. It explains at paragraph 8 that there are three overarching objectives to achieving sustainable development which are interdependent and need to be pursued in mutually supportive ways:

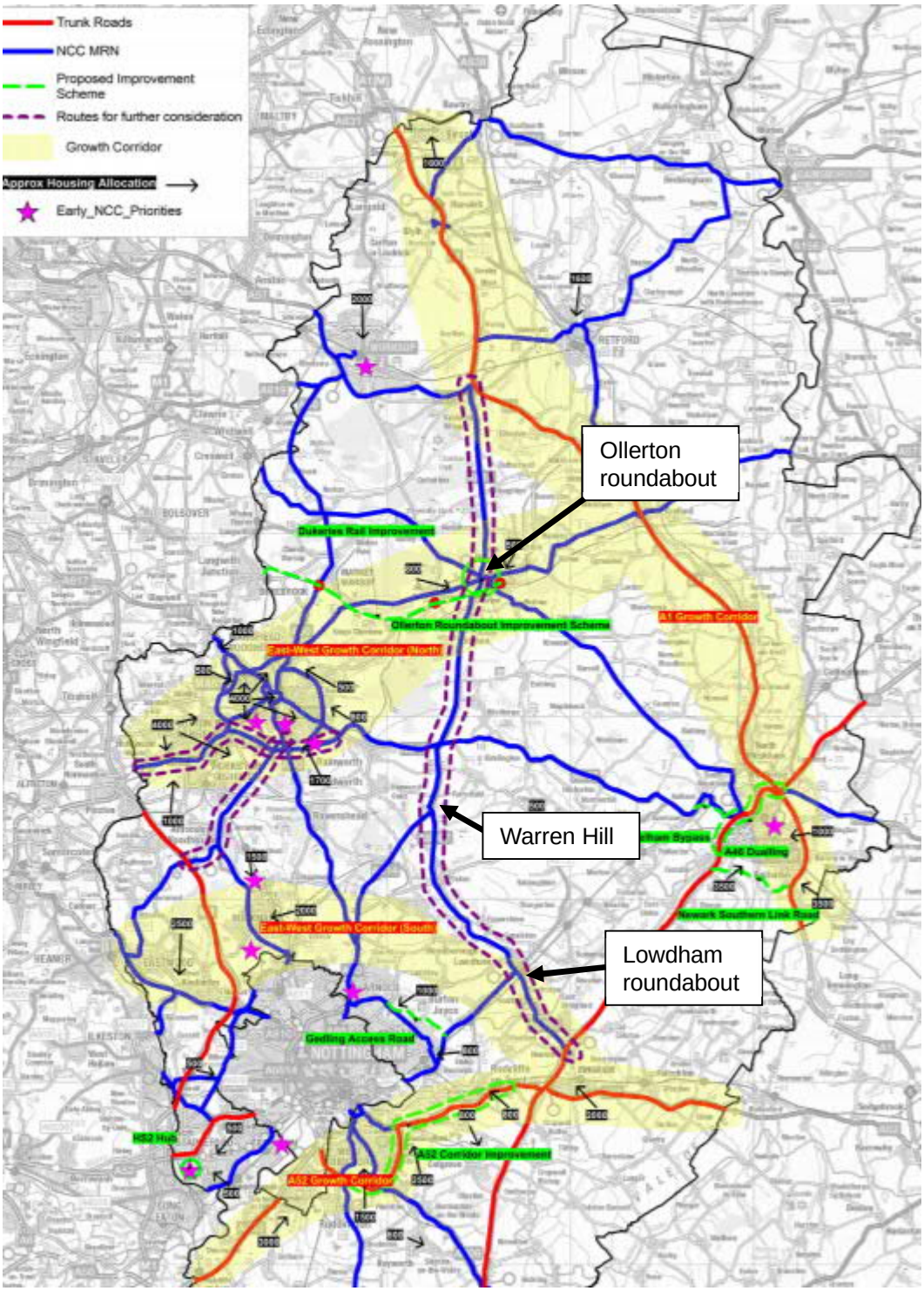
- Economic - to help build a strong, responsive and competitive economy;
- Social - to support strong, healthy and vibrant communities; and
- Environmental - contributing to protecting and enhancing the natural, built and historic environment

1.4.3 It is considered that the proposed A614 / A6097 MRN improvements are entirely consistent with and would contribute towards achieving the objectives of the NPPF 2021.

1.4.4 **Major Road Network:** As part of the Transport Investment Strategy, the Government has committed to creating a Major Road Network (MRN), which identified important national routes below the level of Strategic Road Network (managed by Highways England). The current MRN includes both the A614 and A6097 as shown on Figure 1.2. As such, improvement of this corridor is consistent with current Government thinking on the improvement of important national 'A' roads which will;

- reduce congestion;
- support economic growth and rebalancing;
- support housing delivery;
- support all road users; and
- support the Strategic Road Network

Figure 1.2: MRN and growth corridors in Nottinghamshire.



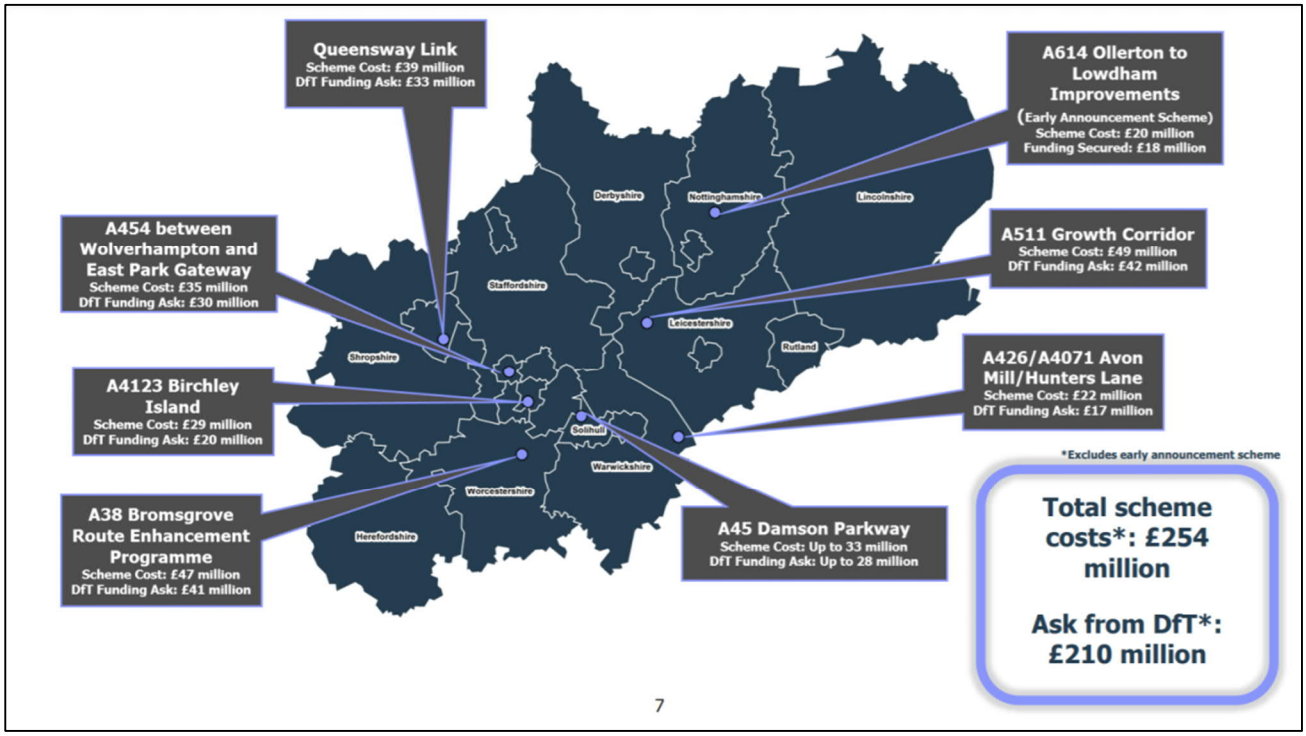
(Source: https://www.nottinghamshire.gov.uk/media/1739235/place-departmental-strategy-2019-2021.pdf)

1.4.5 **Midlands Connect – Major Road Network and Large Major Scheme Submission – Regional Evidence Base (July 2019):** In the Autumn Budget 2018, the Government announced that the National Roads Fund would be £28.8 billion between 2020 and 2025. This fund was expected to be spent on the SRN, which is managed by Highways England, and local roads (managed by local highway authorities). £3.5 billion is to be spent on local roads through the delivery of the MRN and Large Local Major (LLM) schemes.

1.4.6 MRN schemes must be located on the existing MRN itself and according to the guidance, schemes will be typically expected to cost between £20 and £50 million. In December 2018, the DfT published the Investment Planning Guidance for MRN and LLM programmes. The guidance states that Sub-National Transport Bodies (STBs) are required to submit up to 10 MRN and 2-3 LLM schemes to the DfT. Midlands Connect included the A614/A6097 corridor as one of their chosen MRN schemes.

1.4.7 Midlands Connect submitted a total of 7 MRN schemes and 4 LLMs as part of the selection process.

Figure 1.3: Midlands Connect chosen MRN schemes (2018)



1.4.8 **The Midlands Engine for Growth Prospectus and Midlands Connect Strategy:** The Midlands Connect Strategy was published in 2017 and aims to make the East and West Midlands an engine for growth for the UK economy. The document outlines plans to invest a further £392 million in the Midlands through the Local Growth Fund, on top of the £1.5 billion Local Growth Fund investments which have been previously announced.

1.4.9 Improving connectivity in order to increase productivity is one of the Midland's Engine key objectives. Investments in local transport connections are designed to address the fragmentation of the Midlands' economy which is fairly dependent on the regions 11 cities (Nottingham, being the closest City to the A614/A6097 corridor). The funding is to target poorly connected areas which are not able to fully synergise with the region's productive areas, allowing businesses and people to make the most of their strategic position in the centre of the country.

1.4.10 The Midlands Connect Strategy identifies that in order to achieve ambitions of high-quality end to end journeys, further intervention is required on the local and sub-regional networks too, rather than just the SRN.

1.4.11 The A614/A6097 MRN corridor package of improvements will reduce travel costs, improve connectivity for local businesses, and reduce congestion at key locations on the road network. Improving transport connectivity could also allow for a greater spill over of skills from highly productive areas to less productive areas as well as allowing for increased trade and specialisation throughout the region.

1.4.12 **The Derby, Derbyshire, Nottingham and Nottinghamshire Local Enterprise Partnership (D2N2 LEP) Strategic Economic Plan:** Sub-regionally, the whole of the A614/A6097 MRN corridor lies within the area boundaries of the D2N2 LEP. The purpose of the LEP is to provide a partnership between local authorities and businesses in order to decide local economic priorities and undertake activities which drive economic growth and create local jobs.

1.4.13 The D2N2 Strategic Economic Plan establishes a framework for identifying future investment priorities as well as outlining the key actions which will facilitate its vision for 2030. The plan's key focus is on driving inclusive growth through innovation, with an emphasis on improving productivity and growing businesses, delivering skills and knowledge for the future and enhancing the quality of the place where people live and work.

1.4.14 The D2N2 Strategic Economic Plan has seen £257 million of transport infrastructure investment since 2013, with the goal of opening up key enterprise sites within Derby, Derbyshire, Nottingham and Nottinghamshire. Continued investment from the LEP as well as the Midlands Engine's investments will help to future proof the region and encourage interconnectivity. The strategic case for the Scheme aligns well with D2N2 LEP's objectives to improve connectivity and to unlock potential areas for growth. The LEP believes that a high performing transportation network will benefit D2N2's range of high performing industries which are dependent on the transport network such as in the manufacturing, logistics and extractive sectors. These sectors are shown in the Local Economic Profile to also be important contributors to businesses located within two miles of the route, with a high number of manufacturing and trade businesses in particular.

1.4.15 Among other transport projects, the A614/A6097 MRN corridor is identified as one of the priorities for highway investment. As also identified in D2N2 priorities, NCC seeks continued investment in the MRN to improve connectivity around the LEP for more local trips. Greater access to Nottinghamshire's neighbouring towns and cities such as Nottingham, Derby, Leicester, Sheffield and Doncaster will help to propagate economic growth in the likes of Retford, Mansfield and Newark-on-Trent by allowing for synergies between these urban areas

1.4.16 **Nottinghamshire Local Transport Plan:** The Nottinghamshire Local Transport Plan 2011 to 2026 is the third Local Transport Plan (LTP) for the County of Nottinghamshire and came into effect on 1 April 2011. The document details the County Council's transport strategy for the whole of the county of Nottinghamshire for the fifteen-year period 2011-2026.

1.4.17 The LTP document comprises:

- The Local Transport Plan Strategy which sets out how NCC aims to make transport improvements in Nottinghamshire during the plan period. Including a review at least every five years to make sure that it considers any changes in transport conditions and priorities; and to make sure that it is effective; and
- The Implementation Plan that runs for the same period as Central Government's capital funding allocations to ensure it takes account of realistic funding levels. The first implementation plan covered the four-year period 1 April 2011 to 31 March 2015. NCC are currently within the third implementation plan that covers the period 1 April 2018 to 31st March 2019. The current LTP Implementation Plan includes reference to pursuing

"Integrated programmes to address existing and forecast journey time delays along the A614 / A6097 corridor including Ollerton Roundabout improvements''.

