Heyford Park

Transport Assessment

On behalf of **Dorchester Group**

Project Ref: 39304 | Rev: 01 | Date: April 2018

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Document Control Sheet

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1 Introduction

1.1 Background

1.1.1 Peter Brett Associates LLP (PBA) have been commissioned by Dorchester Group to undertake a comprehensive Transport Assessment (TA) which considers transport impacts and associated package of measures required to support the allocation of 1,600 homes and 1,500 jobs at Heyford in accordance with policy Villages 5 of the adopted Cherwell District Council (CDC) Local Plan.

1.1.2 The Transport Assessment enables CDC and Oxfordshire County Council (OCC), as local planning and highway authorities, to consider the cumulative transport effects of the Local Plan allocation. This will serve as a basis for informing planning decisions and establishing the transport requirements in terms of S106 obligations and planning conditions relating to any consents granted for applications submitted in respect of the Heyford Local Plan allocation.

1.1.3 A copy of the proposed development's Parameter Plan is contained at **Appendix A** and further details in respect of the development proposals and sites considered and assessed as part of this TA are set out in **Section 4** of this TA.

1.2 Scoping and Consultation of the Transport Assessment

1.2.1 An extensive series of technical meetings and consultations has been undertaken and remains ongoing with CDC, OCC and Highways England (HE) in developing the scope, technical methodology and parameters underpinning the assessment work and subsequent strategy for all land and potential development which falls within Dorchester Group ownership. Meetings have been held on the following dates with on-going liaison between times to agree the scope of the TA, modelling work and any mitigation measures proposed:

- 21st September 2016 (OCC);
- 1st February 2017 (OCC / HE);
- 6th April 2017 (OCC);
- 11th May 2017 (OCC / HE / CDC);
- 20th June 2017 (OCC / HE);
- 26th July 2017 (OCC / HE / CDC);
- 26th September 2017 (OCC / CDC);
- 6th October 2017 (HE);
- 29th November 2017 (OCC / CDC);
- 11th January 2018 (OCC / CDC); and
- 12th February 2018 (HE / OCC / CDC).

1.2.2 A series of stakeholder consultation events were also held on the following dates to inform the public about the development proposals and transport implications of the development:

- 5th October 2017;
- 7th October 2017; and
- 10th October 2017.

1.3 Content of TA report

1.3.1 This report includes the following sections:

- **Section 2**: Policy Context;
- **Section 3**: Existing Conditions;
- **Section 4**: Development Proposals;
- **Section 5**: Movement Framework;
- **Section 6**: Assessment Methodology;
- **Section 7**: Proportional Impact Analysis;
- **Section 8**: 2016 Baseline Modelling;
- **Section 9**: Camp Road / Site Access Junctions;
- **Section 10**: Local Road Network;
- **Section 11:** Strategic Road Network;
- **Section 12**: Travel Plans; and
- **Section 13**: Conclusions.

2 Policy Context

2.1 Introduction

2.1.1 A review has been undertaken of the national, regional and local transport policy documents in order to inform the development proposals. This section of the report sets out the key relevant policies.

2.2 National Planning and Policy Context

National Planning Policy Framework (NPPF)

2.2.1 The National Planning Policy Framework (NPPF, Department for Communities and Local Government, 2012) sets out the Government's economic, environmental and social planning policies for the country. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

2.2.2 The NPPF sets out the Government's commitment to ensuring that the planning system does everything it can to support sustainable economic growth. A positive planning system is essential because, without growth, a sustainable future cannot be achieved. Planning must operate to encourage growth and not act as an impediment. Therefore, significant weight should be placed on the need to support economic growth through the planning system.