1.4.18 The Nottinghamshire LTP Implementation Plan seeks to deliver proposals and measures that will help to achieve the County Council's overarching strategic objectives for transport which are to:

1. Provide a reliable, resilient transport system which supports a thriving economy and growth whilst encouraging sustainable and healthy travel;

2. Improve access to key services, particularly enabling employment and training opportunities; and

3. Minimise the impacts of transport on people's lives, maximise opportunities to improve the environment and help tackle carbon emissions.

1.4.19 The A614 / A6097 improvements accord closely with the LTP strategic objectives in terms of supporting growth along the corridor, through the regeneration of the former Thoresby colliery site, delivering traffic relief to adjacent roads within Ollerton Village, all of which will help to support a thriving local economy and minimise the impacts of transport on people's lives, as well as improving access to and enabling new employment opportunities.

1.4.20 **Council Plan and Place Departmental Strategy 2019 - 2021:** In January 2018, Nottinghamshire County Council adopted a new Council Plan ''Your Nottinghamshire Your Future'' which set out an ambitious future of Nottinghamshire in which the county is at the forefront of modern Britain. As part of this the Place Departmental Strategy was devised to support and deliver the Council Plan. This strategy was agreed by the Council's Policy Committee as part of its responsibility for approving, monitoring and implementing the Council Plan.

1.4.21 The Council Plan supports the Midlands Engine 'Vision for Growth' and believes that a strong Midlands economy will grow the national economy, attract more investment and help to redress the North – South divide. Investment in infrastructure to improve transport is seen as critical to creating the best conditions for unlocking housing and business growth. There are marked disparities in economic fortunes across Nottinghamshire. The south and east of Nottinghamshire are generally performing at or around the national average, but the north is below the national average. Improvements to the A614 / A6097 corridor will assist in building the business base for the areas lagging behind and improve productivity.

1.4.22 The Council's *Place Department Strategy (2019-2021)* sets the context for strategic transport corridors and growth directions across the county and recognises that the economic impact of connecting places like Worksop, Retford, Mansfield, Newark to other parts of the Midlands cannot be underestimated. The MRN outlined in Figure 1.2 (taken from the Place Strategy) demonstrates that connectivity. Working with Midlands Connect and its partners in Transport for East Midlands, the County Council will continue to press Government to not only invest in the SRN but also in key routes in the MRN linked to growth and opportunity areas. The Departmental Place Strategy includes the A614 / A6097 corridor as a priority for highway investment, as well as the Ollerton roundabout.

1.4.23 **Newark and Sherwood Local Plan: Adopted Core Strategy 2011-2026:** The A614 / A6097 improvement scheme lies within the Newark and Sherwood District Council (NSDC) administrative area. A key policy document used by NSDC is the Adopted Core Strategy (March 2011). This document sets out the big issues that the district council and the public and private sector partners need to address over the next twenty years in the district. It sets a vision and objectives and a number of policies to help deliver the development and change identified. Para 4.48 of the NSDC Adopted Core Strategy states that: "in order to gain a clear and up to date assessment of Transport issues within the District, the Council commissioned

a study by WYG in 2009. This showed that: improvements to the A614 / A6075 / A616 Ollerton Roundabout junction will be required to accommodate any additional growth in the north west of the District or significant growth elsewhere; and Strategic highway infrastructure improvements will be required at various locations on the rural highway network within the District. Information from this study, including the need and potential for highway and public transport infrastructure has been incorporated into the District Council's Infrastructure Delivery Plan.

1.4.24 Of the proposed scheme junctions, the Ollerton, Lowdham, White Post, and Mickledale Lane junctions are all listed in the Strategic Highway Infrastructure requirements of the NSDC Adopted Core Strategy.

1.4.25 **Planning policy summary:** The A614 and A6097 are included on the Government's newly designated Major Road Network. Both the Newark and Sherwood District Council Adopted Local Plan and Nottinghamshire third Local Transport Plan specifically reference the A614/A6097 corridor as requiring improvement, and such improvements would support both national (NPPF), regional (Midlands Connect, D2N2) and local aspirations (Nottinghamshire Place Plan).

2. Methodology

2.1 Overview

2.1.1 The purpose of this chapter is to identify the methodology through which the individual junction options (that make up the full scheme package) have been designed and assessed. It considers the traffic surveys, junction assessment and modelling tools and sources of road safety used within this report. It also identifies sources of information relating to traffic growth.

2.2 Traffic Surveys

2.2.1 According to the document, "*How the National Road Traffic Estimates are Made*" (Department for Transport (DfT), 2007), traffic counts are normally undertaken during the 'neutral' months of March, April, May, June, September and October (but outside of school holidays). This is to ensure seasonal impacts are minimised.

2.2.2 The Manual Classified Counts (MCCs) undertaken to support this study were undertaken on the following dates:

- Ollerton Roundabout – Thursday 29th June 2017;
- Mickledale Lane – Wednesday 27th September 2017;
- White Post – Thursday 11th October 2018;
- Warren Hill – Thursday 20th September 2018;
- Lowdham – Thursday 7th June 2018; and
- Kirk Hill – Wednesday 9th October 2019

2.2.3 For the MCCs, all possible traffic movements were recorded in 15 minutes intervals, between the times of 07:00 – 19:00hrs.

2.2.4 Queue length surveys were also conducted. The queue length data was collected on the following dates:

- Ollerton Roundabout – Thursday 29th June 2017;
- Mickledale Lane – Wednesday 27th September 2017;
- White Post – Wednesday 12th December 2018;
- Warren Hill – Thursday 20th September 2018;
- Lowdham – Thursday 13th December 2018; and
- Kirk Hill – Wednesday 9th ,Thursday 10th and Friday 11th October 2019.

2.2.5 The length of queues was recorded at each junction between 07:00 – 10:00hrs & 16:00 – 19:00hrs, every five minutes.

2.2.6 All surveys were conducted within a 'neutral' month and outside of school holidays with the exception of the queue length surveys conducted at White Post and Lowdham (which were non-neutral months but conducted outside of school holidays with no adverse weather conditions recorded). All surveys were also conducted prior to the COVID19 pandemic.

2.3 Background Traffic Growth

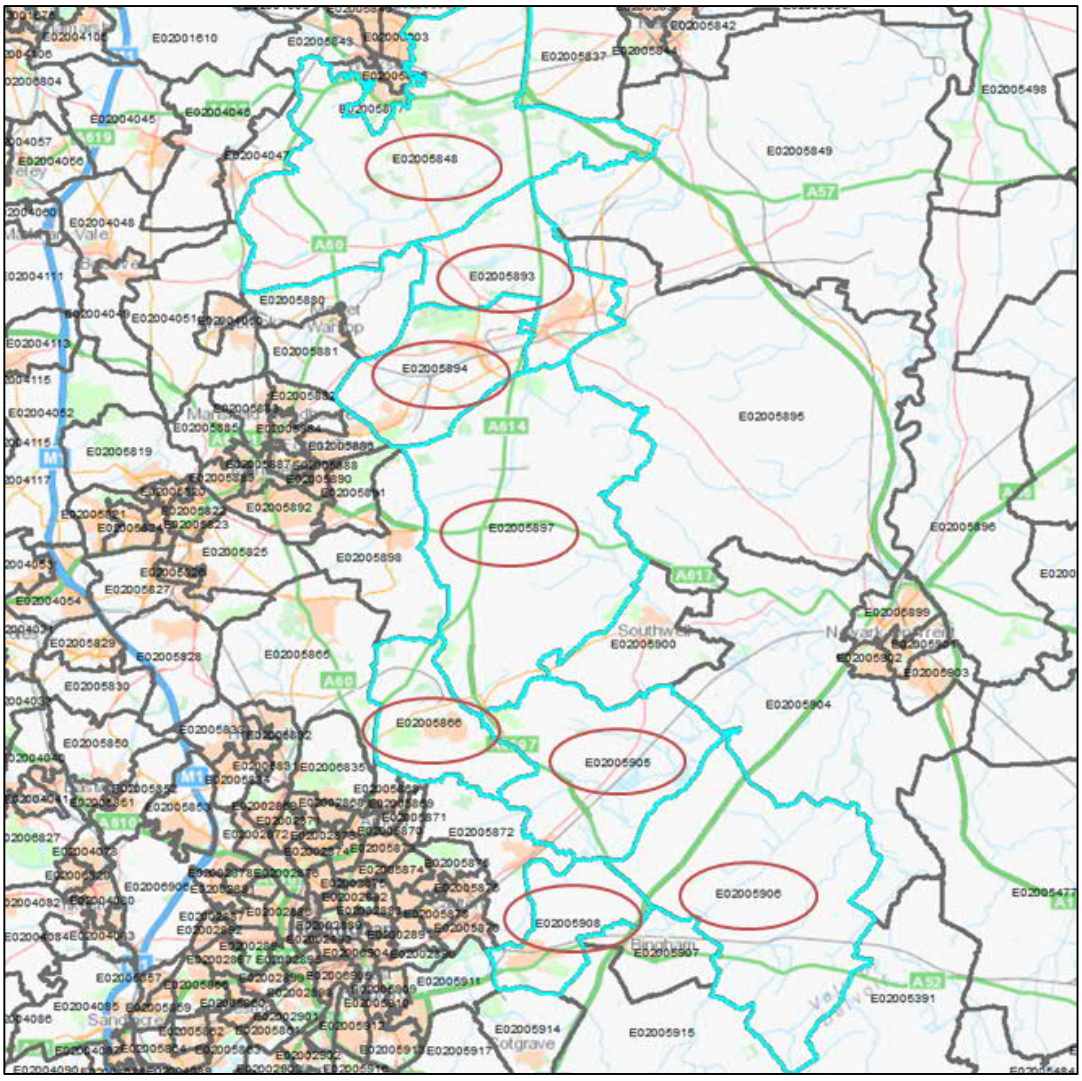
2.3.1 The future demand for travel within the model study area will be affected by a number of key factors. These will include:

- Changes in population and employment levels;
- Changes in the number of households; and
- Changes in the level of car ownership.

2.3.2 The impacts of these factors and the effect that they have on future year travel demand are modelled at a national level through the National Transport Model (NTM) developed by the DfT, which itself incorporates the NTEM (National Trip End Model). Use of TEMPRO software allows for the information contained within the NTEM database to be output in the form of forecast year trip-end growth projections for travel including by car, thus allowing local area traffic models to be developed on a consistent basis with regard to future year national growth. The forecasts output from TEMPRO for a specific area are, inter-alia, based upon assumptions regarding future employment and housing levels that have been input to the NTM.

2.3.3 Figure 2.1 shows those zones for which TEMPRO data has been extracted around the corridor.

Figure 2.1: NTEM Growth Factor districts



2.3.4 To suitably forecast the future traffic on the network, it is necessary to consider the additional traffic generated by the development of new housing and employment sites on, or nearby, the corridor. As such, following discussion with NCC, it was agreed to include the following committed developments, deemed to be near certain, or more than likely, in the traffic forecasts:

- Newark & Sherwood District Council:
  - Land north of Petersmith Drive;
  - Thoresby Colliery;
  - Land East of Eakring Road (Bilsthorpe Village);
  - Kirklington Road (Bilsthorpe Village);
  - Oldbridge Way (Bilsthorpe Village);
- Rushcliffe Borough Council:
  - Land at the former RAF Newton;
  - Chapel lane, Bingham;
- Gedling Borough Council:
  - Park Road, Calverton;
  - Land at Teal Close; and
  - Land at Chase Farm (Former Gedling Colliery).

2.3.5 Figure 2.2 locates these developments.

2.3.6 Some of the developments listed above are dependent on junction improvements taking place; for instance, Thoresby Colliery requires improvements at the Ollerton roundabout. For the scheme's economic assessment, such trips that are 'unlocked' by the scheme cannot be considered when calculating overall scheme benefits. However, for the purposes of this TA, the full potential future year demand has been used to inform the operation demand and capacity analysis of the junctions. This is to ensure a robust assessment of future year performance.

Figure 2.2: Committed Development Locations

2.4 Forecast Traffic Flows

2.4.1 Baseline and forecast traffic flows are contained within Appendix A.

2.5 Junction Capacity Analysis Tools

2.5.1 The scheme has been assessed in terms of highway capacity (both for the existing junctions, and proposed schemes) and designed using industry standard software: ARCADY for roundabouts; PICADY for priority T-junctions and crossroads; and LINSIG for signalised junctions.

2.5.2 **Roundabouts:** ARCADY software has been run using a synthesised profile and provides outputs in the form of Ratios of Flow to Capacity (RFC) and queue length (Q). A synthesised profile includes a 12.5% mid-peak 'surge' to robustly test the performance of the junction. For a new junction, a worst-arm target RFC value of 0.85 during a single time segment is preferred as this minimises the chance that queuing will occur at a new junction on opening. For existing junctions, RFC values above 0.85 are likely to produce queues which increase slowly. Above an RFC value of 1.0, a junction is more than likely to be at capacity (with resulting larger increases in queue length).

2.5.3 **Priority T-junctions and crossroads:** Similar to ARCADY (since they are related software tools), PICADY software has been run using a synthesised profile and provides outputs in the form of Ratios of Flow to Capacity (RFC) and queue length (Q). A synthesised profile includes a 12.5% mid-peak 'surge' to robustly test the performance of the junction. For a new junction, a worst-arm target RFC value of 0.85 during a single time segment is preferred (or 0.75 in a rural location) as this minimises the chance that queuing will occur at a new junction on opening. For existing junctions, RFC values above 0.85 are likely to produce queues which increase slowly. Above an RFC value of 1.0, a junction is more than likely to be at capacity (with resulting larger increases in queue length).

2.5.4 **Signalised Junctions:** LINSIG software is designed to test the operational efficiency of signalised junctions. A total-junction statistic known as the Practical Reserve Capacity (PRC) is reported within LINSIG, which shows the percentage of "spare" capacity left at the junction. A negative PRC indicates a junction operating above is theoretical capacity.

2.5.5 **Reporting of junction performance:** Tables showing the performance of the existing junctions and proposed junction arrangements are provided in Section 3. Within these tables, the following periods have been assessed:

- AM Peak: 0730 – 0830hrs
- PM Peak: 1630 – 1730hrs;
- Interpeak: 1000 – 1600 (average hour); and
- Off Peak: 2200 – 0600 (average hour).

2.6 Approach to Variable Demand / Route Choice

2.6.1 **Scheme-Wide Approach:** Drivers respond to congestion in a variety of ways, which can be classified either as routeing decisions or demand decisions:

- *Variable Demand:* Under congested conditions, drivers may decide to time their journeys to avoid peak times (a phenomenon known as 'peak spreading') or not make their journeys at all (supressed demand).
- *Routeing:* Congestion on corridors may also directly influence routing decisions. As an example: a longer route, for instance, may be more attractive to traffic than a direct one, if that longer route suffers from fewer delays or provides a more reliable journey.

2.6.2 For transport planning, this phenomenon has two important consequences:

- Providing increased capacity on a route may draw traffic away from competing routes or unlock supressed demand. If this happens, then the benefits of providing the capacity (in terms of improved journey times) may be lost.
- Reducing capacity on a route does not necessarily mean increasing delays as much as might be expected, if other routes are available, because drivers on longer distance trips will start making different choices.

2.6.3 The methodology used to design and assess the A614 junction improvements used a fixed trip forecasting approach on the basis that there is minimal route choice and the improvements are relatively modest capacity improvements (i.e. it was assumed there would be little re-routeing or variable demand impacts). Following feedback from the Department for Transport, however, it was decided to test this assumption using the Midlands Connect Highway Model (MCHM).

2.6.4 The MCHM is a variant of the Highways England Midlands Regional Transport Model, which was developed using data from March 2015, and can consider aspects including route choice and variable demand. MCHM was used to examine potential Variable Demand and reassignment impacts, noting the strategic model does not represent the A614/A6097 in sufficient detail to support detailed scheme appraisal (The MCHM contains representation of only three of the scheme junctions). The scheme was therefore included in this model, and outputs from the model's future year forecasts with and without the scheme have been compared and contrasted. A full technical report on the MCHM has been prepared separate from this TA. In summary, however the work shows that:

- Total changes in traffic flow prompted by the scheme (either in terms of re-routeing impacts or variable demand) are non-material.
- There is no clear rerouting on to the scheme corridor from parallel corridors such as the M1, A46 / A1, or the A60.
- There is a very small amount of re-routing for traffic leaving Nottingham, from the A616 to the A612, which is then joining the scheme corridor at Lowdham. This is due to two factors: firstly, that a give way line on the northbound A616 movement is introduced when implementing a roundabout at Warren Hill, and secondly, that amendments to the capacity on the A612 arm of the Lowdham roundabout cause a decrease in delay on that arm.
- The largest changes from the do-minimum in percentage terms are on the northbound A6097 Oxton Bypass – this is approaching the Warren Hill junction. It is expected that the most significant changes will happen here because of the change in priorities entailed by the improvements.

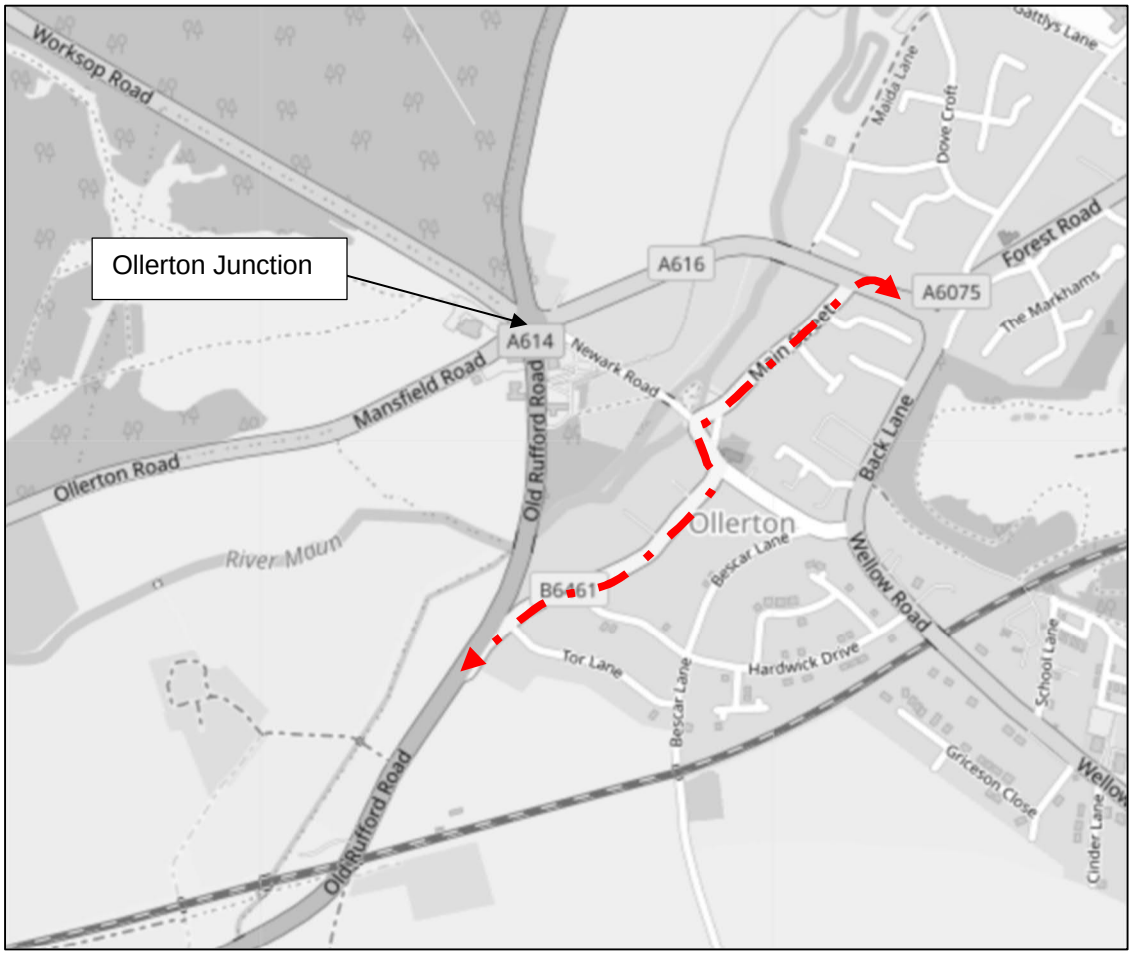
2.6.5 Given the above, it is not considered that re-routing or variable demand impacts will have a material impact on the performance of the scheme and therefore the future year traffic forecasts and each junction with and without the scheme are the same. This approach has been audited and approved by the DfT.

2.6.6 **Ollerton Roundabout:** Notwithstanding the above, congestion at Ollerton roundabout over recent years has seen motorists using Station Road, Old Ollerton as an alternative route to the A616 and A614 approaches to the roundabout, despite the road being narrow and traffic calmed.

2.6.7 Improvements to Ollerton roundabout have the potential to encourage reassignment of local traffic which is currently routing through Old Ollerton to avoid journey time delays at peak times. An assessment of through traffic was identified in a Nottinghamshire County Council analysis of matched registration survey conducted in 2017. This assessment was used to make allowance for potential reassignment onto the A614 corridor to ensure the proposed Ollerton roundabout design caters for a larger volume of traffic than uses the junction at

present. Figure 2.3 shows the potential draw of traffic that could be re-assigned back to the more appropriate A614 Ollerton route.

Figure 2.3: Station Road Alternative Route, avoiding Ollerton roundabout



2.7 Road Safety Data

2.7.1 The Guidance on Transport Assessment (DfT, 2007) states that a TA or a TS (whichever is appropriate for the scale and type of development) should "*establish the current personal injury accident records for the most recent three-year period, or five years if this is considered to be more appropriate*."

2.7.2 Road safety collision statistics have been obtained from the DfT (via the Crashmap database) from 01/01/2014 to 30/06/2019. The data obtained relates to those collisions that resulted in a personal injury and which were reported to the police. This data (known as STATS19 statistics) is generally recognised to be the most complete record of road collisions occurring on the local highway network. For the avoidance of doubt, and as is normal practice, they do not include statistics from collisions resulting in "damage-only" to vehicles, or which were not reported to the police.

2.7.3 Each collision resulting in a personal injury is classed as either 'Slight', 'Serious' or 'Fatal' by the police depending on the most serious injury resulting from the collision (i.e. a collision resulting in two 'Slight' injuries and one 'Serious' injury would be classified as a 'Serious' collision). Definitions given in Road Accidents Great Britain (published by the DfT) are as follows:

- Slight: An injury of a minor character such as a sprain (including neck whiplash injury), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment.
- Serious: An injury for which a person is detained in hospital as an “in-patient”, or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushings, burns (excluding friction burns), severe cuts, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident. An injured casualty is recorded as seriously or slightly injured by the police on the basis of information available within a short time of the accident. This generally will not reflect the results of a medical examination, but may be influenced according to whether the casualty is hospitalised or not. Hospitalisation procedures will vary regionally.
- Fatal: Human casualties who sustained injuries which caused death less than 30 days (before 1954, about two months) after the accident. Confirmed suicides are excluded.

2.7.4 The road safety performance of each junction is considered in Section 3.

3. Scheme Description and Junction Performance

3.1 Scheme Background

3.1.1 The A614 is an important north-south route from Retford towards north Nottingham, with the A6097 providing a spur from the A614 to the A46 (which is a trunk road linking Leicester with Newark and Lincoln). Between the study area junctions, the A614 is a two-way single carriageway. The A6097 is a two-way single carriageway which becomes a dual carriageway through Lowdham.

3.1.2 The route was designated part of the MRN in October 2018, a middle tier of the country's busiest and most economically important local authority 'A' roads, sitting between the Strategic Road Network (SRN) and the rest of the local road network.

3.1.3 The route previously had a poor accident record and was subject to a major safety improvement scheme in 2012 with the implementation of a 50mph speed limit. An average speed camera system is in place on the A614 and the A6097 to enforce the speed limit. The installation of the lower speed limit and safety cameras saw a reduction in the number of collisions along the route, although there is still a local perception that the route is unsafe, particularly when accessing the A614 from the side road priority junctions.

3.1.4 At its northern end, the A614 serves a number of tourist attractions including: Rufford Abbey, Centre Parcs, Sherwood Pines Forest Park, Go Ape, Sherwood Forest Country Park, White Post Farm and Robin Hood's Wheelgate Family Theme Park.

3.1.5 The route regularly experiences journey time delays in the peak periods, particularly at the Ollerton, Lowdham and Kirk Hill junctions which results from insufficient capacity to cater for current traffic demands. In addition, there are regular delays to traffic joining the A614 at the Mickledale Lane junction as traffic waits for suitable gaps in the A614 traffic before joining. A key concern at Mickledale Lane is the ability of minor-arm traffic to safely judge gaps when entering the A614 and to do so without undue delay

3.1.6 A number of development sites along the A614/A6097 have planning conditions which restricts the level of development permitted until Ollerton and Lowdham roundabouts are improved. This is limiting economic growth in the area.

3.1.7 As such, the A614 serves a dual-economic function: facilitating regular commuter trips and local movements, and also being an important corridor for the tourist economy which will grow in future. The proposed scheme therefore seeks to continue the strategic development of the corridor to both accommodate and facilitate economic growth.

3.2 Junction 1: Ollerton

3.2.1 **Form of Junction:** The junction currently consists of a 6-arm roundabout junction, as shown in Figure 3.1. The junction connects the A614 (Blyth Road) to the north, A6161 (Ollerton Road) to the east, A614 (Old Rufford Road) to the south, Mansfield Road to the south west and the A616 (Worksop Road) to the north west.

Figure 3.1: Ollerton Roundabout

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3.2.2 The junction currently experiences regular peak hour journey time delays and queuing. This is shown in Figures 3.2 and 3.3 which show the queue length surveys in the AM and PM peak periods.