2.2.3 The NPPF sets out 12 Core Planning Principles at paragraph 17. With regards to the principles that Authorities should consider in determining planning applications (rather than those which specifically relate to plan making), these state that planning should:

"*3. Pro-actively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs. Every effort should be made objectively to identify and then meet the housing, business, and other development needs of an area, and respond positively to wider opportunities for growth.*

9. Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas

11. Actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable".

2.2.4 The NPPF recognises the importance transport policies have in facilitating development but also in contributing to wider sustainability and health objectives. The Framework identifies at paragraph 32, that "*all developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment… Plans and decisions should take account of whether:*

- *The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *Safe and suitable access to the site can be achieved for all people; and*
- *Improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe"'.*

2.2.5 NPPF, in paragraphs 34 to 36, identifies that "*Local Authority plans and decisions should ensure developments that generate significant movements are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised… Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods and people. Therefore, developments should be located and designed where practical to:*

- *"Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;*
- *Create safe and secure layouts which minimise the conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;*
- *Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and*
- *Consider the needs of people with disabilities by all modes of transport."*

2.2.6 NPPF recognises that a key tool to facilitate this will be a Travel Plan such that all developments which generate significant amounts of movement should be required to provide a Travel Plan.

Planning Practice Guidance

2.2.7 The Government has recently adopted the national Planning Practice Guidance (PPG), which provides comprehensive guidance *Transport evidence bases in Plan making*, compatible with the NPPF, superseding much previous guidance, such as Department for Transport's *Guidance on Transport Assessment* (2007).

2.2.8 The PPG includes a section dedicated *to "Why are Travel Plans, Transport Assessment and Statements important?"*, citing the following points:

- 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.

2.2.9 The guidance specifies that it is linked directly to paragraphs 17 (bullet point 11), 39 and 40 of the NPPF and explains that planning should actively manage patterns of growth in order to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are, or can be made, sustainable.

2.2.10 Under the section *"What key principles should be taken into account in preparing a Travel Plan, Transport Assessment or Statement?"*, the guidance states that Travel Plans, Transport Assessments and Statements should be:

- Proportionate to the size and scope of the proposed development to which they relate and build on existing information wherever possible;

- Established at the earliest practicable possible stage of a development proposal;

- Tailored to particular local circumstances (other locally-determined factors and information beyond those which are set out in this guidance may need to be considered in these studies provided there is robust evidence for doing so locally); and

- Brought forward through collaborative ongoing working between the local planning authority/Transport Authority, transport operators, Rail Network Operators, Highways Agency (now known as Highways England) where there may be implications for the Strategic Road Network and other relevant bodies. Engaging communities and local businesses in Travel Plans, Transport Assessments and Statements can be beneficial in positively supporting higher levels of walking and cycling (which in turn can encourage greater social inclusion, community cohesion and healthier communities).

2.2.11 The guidance also sets out the ways in which these documents can be made to be as useful and accessible as possible – by ensuring that any information or assumptions should be set out clearly and be publicly accessible.

2.3 Local Planning Policy Context

Oxfordshire Local Transport Plan: Connecting Oxfordshire 2015 - 2031

2.3.1 The current Oxfordshire Local Transport Plan: Connecting Oxfordshire 2015-2031 (LTP4) sets out OCC's policy and strategy for developing the transport system in Oxfordshire to 2031. The LTP4 was adopted as policy in September 2015.

2.3.2 Connecting Oxfordshire has these transport goals:

i. To support jobs and housing growth and economic vitality;

ii. To support the transition to a low carbon future;

iii. To support social inclusion and equality of opportunity;

iv. To protect, and where possible enhance Oxfordshire's environment and improve quality of life; and

v. To improve public health, safety and individual wellbeing.

2.3.3 A set of ten objectives form the basis for achieving these goals, and have been grouped under three themes:

Theme 1: Supporting growth and economic vitality (Goal 1)

- *"Maintain and improve transport connections to support economic growth and vitality across the county;*

- *Make most effective use of all available transport capacity through innovative management of the network;*

- *Increase journey time reliability and minimise end-to-end public transport journey times on main routes; and*

- *Develop a high quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment."*

Theme 2: Reducing Emissions (Goal 2)

- *"Minimise the need to travel;*
- *Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive;*
- *Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment; and*
- *Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets."*

Theme 3: Improving quality of life (Goals 3, 4 and 5)

- *"Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment; and*
- *Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties, and enabling inclusive access to jobs, education, training and services."*

2.3.4 The LTP4 Volume 2 Area Strategies states the following under the Bicester Area Strategy with regards to development at Heyford Park:

*"BIC1 – **Improve access and connections between key employment and residential sites and the strategic transport system by**:*

- ***Reviewing key county road links out of Bicester, including those that cross the county boundary**… The interrelationship of development at Upper Heyford with that of Bicester, connected by the B4030, will be considered carefully."*

*"BIC2 – **We will work to reduce the proportion of journeys made by private car by implementing a Sustainable Transport Strategy by**:*

- ***Growth at Upper Heyford** will need to be considered in terms of improved public transport frequency and connectivity with Bicester."*

2.3.5 The LTP4 recognises the importance of Travel Planning to encourage people to change their travel habits to ones which will cause fewer environmental problems. Travel Planning provides initiatives to increase levels of walking, cycling and use of public transport as appropriate, to bring about improved health and help towards the goal of reducing peak time traffic congestion.

2.3.6 Policy 34 of the LTP4 requires *"the layout and design of new developments to proactively encourage walking and cycling, especially for local trips, and allow developments to be served by frequent, reliable and efficient public transport."* This will be supported by the preparation of effective travel plans.

Cherwell Local Plan 2011-2031

2.3.7 Part 1 of the Cherwell Local Plan was re-adopted on 19th December 2016 and sets out how the district will grow and change up to 2031. It sets out the proposals for how they will develop and support the local economy, protect villages and strengthen town centres.

2.3.8 Section A sets out objectives for 'Ensuring Sustainable Development' and lists Strategic Objectives such as:

- *"Strategic Objective 13. To reduce the dependency on the private car as a mode of travel, increase the attraction of and opportunities for travelling by public transport, cycle and on foot, and to ensure high standards of accessibility for people with impaired mobility.*

- *Strategic Objective 14. To create more sustainable communities by providing high quality, locally distinctive and well-designed environments which increase the attractiveness of Cherwell's towns and villages as places to live and work and which contribute to the well-being of residents."*

2.3.9 Policy SLE 4: *Improved Transport Connections* details the Council's requirements of new developments in relation to transport connections. The policy states:

- *"All development where reasonable to do so, should facilitate the use of sustainable modes of transport to make the fullest use of public transport, walking and cycling."*

2.3.10 The Cherwell Local Plan lists former RAF Upper Heyford under *Section C.5 Our Villages and Rural Areas* and specifically in *Policy Villages 5: Former RAF Upper Heyford*. *Policy Villages 5* states that Heyford Park as a whole will provide a new settlement of approximately 1,600 dwellings (in addition to the 761 dwellings (net) already permitted) together with additional employment and supporting social and physical infrastructure, including the need to provide a local centre/hotel. Some of the key specific design and place shaping principles required of the development are:

- *"The settlement should be designed to encourage walking, cycling and use of public transport rather than travel by private car, with the provision of footpaths and cycleways that link to existing networks.*

- *Development should provide for good accessibility to public transport services.*

- *A Travel Plan should accompany any development proposals."*

Infrastructure Delivery Plan

2.3.11 Appendix 8 of The Cherwell Local Plan 2011 – 2031 contains *'The Infrastructure Delivery Plan'* which details the new infrastructure and key facilities the Local Plan will secure. The infrastructure to be secured at the Former RAF Upper Heyford, as detailed in the Plan, is listed below:

"14b Local and Area Bus Services – Former RAF Upper Heyford:

- *New or Improved Bus Services with connections to other transport nodes.*

- *Improved accessibility.*

- *Provide sustainable travel options.*

14d Highway Improvements and Traffic Management Measures (including to the rural road network to the west and at Middleton Stoney) – Former RAF Upper Heyford:

- *Improvements to the highways network as required by the Highways Authority in addition to the approved scheme. Including capacity improvements and village traffic calming subject to Transport Assessment.*

14e Junction 10 capacity improvements – Former RAF Upper Heyford:

- *Contributions to capacity improvements as required by the Highways England."*

2.4 Highways England Guidance

Highways England, The Strategic Road network, Planning for the future (September 2015)

2.4.1 This document is a guide to working with Highways England on planning matters and Paragraph 3 states that:

- *"The document is written in the context of statutory responsibilities as set out in our Licence, and in the light of Government policy and regulation, including the National Planning Policy Framework (NPPF)…and DfT Circular 02/2013 The Strategic Road Network and the delivery of sustainable development ('the Circular')."*

2.4.2 Para 69 states, *"Development should be promoted at locations that are or can be made sustainable, that facilitate the uptake of sustainable transport modes, and support wider social and health objectives, and which support existing business sectors as well as enabling new growth."*

Department for Transport (DfT) Circular 02/13: The Strategic Road Network and the Delivery of Sustainable Development'

2.4.3 This document sets out the way in which Highways England will engage with communities and the development industry to deliver sustainable development whilst safeguarding the primary function and purpose of the strategic road network.