Figure 3.2: Ollerton Roundabout - AM Queue Length Survey

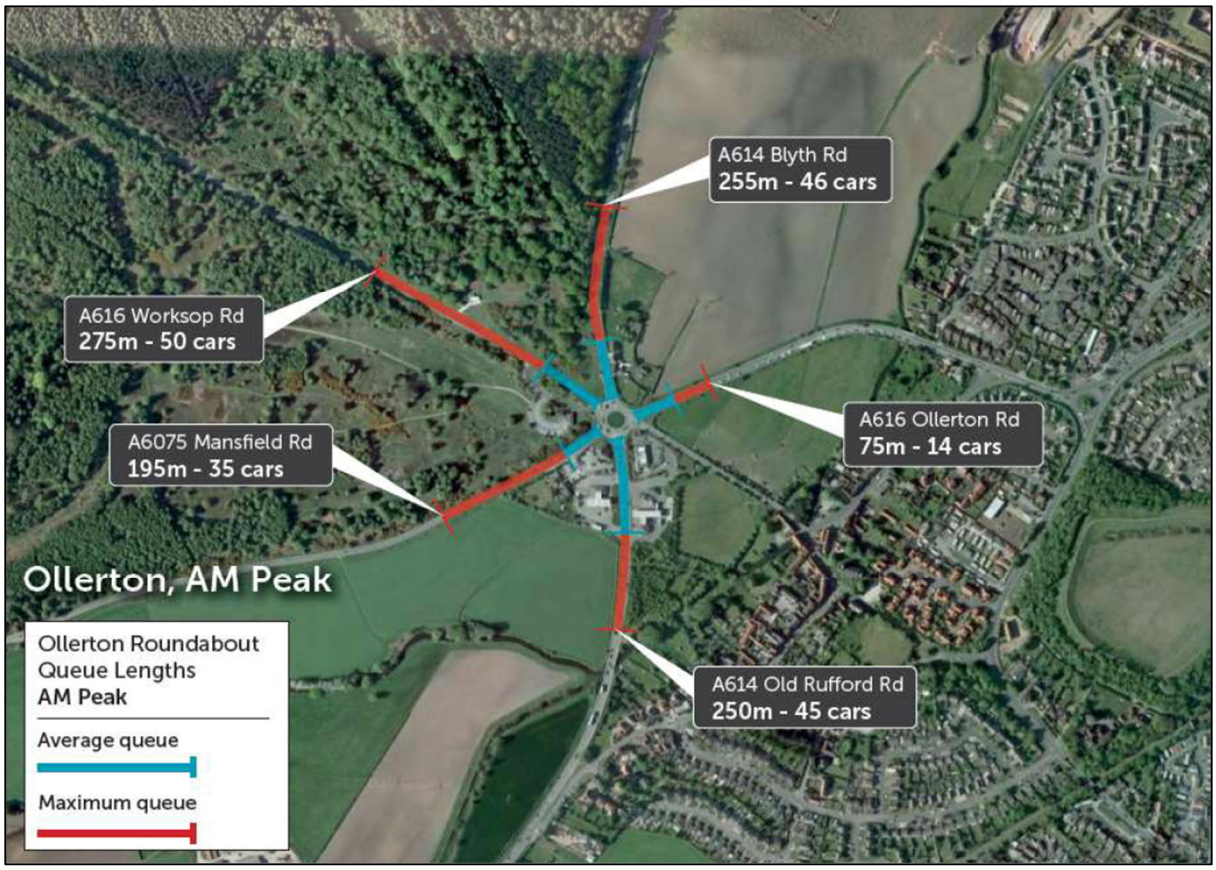
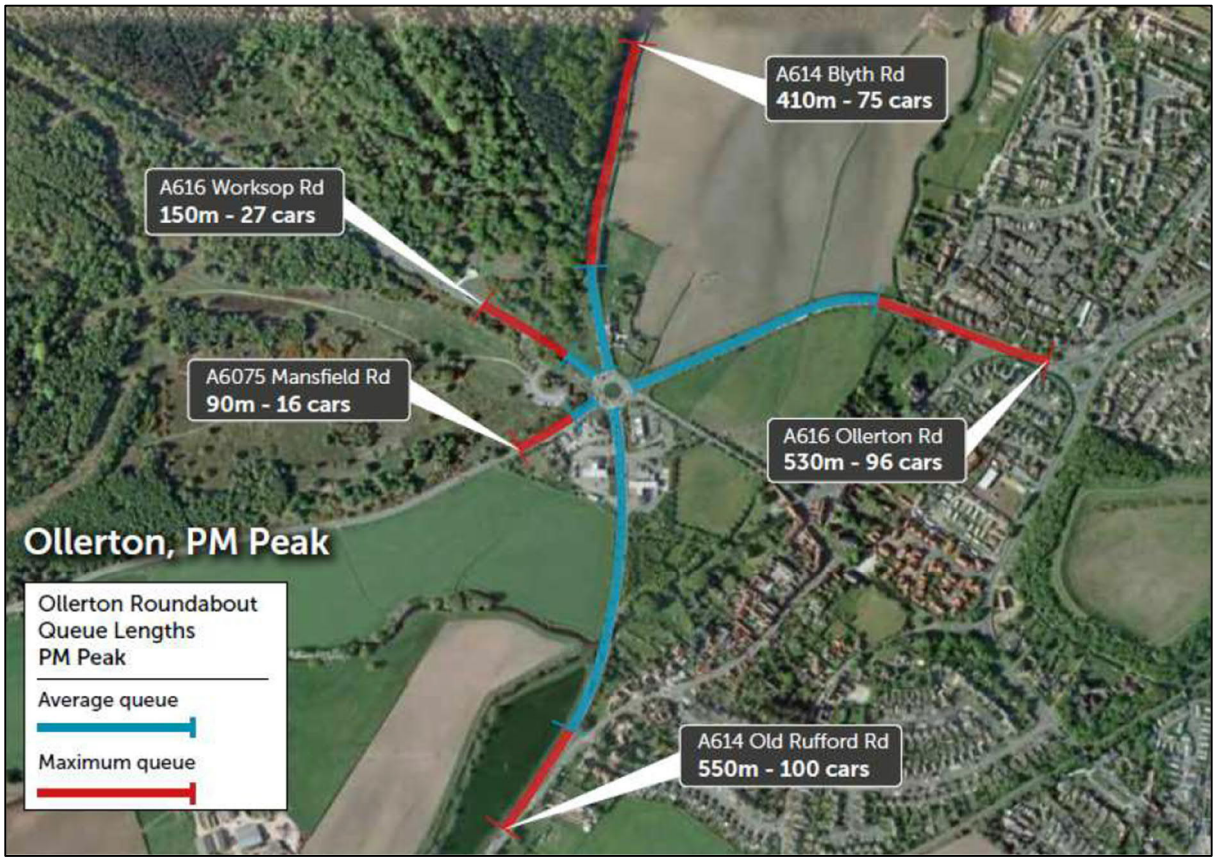


Figure 3.3: Ollerton Roundabout - PM Queue Length Survey

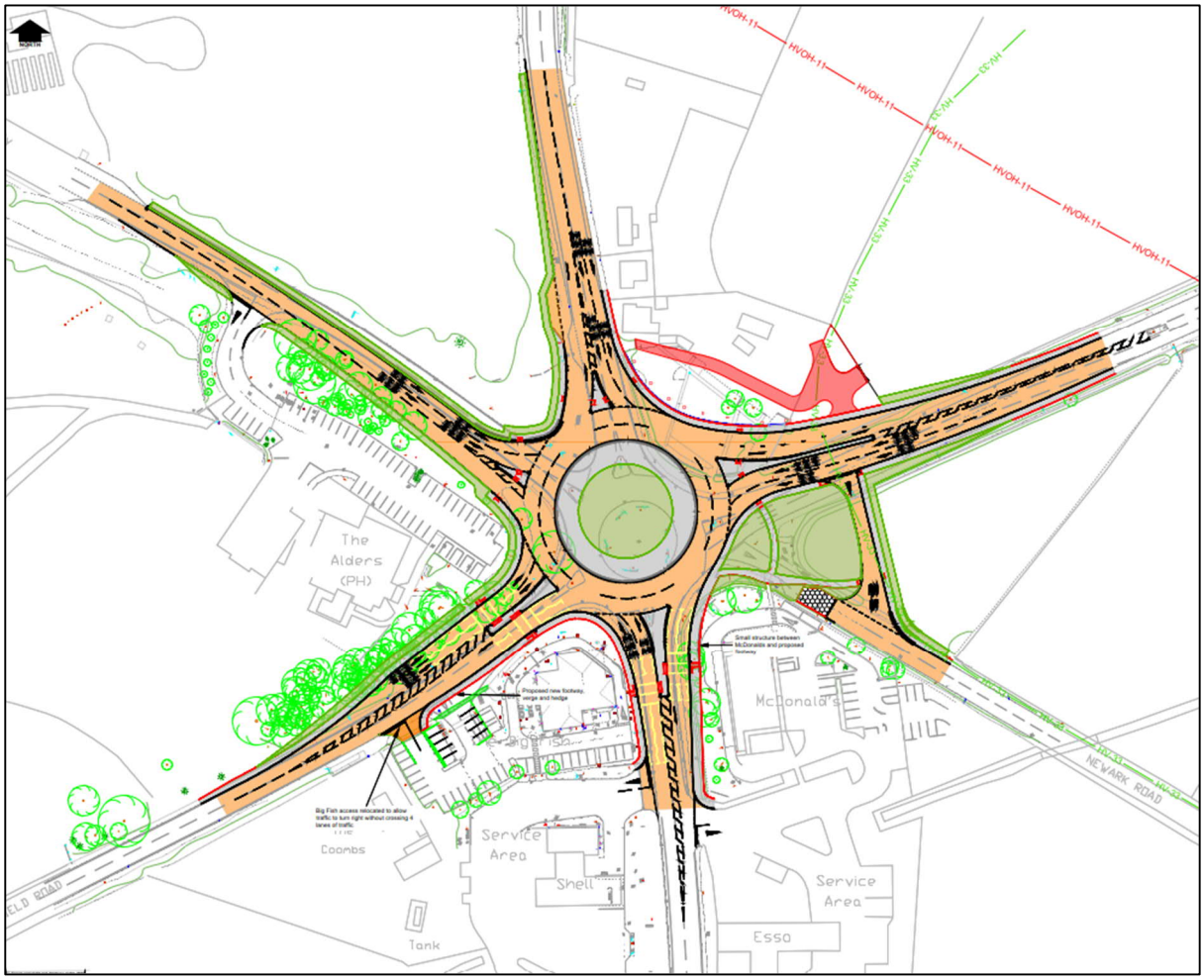


3.2.3 The junction is restricting economic growth and housing delivery, with the nearby Thoresby Colliery development having conditional planning conditions which limit the quantum of development that can be delivered until improvements are implemented at the junction.

3.2.4 There are currently no controlled or uncontrolled pedestrian (or cyclist) crossing facilities at the junction, despite pedestrian demand to / from leisure facilities (including a fast food restaurant and other eateries). Furthermore, the roundabout provides a key route to major cycling destinations such as Clumber Park, yet (at present) there is no cycle crossing point available at the junction.

3.2.5 **Proposed Improvement:** In order to improve the traffic capacity of the Ollerton Roundabout, an enlarged conventional roundabout is proposed. The scheme is shown in Figure 3.4 with more detailed plans provided as part of the wider planning application bundle.

Figure 3.4: Ollerton Roundabout proposal



3.2.6 The roundabout option proposes five arms with the bus-only link road realigned onto the A616 Ollerton Road arm. Two of the arms would have Toucan crossing points to improve facilities for pedestrians and cyclists. Due to existing land constraints, and the current alignment of the approach roads, the proposal for an enlarged 60m ICD roundabout is the largest size that can be accommodated within the limit of the constraints.

3.2.7 The realignment of the bus-only link will likely provide journey time savings to all services routing through Ollerton Roundabout and Newark Road. This includes the 14/15/15a, 333/334/335, DSA (school service), Edwinstowe Shopper and Sherwood Arrow. These bus

services provide connection to Mansfield, Nottingham, Edwinstowe, Wellow, Newark and other intermediary stops. NCC's public transport team was consulted on the changes to the bus only link and were supportive of the proposals.

3.2.8 **Junction Performance:** An ARCADY model has been prepared by VIA East Midlands Ltd to model the performance of this junction.

3.2.9 The performance of the junction in the 2023 and 2037 Do Minimum and Do Something scenarios (including dependent development trips) are shown in Table 3.1. The worst performing arm is shown in each instance, with the exception of Junctions Delays which presents the combined delays across all arms of the junction. Results in excess of capacity are highlighted in red.

Table 3.1: Performance of Ollerton Roundabout Junction – 2023 & 2037 (DM and DS)

	2023						2037					
	Do Minimum			Do Something			Do Minimum			Do Something		
	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)
AM	67.5	1.13	85.92	1.9	0.66	5.29	276.5	1.48	419.23	5.9	0.85	11.33
PM	69.2	1.17	73.19	2.4	0.71	5.85	349.0	1.74	422.80	8.2	0.90	15.45
IP	3.9	0.81	9.82	0.9	0.48	3.61	25.1	1.02	35.09	1.5	0.61	4.58
OP	0.1	0.06	2.60	0.0	0.04	1.88	0.10	0.07	2.65	0.1	0.05	1.96

3.2.10 Table 3.1 indicates that the junction would be overcapacity in the 2023 and 2037 AM and PM peak hours should no intervention occur. Upgrading the junction to a larger conventional roundabout will result in large reductions to both delay and queue lengths.