2.4.4 With regards to Transport Assessments, the Circular states in Paragraph 48: *"Transport assessment undertaken by the promoter of the development should be comprehensive enough to establish the likely environmental impacts, including air quality, light pollution and noise, and to identify the measures to mitigate these impacts."*

2.4.5 Paragraphs 25, 27 and 34 of the Circular provide guidance on assessment of development in the future years. Paragraph 34 states,

- *"Where insufficient capacity exists to provide for overall forecast demand at the time of opening, the impact of the development will be mitigated to ensure that at that time, the strategic road network is able to accommodate existing and development generated traffic. Any associated mitigation works should be appropriate to the overall connectivity and capacity of any affected part of the strategic road network."*

2.5 Relevance to the Proposed Development

2.5.1 The proposed development takes full account of the planning and transport policies identified above and the rest of this report demonstrates how the proposed development responds positively to these policies.

3 Existing Conditions

3.1 Introduction

3.1.1 The following section sets out a description of the site location and local transport conditions at the Heyford Park development. It is broken down into existing and consented provision across the site.

3.1.2 "*Existing*" refers to any provision already built and operational, including provision associated with the 1,075 scheme. "*Consented*" refers to any provision that has been granted permission but has not yet been constructed / become operational. This may also include elements of the 1,075 scheme that have not been constructed at the time of writing of this Transport Assessment (February 2018).

3.2 Site Location and Description

3.2.1 The Heyford Park site is located on the former RAF Upper Heyford site, which lies approximately 20km north of Oxford. The nearest towns to the site are Bicester, approximately 7.5km southeast of the site, Brackley approximately 13km northeast, and Banbury 16km to the north (all distances crow fly). **Figure 3.1** illustrates the site location at a strategic level.

3.2.2 Heyford Park offers a great range of infrastructure over a sizeable area due to its military history. Following the closure of the airfield (1994), most of the infrastructure has been retained, with some now used for commercial purposes, although some are also disused and derelict. The existing employment areas comprise some B1 use with predominantly B2 / B8 uses occupying the existing Flying Field Buildings. There are also 313 dwellings formerly used by military personnel which are still in use on the site for residential purposes and a further 865 residential dwellings with consent currently being constructed.

3.2.3 The RAF Upper Heyford former airbase site covers a total area of 520 ha (1,285 acres) with several existing points of access along Camp Road.

3.2.4 The M40 forms part of the strategic route to London to the southeast and Birmingham to the northwest.

3.3 Local Highway Network

Existing Provision

Camp Road

3.3.1 Camp Road forms the arterial route through former RAF Upper Heyford and connects the site to Upper Heyford village, and Somerton Road / Station Road to the west and to the B340 in the east. An overview of the currently consented highway scheme for Camp Road is illustrated on Woods Hardwick **Drawings HEYF-5-514 Q, HEYF-5-515 P, HEYF-5-516 Q** and **HEYF-5-517 Q** at **Appendix B** . It should be noted that the scheme shown between the two red outlines on **Drawing HEYF-5-516 Q** is not a consented scheme and has since been superseded by proposals associated with the Village Centre in this location. These proposals are detailed at **Section 5.2**.

3.3.2 Currently, Camp Road is approximately 6m wide where it passes through the existing development, with one lane in either direction for the majority of the carriageway, and reduction to single-lane operation at a number of locations which provides traffic calming features i.e. kerb extensions. Camp Road is restricted to a 30mph speed limit along its length. Street lighting is provided and pedestrian footpaths are present along its length, although not all of the footways have been formally adopted and are therefore not maintained at public expense by the local authority.

3.3.3 Camp Road is in the process of being improved as part of work associated with the consented development. These works are shown on Woods Hardwick plans at **Appendix B** . These improvements include a shared surface area in close proximity to the existing main gate, which will be adjacent to the proposed village centre location.

Chilgrove Drive

3.3.4 Chilgrove Drive historically formed a connection between Camp Road and Somerton Road to the north of the airfield but was cut off when the airfield was developed, creating a no through road and forming an access to the airfield. In recent times the access to the airfield has been temporarily blocked up. The current Chilgrove Drive is a narrow rural road approximately 3.6m wide up to 70m north of its junction with Camp Road and is approximately 2.5m wide thereafter. There is a consented scheme to upgrade Chilgrove Drive however it is proposed that the new application will supersede this scheme and Chilgrove Drive will be upgraded and a new access to the site provided at the junction with Camp Road.

Unnamed Road (between Camp Road and B430 Ardley Road)

3.3.5 The Unnamed Road between Camp Road and B430 Ardley Road is a narrow rural road which runs east to west and connects Camp Road in the west to Ardley Road in the east. The carriageway is approximately 5.4m in the vicinity of the Camp Road junction and approximately 5.5m wide at the junction with Ardley Road. The road is subject to a 60mph speed limit from the Ardley Road junction until it reaches the Camp Road junction where it decreases to 30mph.

Unnamed Road (between Camp Road and B4030)

3.3.6 The Unnamed Road between Camp Road and B4030 is a narrow rural road which runs north to south and connects Camp Road in the north to the B4030 in the south. The carriageway is approximately 6.0m in the vicinity of the Camp Road junction and approximately 6.2m wide at the junction with the B4030. The road is subject to a 60mph speed limit from the B4030 junction until it reaches the Camp Road junction where it decreases to 30mph.

B4030 (between Unnamed Road and B430)

3.3.7 The B4030 between Unnamed Road and the B430 is a rural road which runs northwest to southeast and connects the Unnamed Road to the northwest to the B430 in the southwest. The carriageway is approximately 6.1m in the vicinity of both the Unnamed Road junction and the B430 junction. The road is subject to national speed limit from the Unnamed Road until the approach to the village of Middleton Stoney, where the speed limit is reduced to 30mph through the village.

B430

3.3.8 The B430 forms a north-south link between the M40 and the A34 Trunk Road at Weston-on-the-Green, providing access to other key destinations including Banbury and Oxford. To the north, the B430 terminates at Junction 10 of the M40 immediately north of the village of Ardley. The road is subject to a 60mph speed limit which decreases to 40mph through Ardley. To the south, the B430 terminates at the A34 Trunk Road. The road is subject to a 60mph speed limit until it reaches the village of Weston-on-the-Green where it decreases to 40mph through the village. The B340 meets the B4030 at a staggered crossroads in Middleton Stoney, located around 3.0kms to the south east of former RAF Upper Heyford. The road through Middleton Stoney is subject to a 30mph speed limit.

Station Road

3.3.9 Station Road is a narrow road which runs north to south and connects Camp Road in the north to the B4030 in the south. The carriageway is approximately 6.2m in the vicinity of the Camp Road junction and approximately 6.1m wide at the junction with the B4030. The road is subject to a 30mph speed limit from the Camp Road junction before turning to national speed limit, the road is then restricted back to 30mph on the approach into Lower Heyford and the B4030 junction.

B4030 (Station Road to A4260)

3.3.10 The B4030 is a narrow rural road which runs east to west and connects Station Road in the east to the A4260 in the west. The carriageway is approximately 5.6m wide in the vicinity of the Station Road junction and approximately 6.3m in the vicinity of the A4260 junction. The road is subject to national speed limit.

Somerton Road

3.3.11 Somerton Road is a narrow rural road which provides a connection from Camp Road to the village of Somerton in the north. The road is subject to a 30mph speed limit through Upper Heyford which increases to national speed limit when leaving the village in either direction.

3.3.12 Somerton Road links to Station Road at the junction with Camp Road which continues to the B4030 which runs parallel to Camp Road and onwards to the A4260 to the west.

A4260

3.3.13 The A4260 connects Banbury in the north to Frieze Way near Oxford in the south and is a predominantly rural road. The road passes through the villages of Kidlington, Deddington and Adderbury. The carriageway varies in width and speed limit along its approximate 33km stretch.