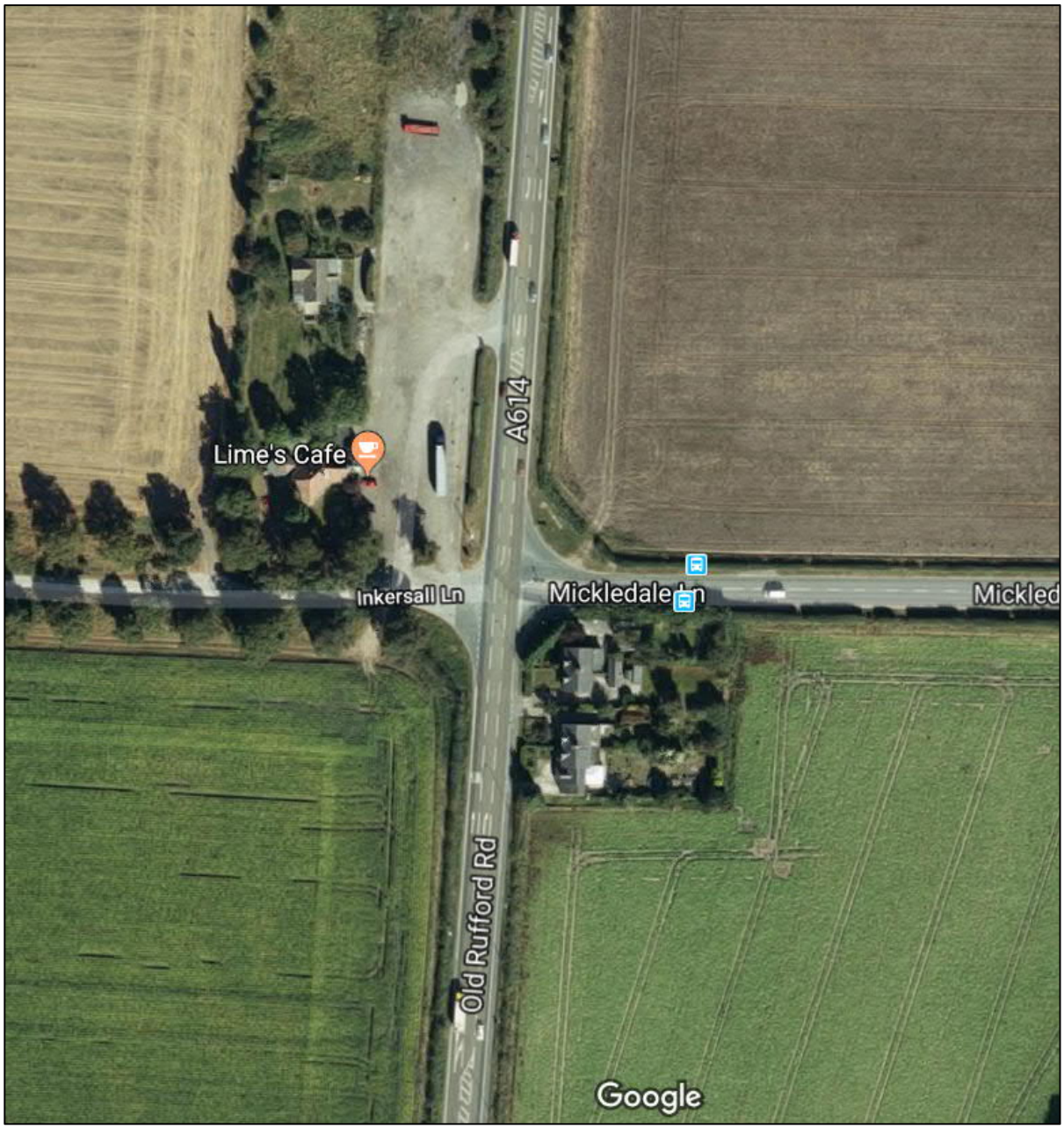
3.2.11 **Road Safety:** Traffic collision data obtained from the DfT (via the Crashmap database) indicates that two collisions have been recorded on the roundabout itself (one on the A6075 approach arm and the other on the A6161 (Worksop Road) approach arm), with a further three collisions recorded within 50m of the junction. These collisions occurred on the A6075, A614 (S) and Newark Road, respectively. All collisions occurring at, or within close proximity to, the junction were recorded as 'slight' by the police.

3.2.12 None of the collisions recorded involved a vulnerable road user (i.e. a pedal cyclist or a pedestrian).

3.3 Junction 2: Mickledale

3.3.1 **Form of Junction**: The existing junction is currently a priority controlled 4 arm crossroads with the side roads giving way to the A614 traffic flows. The junction form is shown in Figure 3.5.

Figure 3.5: Mickledale Lane



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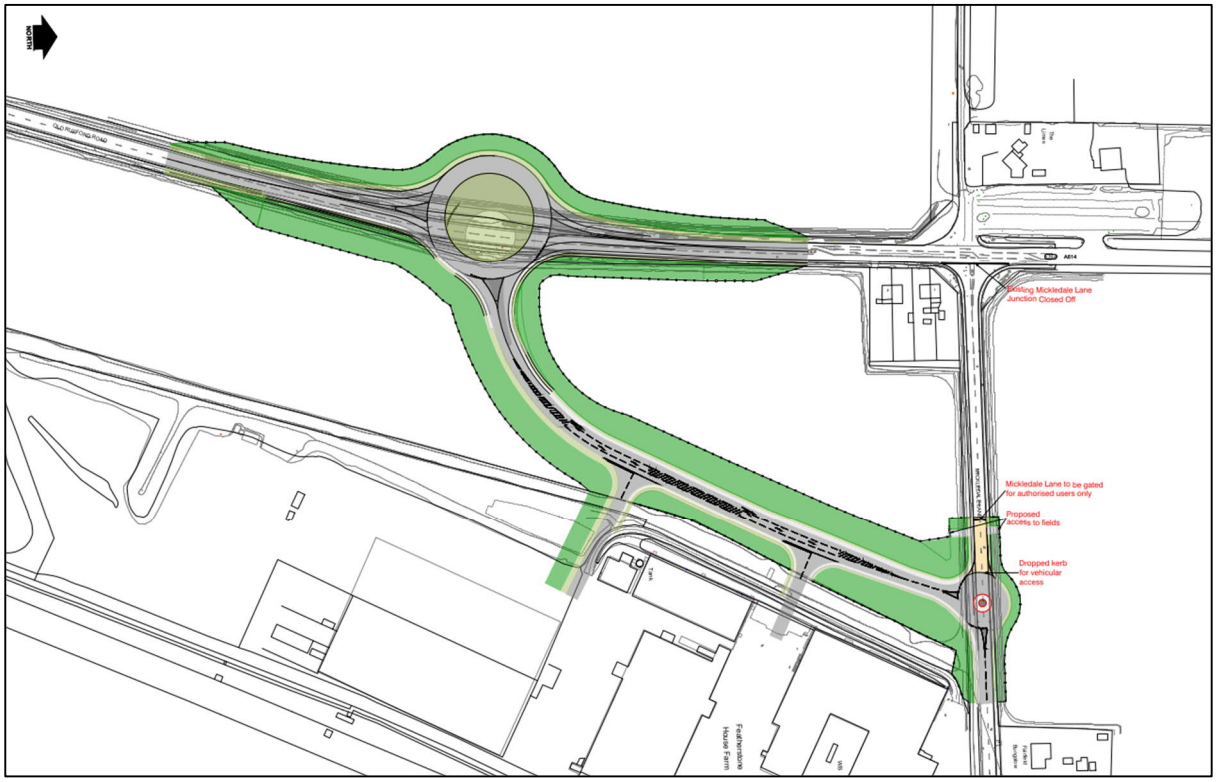
3.3.2 The local perception of this junction is that it is very difficult to access the A614 from Mickledale Lane, with large delays (rather than large queues), as joining traffic waits for suitable gaps in the high-speed mainline traffic and trips exiting the Lime's Cafe before joining. Waiting times to access the A614 from Mickledale Lane are variable, resulting in poor journey time reliability for road users.

3.3.3 **Proposed Improvement**: It is proposed to construct a new roundabout junction. The proposed option is shown in Figure 3.6 with more detailed plans provided as part of the wider planning application bundle.

Figure 3.6: Mickledale Lane proposal



3.3.4 **Junction Performance:** A PICADY model was developed to represent the priority junction in the future year Do Minimum scenario, whilst an ARCADY was developed to model the proposed junction improvement (Do Something).

3.3.5 The performance of the junction in the 2023 and 2037 Do Minimum and Do Something scenarios are shown in Table 3.2. The worst preforming arm is shown in each instance, with the exception of Junctions Delays which presents the combined delays across all arms of the junction.

Table 3.2: Performance of Mickledale Lane Junction – 2023 & 2037 (DM and DS)

	2023						2037					
	Do Minimum			Do Something			Do Minimum			Do Something		
	Max Q (PCU)	RFC	Junction Delay (s)	Max Q (PCU)	RFC	Junction Delay (s)	Max Q (PCU)	RFC	Junction Delay (s)	Max Q (PCU)	RFC	Junction Delay (s)
AM	0.6	0.39	1.86	1.0	0.51	3.17	1.2	0.55	3.47	1.5	0.60	3.77
PM	0.6	0.36	2.00	1.2	0.51	3.60	0.8	0.45	2.90	1.6	0.59	4.26
IP	0.2	0.18	1.51	0.5	0.32	2.39	0.3	0.20	1.57	0.6	0.37	2.57
OP	0.0	0.01	0.78	0.0	0.03	1.66	0.0	0.01	0.74	0.0	0.04	1.66

3.3.6 As noted, the local perception of the junction is worse than the typical conditions. Future traffic growth along the route corridor, including known development in Bilsthorpe is likely to exacerbate this perception. Given this, a roundabout will provide those moving from the minor arm (Mickledale Lane) onto the main line (A614) an opportunity to safety undertake this manoeuvre. Notwithstanding, introducing a roundabout in the Do Something scenario will lead to a worsening of vehicle delay across all Do Something scenarios.

3.3.7 **Road Safety**: Stakeholders report a perception of road safety issues at Mickledale Lane, relating to the judgement of gaps when leaving the minor arm and entering the A614, particularly for right-turning traffic.

3.3.8 The collision data obtained for this study indicates that three collisions have occurred at the junction within the past five full years of collision data. All collisions were recorded as ‘slight’ by the police. None of the collisions involved a vulnerable road user (i.e. a pedal cyclist or a pedestrian). A further four collisions were recorded within 100m of the junction on Mickledale Lane. All of these collisions were also recorded as ‘slight’ by the police and none involved a vulnerable road user.

3.4 Junction 3: White Post

3.4.1 **Form of Junction**: The current layout is a four-arm roundabout with the A614 running north-south. Mansfield Road runs east- west. The existing junction form is shown in Figure 3.7.

Figure 3.7: White Post junction

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3.4.2 **Proposed Improvement**: Following careful consideration of the options to improve the traffic carrying capacity of this junction it became clear that the availability of land to permit a meaningful improvement scheme was limited due to built-development on all four corners of this junction. It was therefore decided that in order to ensure network resilience and to ensure that this junction continues to perform as effectively and as safely as possible that the junction would be improved in situ.

3.4.3 This will involve carriageway maintenance and repairs and could also include minor realignment and widening of entries and exits, the provision of high friction surfacing on carriageway entries, signing, lining and street lighting upgrades. These modest alterations will ensure that this junction remains fit for purpose and provides consistency of junction standards along the A614 / A6097 corridor.

3.4.4 **Junction Performance**: To assess the junction capacity at White Post, an ARCADY assessment was conducted.

3.4.5 The scheme at White Post is a road safety scheme involving anti-skid road surfacing and minor maintenance improvements. Since the junction improvement scheme involves no alterations to the physical infrastructure, there is no change in junction capacity between the Do Minimum and Do Something scenarios, as shown in Table 3.3. The worst preforming arm is shown in each instance, with the exception of Junctions Delays which presents the combined delays across all arms of the junction.

Table 3.3 Performance of White Post Junction – 2023 & 2037 (DM and DS)

	2023						2037					
	Do Minimum			Do Something			Do Minimum			Do Something		
	Max Queue (PCU)	RFC	Junction Delay (s)	Mean Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Mean Max Queue (PCU)	RFC	Junction Delay (s)
AM	7.8	0.89	19.25	7.8	0.89	19.25	54.9	1.06	75.13	54.9	1.06	75.13
PM	15.8	0.96	27.58	15.8	0.96	27.58	91.0	1.12	106.00	91.0	1.12	106.00
IP	1.2	0.53	5.60	1.2	0.53	5.60	1.7	0.61	6.76	1.7	0.61	6.76
OP	0.1	0.05	2.67	0.1	0.05	2.67	0.06	0.1	2.69	0.06	0.1	2.69

3.4.6 Table 3.3 indicates that the junction is not expected to operate over capacity in the 2023 but does become over capacity in the 2037 design scenario. As the Do Something scenario does not see any infrastructure change proposed at the junction there is therefore not expected to be any improvement to capacity at this junction (as reflected in Table 3.3).

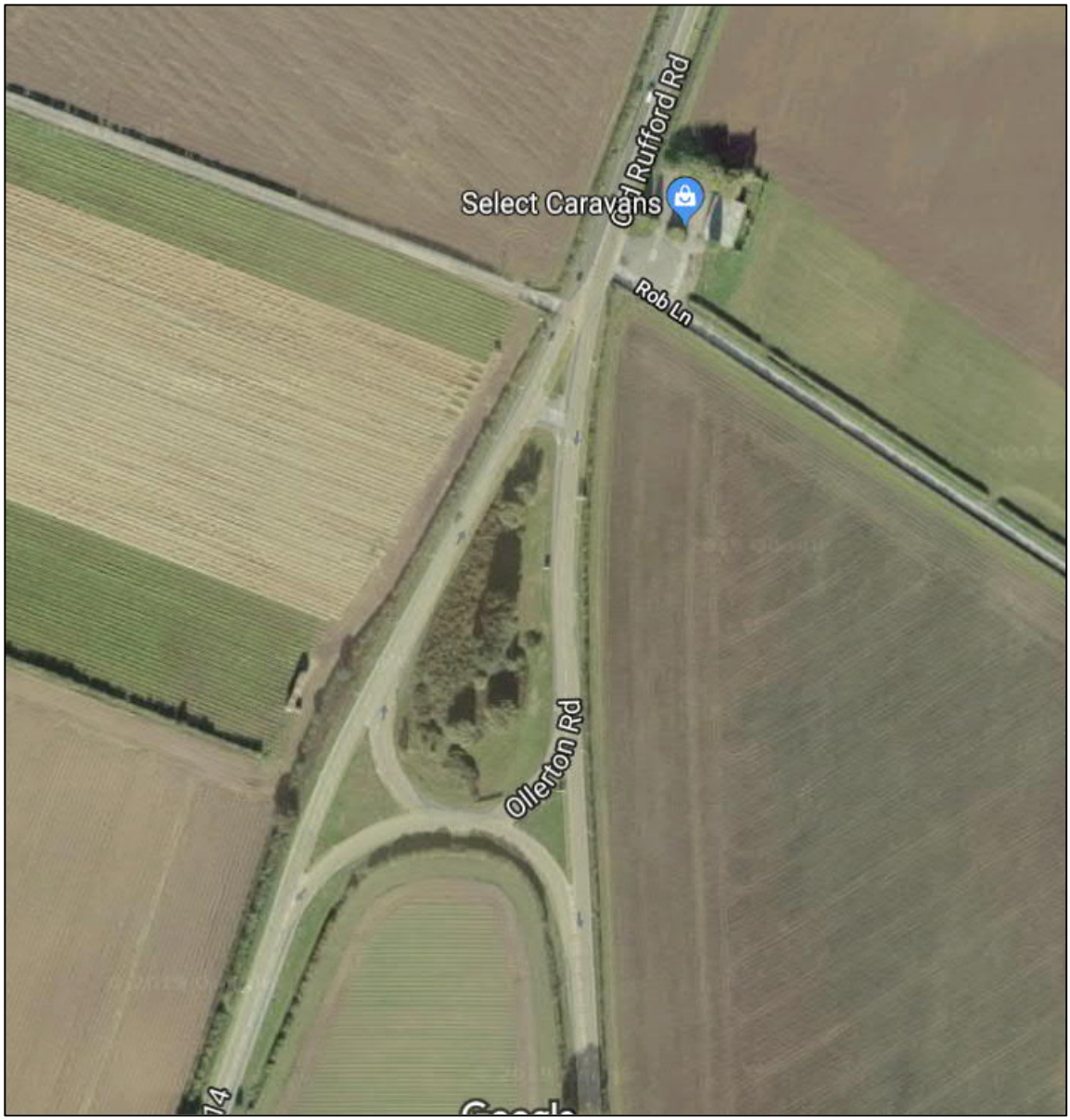
3.4.7 **Road Safety:** Two collisions have been recorded within the past five full years of collision data. One collision was recorded as ‘slight’ by the police, and occurred on the Mansfield Road (E) approach arm, whilst the other collision was recorded as ‘serious’ and occurred on the roundabout itself involving a motorcyclist.

3.4.8 Since the proposals at White Post include only carriageway maintenance and repairs, it is not anticipated that there will be any material impact upon road safety as a result of the proposed changes.

3.5 Junction 4: Warren Hill

3.5.1 **Form of Junction**: The existing junction is in the form of a non-standard 3-arm gyratory consisting of a series of priority junctions. The existing junction is shown in Figure 3.8.

Figure 3.8: Warren Hill junction



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3.5.2 **Proposed Improvement:** It is proposed to resurface the existing junction, including relining in places. New removable bollards will be installed, whilst a new kerb line with carriageway reconstruction will be installed on the A614 (NB). The proposal is shown in Figure 3.9 with more detailed plans provided as part of the wider planning application bundle.

Figure 3.9: Warren Hill junction proposal

3.5.3 **Junction Performance**: Warren Hill is a minor geometric alteration which does not provide measurable capacity improvements. A PICADY model has been prepared by VIA East Midlands Ltd to model the performance of the junction in the Do Minimum and Do Something scenarios.

3.5.4 The PICADY outputs are shown in Table 3.4 for the 2023 / 2037 Do Minimum and Do Something scenario. The worst preforming arm is shown in each instance, with the exception of Junctions Delays which presents the combined delays across all arms of the junction.

Table 3.4 Performance of Warren Hill Junction – 2023 & 2037 (DM and DS)

	2023						2037					
	Do Minimum*			Do Something			Do Minimum*			Do Something		
	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)
AM	3.4	0.78	11.84	3.4	0.78	11.84	11.7	0.96	36.14	11.7	0.96	36.14
PM	12.1	0.96	34.79	12.1	0.96	34.79	65.3	1.19	169.77	65.3	1.19	169.77
IP	0.9	0.47	4.72	0.9	0.47	4.72	1.4	0.58	6.40	1.4	0.58	6.40
OP	0.0	0.04	2.46	0.0	0.04	2.46	0.1	0.05	5.47	0.1	0.05	5.47

* worst performing priority junction used to show DM scenario (priority junction at A614).

3.5.5 Table 3.4 indicates that the Warren Hill junction would experience capacity issues in the 2023 PM peak period and 2037 AM and PM peak periods in the Do Minimum scenario. The Do Something scenario does not see any infrastructure change proposed at the junction and therefore there is not expected to be any improvement to capacity at this junction (as reflected in Table 3.4).

3.5.6 **Road Safety**: Stakeholders report a perception of road safety issues at Warren Hill, relating to the unusual junction layout. Traffic from the A6097 (routeing north) merges onto the A614 by entering the mainstream on the passenger side (rather than the normal driver's side).

3.5.7 Collision data indicates that four collisions have occurred at the Warren Hill junction. Two collisions were recorded as 'slight' by the police, whilst the other two collisions were recorded as 'serious'. One involved a single vehicle (car), and the other involved a car and a pedal cycle.

3.6 Junction 5: Lowdham

3.6.1 **Form of Junction**: The existing junction is a 4-arm roundabout with an Inscribed Circle Diameter (ICD) of 43m. The A6097 runs northwest – southeast, whilst Nottingham Road runs to the southwest and Southwell Road runs to the northeast. The existing junction form is shown in Figure 3.10.

Figure 3.10: Lowdham Junction

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3.6.2 There are large journey time delays at the junction, particularly on the A6097 southbound, Epperstone Road and Nottingham Road approaches to the junction in the AM peak. The Nottingham Road approach to the junctions typically has large journey time delays in the PM peak hour. This is shown in Figures 3.11 and 3.12 which show the queue length surveys in the AM and PM peak periods.

3.6.3 The junction is restricting economic growth and housing delivery, with the nearby Teal Close development having conditional planning, but limiting the quantum of development that can be delivered prior to improvements being delivered at the junction[2].

[2] The planning condition limits the development of the Teal Close site to 325 dwellings until capacity improvements to Lowdham Roundabout occur. The scheme will allow a further 680 dwellings to progress.

Figure 3.11: Lowdham Roundabout - AM Queue Length Survey

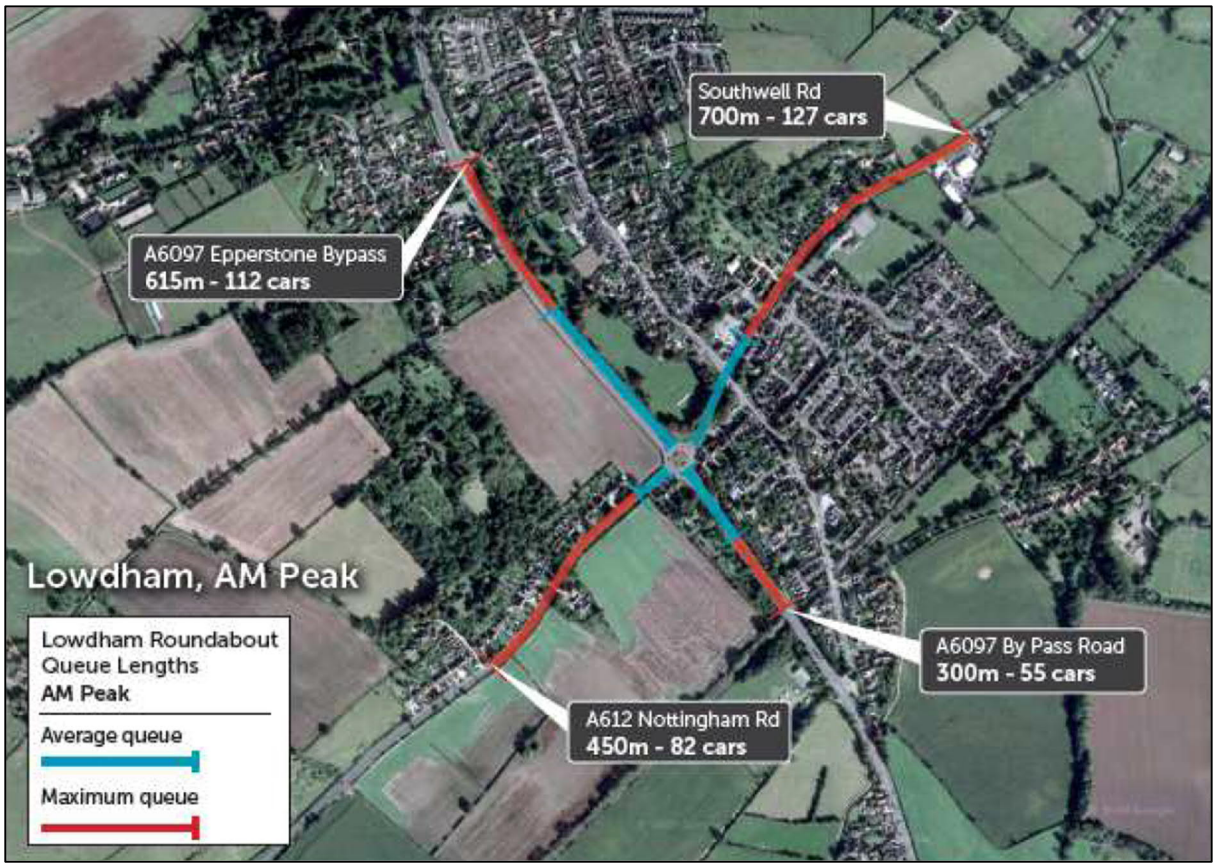
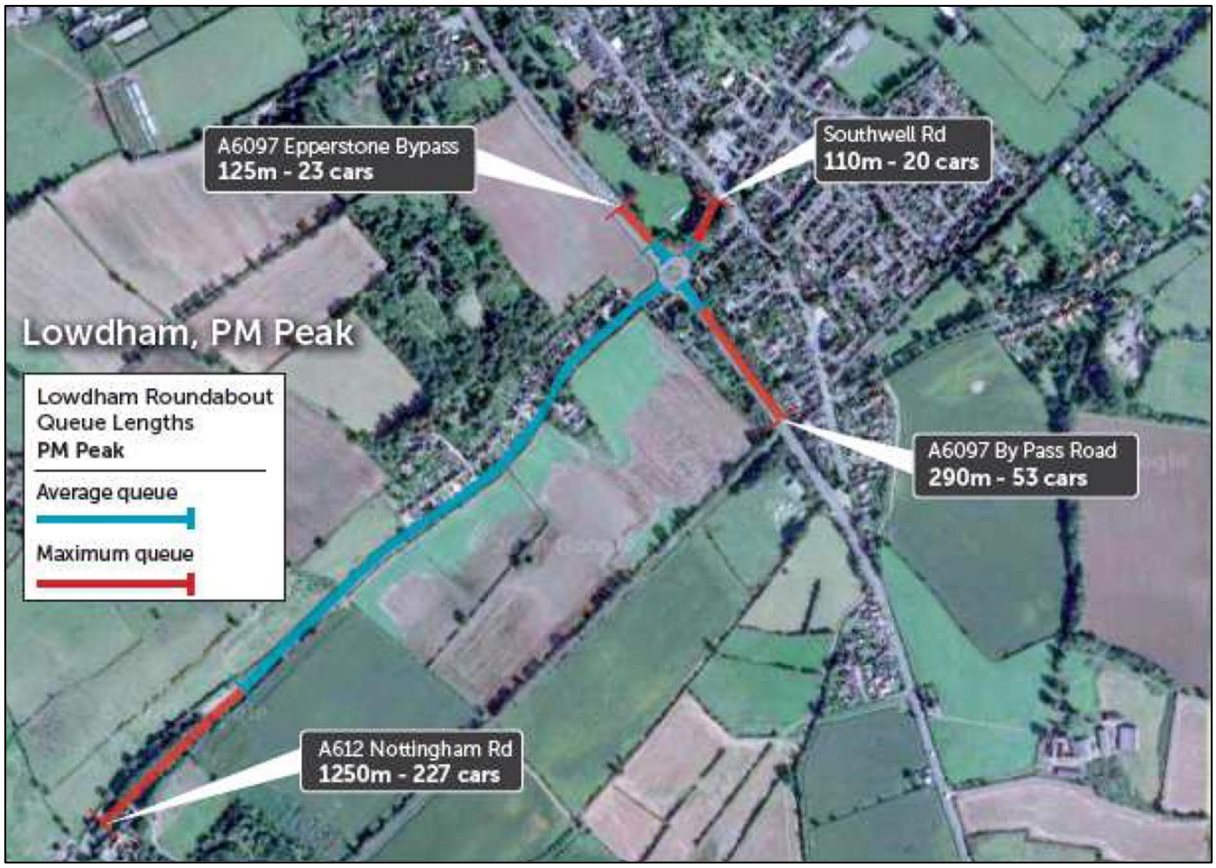


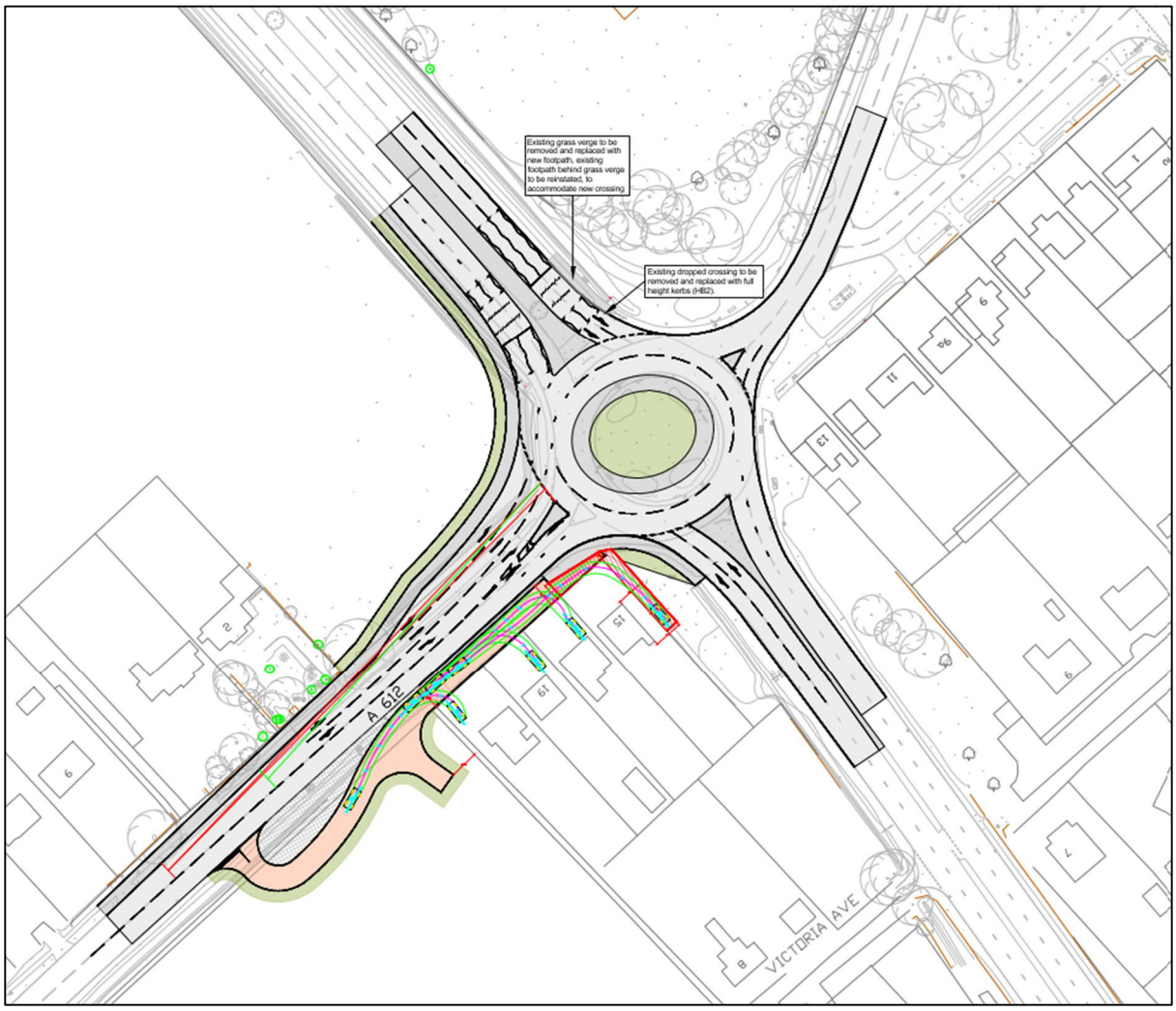
Figure 3.12: Lowdham Roundabout - PM Queue Length Survey



3.6.4 **Proposed Improvement:** It is proposed to construct an enlarged 4-arm conventional roundabout with an ICD of 65m. The proposed circulatory carriageway is 2 lanes wide to cater for side by side movements of all vehicles around the proposed circulatory of the roundabout.

3.6.5 The existing grass verge on the A6097 (N) will be removed and replaced with a new footpath, with the existing footpath behind the grass verge reinstated to accommodate a new Toucan crossing. The proposed junction is shown in Figure 3.13 with more detailed plans provided as part of the wider planning application bundle.

Figure 3.13: Lowdham Junction proposal



3.6.6 **Junction Performance:** ARCADY has been used to model the Do Minimum and Do Something scenarios. The ARCADY outputs are shown in Table 3.5. The worst preforming arm is shown in each instance, with the exception of Junctions Delays which presents the combined delays across all arms of the junction.

Table 3.5 Performance of Lowdham Junction – 2023 & 2037 (DM and DS)

	2023						2037					
	Do Minimum			Do Something			Do Minimum			Do Something		
	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)	Max Queue (PCU)	RFC	Junction Delay (s)
AM	8.2	0.90	24.62	4.9	0.84	11.78	35.3	1.16	77.76	12.3	0.98	29.62
PM	117.5	1.32	121.15	7.9	0.90	10.97	229.7	1.49	297.69	29.0	1.00	28.07
IP	1.4	0.58	5.53	1.1	0.52	3.66	2.0	0.67	6.75	1.3	0.57	4.13
OP	0.0	0.05	2.12	0.0	0.04	1.81	0.1	0.05	2.13	0.1	0.05	1.82

3.6.7 The table indicates that the junction will operate at, or over capacity, in the 2023 and 2037 Do Minimum AM and PM peak periods. Upgrading the junction to a larger conventional roundabout will result in large reductions to both delay and queue lengths.

3.6.8 **Road Safety:** During the past five full years of collision data, seven personal injury collisions were recorded at the roundabout itself, with a further three recorded within 100m of the junction (on the A6097 (N), A6097 (S) and Nottingham Road, respectively). Three collisions were recorded as 'serious' by police, whilst the remaining collisions were recorded as 'slight'. Seven of the ten collisions involved a pedal cyclist casualty.

3.7 Junction 6: Kirk Hill

3.7.1 **Form of Junction**: The existing junction is in the form of a signalised crossroads. The A6097 (Bridgford Street) runs north-west to south-east, whilst Kirk Hill runs to the north and East Bridgford Road to the south. The existing junction is shown in Figure 3.14.

Figure 3.14: Kirk Hill junction

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3.7.2 The proposed scheme at Kirk Hill junction is to provide capacity improvements at the junction to reduce journey time delays. The scheme will also improve crossing facilities for equestrian users.

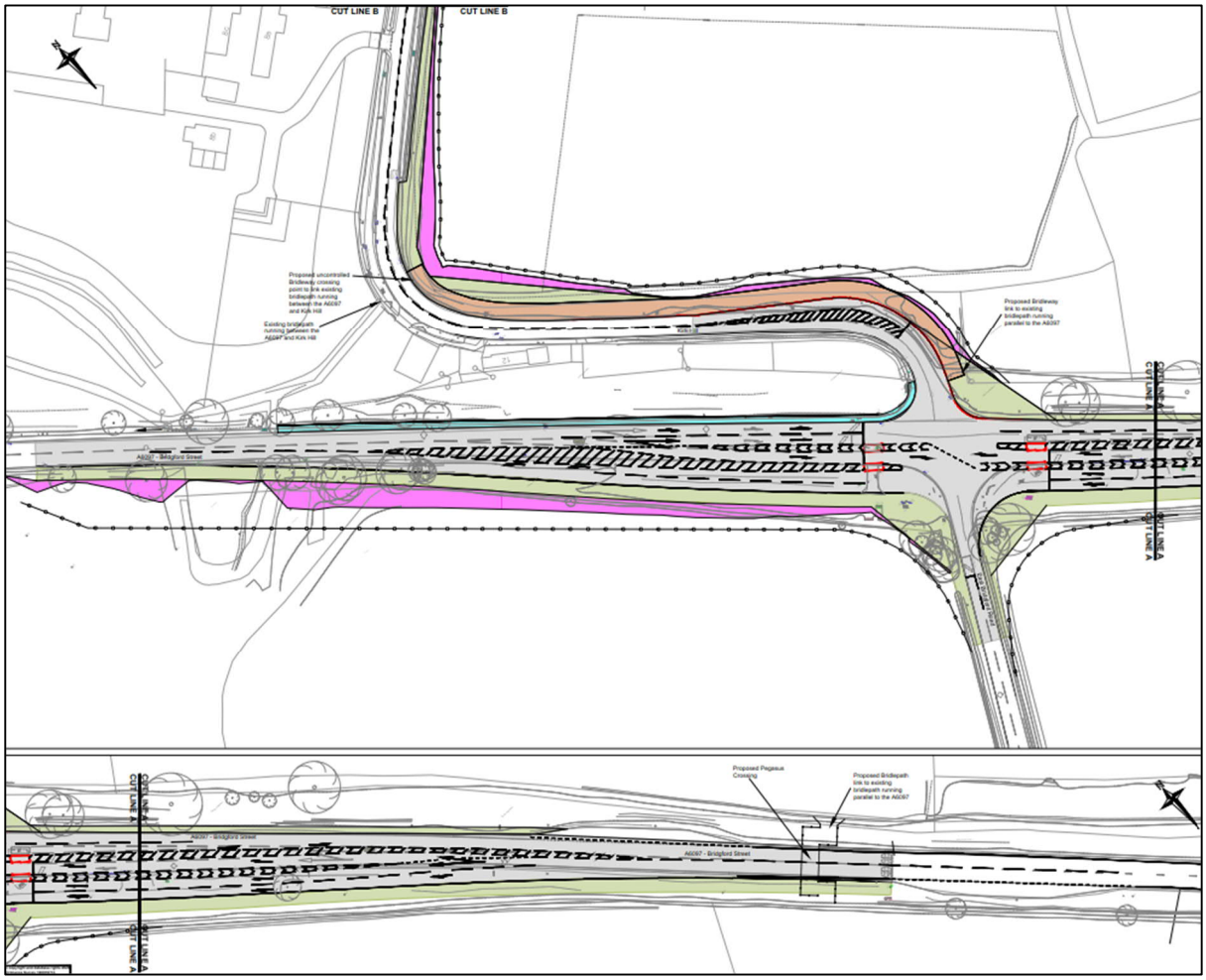
3.7.3 Queues are shown in Figures 3.15 and 3.16 which show the queue length surveys in the AM and PM peak periods.

Figure 3.15: Kirk Hill - AM Queue Length Survey

Figure 3.16: Kirk Hill - PM Queue Length Survey

3.7.4 **Proposed Improvement:** It is proposed to enlarge the existing junction to provide additional approach lanes on the A6097 mainline. The proposal is shown in Figure 3.17 with more detailed plans provided as part of the wider planning application bundle.

Figure 3.17: Kirk Hill junction proposal



3.7.5 **Junction Performance**: A LINSIG model has been prepared by VIA East Midlands Ltd to model the performance of the junction in the Do Minimum and Do Something scenarios.

3.7.6 The LINSIG outputs are shown in Table 3.6 for the 2023 / 2037 Do Minimum and Do Something scenario.

Table 3.6 Performance of Kirk Hill Junction – 2023 & 2037 (DM and DS)

	2023				2037			
	Do Minimum		Do Something		Do Minimum		Do Something	
	PRC (%)	Delay (PCU/hr)	PRC (%)	Delay (PCU/hr)	PRC (%)	Delay (PCU/hr)	PRC (%)	Delay (PCU/hr)
AM	-24.8	121.99	36.5%	21.19	-37.4	203.06	26.7%	23.81
PM	-58.7	399.58	13.8%	33.39	-65.8	478.67	9.6%	36.97
IP	54.5	12.00	155.3%	10.01	38.8	14.13	129.9%	11.36
OP	1759.7	0.73	2828%	0.72	1540.9	0.81	2375%	0.79

3.7.7 Table 3.6 indicates that there is expected to be a large delay at the junction within the Do Minimum scenario in the AM, PM and IP time periods. Junction improvements are expected to lead to reductions in delay and reduce queue lengths.

3.7.8 **Road Safety**: Five collisions have been recorded at, or within close proximity to, the junction. Two collisions were recorded at the junction itself (both were recorded as 'slight' by the police), whilst a further three collisions occurred within 100m of the junction. One of these was recorded as 'serious' by police.

3.7.9 One of the collisions involved a pedal cyclist, which was recorded as 'slight'. No collisions involving a pedestrian were recorded.

3.8 Road Safety

3.8.1 All proposed junctions would be provided to prevailing highway design standards and have been subject to the Road Safety Audit (RSA) process.

3.9 Public Transport

3.9.1 The A614 corridor is served by the Sherwood Arrow service which has an hourly frequency from Ollerton to Nottingham. The route passes through Redhill, Farnsfield, Bilsthorpe, Rufford Country Park, Sherwood Forest and Ollerton. The route takes approximately 65 minutes to travel from Ollerton to Nottingham in the AM peak and 77 minutes in the PM peak. The journey times in the other direction (Nottingham to Ollerton) are 71 minutes in the AM peak and 67 minutes in the PM peak.

3.9.2 Journey time savings created by the scheme will also benefit public transport users. In addition, NCC has a safeguarded bus based park and ride scheme at the A60/ A614 Leapool roundabout and this is anticipated to start construction in 2023 (funded via the Transforming Cities Fund tranche 2) and this scheme will be used by motorists travelling along the A614.

4. Summary and Conclusions

4.1.1 It is proposed to conduct junction improvements at six key locations on the A614 – A6097 corridor as a single scheme package. The proposed improvements are summarised in Table 4.1.

Table 4.1 A614 – A6097 junction improvement proposals

Junction	Current Junction Control	Proposed Junction improvement
Ollerton	6-arm conventional roundabout	Enlarged 5 arm conventional roundabout
Mickledale Lane	Priority crossroads	Roundabout junction
White Post	4-arm conventional roundabout	Local safety improvements
Warren Hill	3-arm gyratory	Geometric improvements to existing layout
Lowdham Roundabout	4-arm roundabout	Enlarged 4-arm conventional roundabout
Kirk Hill	Signalised Crossroads	Enlarged signalised crossroads

4.1.2 The proposed junctions have been developed to address specific policy objectives around improved journey time and reliability, network resilience, economic growth and connectivity. Investment in the A614 junctions is consistent with both the Nottinghamshire Local Transport Plan and the A614's status as part of the Major Road Network.

5. Glossary

ARCADY	*Assessment of Roundabout Capacity and DelaY*. A software tool used to assess the capacity of roundabouts under differing traffic scenarios.
Automatic Traffic Count (ATC)	A method of collecting traffic data over a long period of time, typically with temporary pneumatic tubes or by induction loops built into the road surface.
Degree of Saturation (DoS)	A measure of the operational performance of a signalled junction, with measures 100% or above indicating that a junction arm is operating above capacity.
Design Manual for Roads and Bridges (DMRB)	A highway design guide, commonly used for analysis and design of the trunk road network but also used for local roads, where appropriate.
Gravity Model	A method of calculating the likely destinations of trips from a given location based on the distance to prospective destinations and the number of people or jobs in the prospective destinations. The model pre-supposes that a destination's attractiveness is a function of its size and proximity.
Guidance on Transport Assessment (GTA)	A guidance document prepared by the Department for Transport setting out how a Transport Assessment should be prepared. Now withdrawn, but still a useful guidance document.
Inscribed Circle Diameter (ICD)	The largest circle which can be drawn within the kerbs of a roundabout. It is a measure of the overall junction size.
Junction Capacity	The number of vehicles which can be accommodated by a junction within a given period. Normally calculated using software such as ARCADY, PICADY or LINSIG. Where a junction is operating "at capacity", queues are likely to form since the number of vehicles approaching the junction is more than that which can pass through it.
LINSIG	A computer programme used for modelling traffic at traffic signal junctions. LINSIG allows engineers to model junctions in a way which closely follows the behaviour of on-site signal control equipment.
Local Highway Authority	The body responsible for the local road network in a particular area, in particular with regards network improvements and the control of development that could affect the local highway.
Local Plan	A document produced by Local Authorities containing the development plans and policy documents for the local area.

Local Transport Plan	The Transport Act 2000 required Local Highway Authorities to produce and maintain an LTP. The LTP sets out transport strategies and policies for a given area and how these will be implemented. The plans cover a defined period and are used by the DfT to make decisions on capital funding, and for Local Authorities to monitor the delivery of key objectives and targets. The current LTP document covers the period 2011- 2026.
Manual Classified Count (MCC)	A count of traffic on a particular road, or at a junction, which is usually undertaken by a team of enumerators, usually over a 12-hour period. Traffic is classified by vehicle type.
MOVA	Microprocessor Optimised Vehicle Actuation is an adaptive signal control system. It uses advanced traffic control algorithms to increase capacity and minimise delay at traffic signals. It is used at a range of junctions from high speed to smaller suburban and urban sites.
Passenger Car Unit (PCU)	A Passenger Car Unit (PCU) is a measure used primarily to assess highway capacity, for modelling purposes. Different vehicles are assigned different values, according to the space they take up so that traffic flow can be expressed as a single number. e.g. a car has a value of 1; smaller vehicles will have lower values, and larger vehicles will have higher values.
Percentage Reserve Capacity (PRC)	A total-junction statistic known as the Practical Reserve Capacity (PRC) is reported within LINSIG, which shows the percentage of “spare” capacity left at the junction. A negative PRC indicates a junction operating above is theoretical capacity.
PICADY	Priority Intersection Capacity and Delay. A software tool that predicts capacities, queue lengths and delays at non-signalised major/minor priority junctions.
Ratio of Flow to Capacity (RFC)	A measure of the performance of a junction, with a measure of 1.0 or above indicating that a junction is operating above capacity.
SATURN	A software tool used to model traffic flows on a highway network that is responsive to congestion and reassignment issues.
Severance	The separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows. An objective measurement of severance can be calculated with reference to guidance contained in the DMRB.
Transport Analysis Guidance (TAG)	A set of documents (or Units) published by the Department for Transport which sets out how a particular transport scheme should be assessed,

	principally in terms of economic analysis and calculating a Benefit:Cost ratio. Guidance on the assessment of environmental impacts of highway schemes are also contained in the guidance. Sometimes referred to as WebTAG.
Transport Assessment (TA)	A document submitted in support of a planning application which sets out the likely impact of a proposed development on the transport network. Guidance on the content of a Transport Assessment is provided in the GTA.
Travel Plan	A document submitted in support of a planning application which sets out how trips to / from a development would be managed on opening. Its objective is usually to reduce single occupancy car trips by promoting sustainable travel options.
Trip Rate Information Computer System (TRICS)	A software tool which contains traffic survey data classified by land-use type and size. It is used to estimate the number of trips that could be generated by a proposed development based on experience elsewhere in the UK, and is recommended for this purpose in the GTA.
Trip Assignment	A stage in the estimation of future traffic conditions. The process of "assigning" traffic flows to particular links and junctions to and from a particular destination. It is preceded by Trip Distribution.
Trip Distribution	A stage in the estimation of future traffic conditions. The process of determining the likely origins and destinations of traffic to and from a proposed development. This stage does not make any assumptions about routeing, and is followed by Trip Assignment.
Trip End Model Programme (TEMPRO)	The TEMPRO database contains information relating to land-use developments across the United Kingdom. It is used to forecast traffic growth in / from specific areas.
Trip Generation	A stage in the estimation of future traffic conditions. Trip Generation is an estimate of the total arrivals and departures that could be generated by a development within a specific time period. The software tool TRICS is commonly used to inform this stage. This stage is followed by Trip Distribution and Trip Assignment.
WebTAG	See TAG.

Appendix A

Traffic Flows

Junction	Length	Lane	Base				2023				2037			
			AM	IP	PM	OP	AM	IP	PM	OP	AM	IP	PM	OP
Ollerton	OllertonA616(W)	A616(W)	350	208	294	20	363	216	313	21	368	220	317	21
	OllertonA614(N)	A614(N)	462	337	490	33	489	355	523	35	499	362	530	35
	OllertonA616(E)	A616(E)	717	665	1,081	65	780	698	1,133	68	809	713	1,141	70
	OllertonA614(S)	A614(S)	825	586	674	57	907	636	755	62	938	653	775	64
	OllertonA6075	A6075	386	277	345	27	465	321	417	31	467	323	420	32
	OllertonA616(W)	A616(W)	306	229	438	22	327	239	459	23	336	243	462	24
	OllertonA614(N)	A614(N)	555	345	493	34	597	364	529	36	613	371	537	36
	OllertonA616(E)	A616(E)	801	590	615	58	843	621	666	61	857	634	679	62
	OllertonA614(S)	A614(S)	830	620	891	61	925	669	971	65	959	687	989	67
	OllertonA6075	A6075	247	289	448	28	312	333	516	33	316	336	515	33
Deerdale	DeerdaleA614(N)	A614(N)	942	540	934	53	1,038	593	934	58	1,072	612	953	60
	DeerdaleDeerdale Lane (E)	Deerdale Lane (E)	98	95	146	9	118	107	146	10	121	109	148	11
	DeerdaleA614(S)	A614(S)	841	547	945	53	909	588	945	58	941	606	964	59
	DeerdaleDeerdale Lane (W)	Deerdale Lane (W)	8	9	8	1	8	9	8	1	8	10	8	1
	DeerdaleA614(N)	A614(N)	811	553	958	54	893	603	959	59	924	620	977	61
	DeerdaleDeerdale Lane (E)	Deerdale Lane (E)	141	85	112	8	156	96	112	9	159	98	114	10
	DeerdaleA614(S)	A614(S)	927	547	945	53	1,013	592	944	58	1,048	611	963	60
	DeerdaleDeerdale Lane (W)	Deerdale Lane (W)	10	7	17	1	11	7	17	1	11	7	17	1
Mickledale	MickledaleA614(N)	A614(N)	918	546	936	53	1,004	590	935	58	1,039	609	954	60
	MickledaleMickledale Lane	Mickledale Lane	150	106	163	10	183	123	163	12	187	125	165	12
	MickledaleA614(S)	A614(S)	863	582	1,073	57	944	638	1,074	62	978	657	1,095	64
	MickledaleInkersall Lane	Inkersall Lane	6	9	2	1	6	9	2	1	6	9	2	1
	MickledaleA614(N)	A614(N)	832	548	948	54	900	589	948	58	931	607	967	59
	MickledaleMickledale Lane	Mickledale Lane	84	100	206	10	100	117	207	11	102	119	208	12
	MickledaleA614(S)	A614(S)	1,004	581	1,014	57	1,121	641	1,013	63	1,159	662	1,035	65
	MickledaleInkersall Lane	Inkersall Lane	16	12	6	1	17	13	6	1	18	13	6	1
Lowdham	LowdhamA6097(NE)	A6097(NE)	1,195	604	942	59	1,284	649	941	63	1,328	674	967	66
	LowdhamSouthwell Road	Southwell Road	395	327	436	32	402	336	436	33	407	342	441	33
	LowdhamA6097(SE)	A6097(SE)	1,102	752	1,430	74	1,182	809	1,430	79	1,250	854	1,487	83
	LowdhamA612	A612	628	527	830	52	668	553	830	54	703	574	844	56
	LowdhamA6097(NE)	A6097(NE)	1,017	675	1,409	66	1,083	718	1,410	70	1,122	741	1,437	72
	LowdhamSouthwell Road	Southwell Road	474	371	655	36	490	380	655	37	502	386	656	38
	LowdhamA6097(SE)	A6097(SE)	960	679	987	66	1,064	739	986	72	1,139	785	1,034	77
	LowdhamA612	A612	869	486	586	48	901	510	586	50	925	532	612	52
Kirkhill	KirkhillA6097 NB	A6097 NB	1,062	678	1,072	66	1,280	683	1,216	60	1,407	767	1,263	65
	KirkhillKirk Hill	Kirk Hill	218	125	163	12	211	120	213	10	220	128	218	9
	KirkhillA6097 SB	A6097 SB	789	680	980	66	946	672	1,405	57	1,027	740	1,430	63
	KirkhillNewton Lane	Newton Lane	168	74	314	7	161	70	313	7	169	75	337	7
	KirkhillA6097 NB	A6097 NB	1,026	754	1,320	74	1,176	745	1,789	63	1,268	787	1,852	70
	KirkhillKirk Hill	Kirk Hill	124	96	122	9	113	95	122	9	118	96	125	9
	KirkhillA6097 SB	A6097 SB	975	625	978	61	1,191	627	1,128	54	1,317	746	1,160	61
	KirkhillNewton Lane	Newton Lane	112	82	109	8	118	77	108	8	120	81	111	4