Consented Provision

3.3.14 As part of the 1,075 scheme, a roundabout was consented at the Camp Road / Chilgrove Drive junction. In addition, a HGV access was to be located where the school is now situated. However, due to the ongoing development, local plan allocation and emerging masterplan, these consented schemes are no longer appropriate and alternatives are proposed to support the current Local Plan allocation. The revised proposals are presented within **Section 9**.

3.3.15 There is a committed Section 278 (S278) scheme for the Middleton Stoney junction that was secured as part of the Dorchester Group's previously approved 1,075 scheme and is shown on Woods Hardwick Drawing HEY/5/582 C, which is provided in **Appendix C** . The committed S278 scheme retains the existing signalised junction form but widens the B430 Oxford Road approach, providing a right turn flare for vehicles turning into B4030 Bicester Road and also provide a short right turn island for vehicles turning into B4030 Heyford Road. The committed S278 scheme provides a baseline infrastructure scheme for consideration of future needs at this location to support the current Local Plan allocation.

3.4 Existing Traffic Flows

3.4.1 In order to establish the baseline traffic conditions and to enable junction capacity analysis to be carried out, traffic flow information has been obtained as follows.

3.4.2 PBA commissioned Community Systems Limited (CSL) to carry out Manual Classified Counts (MCC) at the following locations in June 2013:

- J10 - Camp Road / Kirtlington Road Junction; and

- J11 - Station Road / Camp Road Junction.

3.4.3 PBA commissioned Advanced Transport Research (ATR) to carry out MCC at the following locations in June 2014:

- J5 - B430 / Unnamed Road Junction; and
- J12 – B4030 / Portway Junction.

3.4.4 PBA commissioned ATR to carry out Manual Classified Counts (MCC) at the following locations in June 2016:

- Junction 2a - M40 Junction 10 Southbound Off-slip/A43 Roundabout;
- Junction 2b - M40 Junction 10 Southbound On-slip/A43/Services;
- Junction 2c - M40 Junction 10 Northbound slips/A43/B430 (Ardley) Roundabout;
- Junction 3 - A43/B4100 Roundabout;
- Junction 4a - B430 / Northampton Road Mini-Roundabout;
- Junction 4b - B430 / Oxford Road T-Junction;
- Junction 6 - B430 / B4030 (Middleton Stoney) Staggered Crossroads;
- Junction 7 - A4095 / B430 Oxford Road Staggered Crossroads;
- Junction 8 - A4095 / Middleton Stoney Road Roundabout;
- Junction 9 - B4030 Lower Heyford Road / Unnamed Road T-Junction;
- Junction 13 - Station Road / Freehold Street / B4030 Crossroads;
- Junction 14 - A4260 / Somerton Road Crossroads;
- Junction 15 - A4260 / B4030 (Hopcrofts Holt) Staggered Crossroads;
- Junction 16 - A4260 / Unnamed Road Staggered Crossroads;
- Junction 17 - A4260 Banbury Road Staggered Crossroads;
- Junction 18 - A4260 / B4027 Staggered Crossroads;
- Junction 19 - Port Way / A4095 Junction;
- Junction 20 - A4095 / Bletchingdon Road Junction; and
- Junction 21 - B4027 / A4095 Junction.

3.4.5 The locations of the junctions surveyed, as listed above, are shown on **Figure 3.2**.

3.4.6 The surveys confirmed the following peak hours for the study network:

- AM Peak Hour = 07:45 – 08:45; and
- PM Peak Hour = 17:00 – 18:00.

3.4.7 The peak hour traffic flows which have been obtained through the surveys are shown on **Figures 3.3** to **3.8**. Flow data from 2013 and 2014 have been growthed to 2016, as shown on the 2016 figures (**Figure 3.7 and 3.8**).

3.4.8 In November 2017 OCC requested that further junctions were included within the scope of the assessment including:

- B430 / Ardley Road staggered crossroads
- B430 / Somerton Road T-Junction;
- B430 / Church Road T-Junction; and
- A4260 / A4095 staggered crossroads.

3.4.9 Surveys for these junctions were undertaken on the 8th February 2018, however, work to assess these junctions has not yet been completed. On this basis these junctions have been excluded from this report and will be considered in detail during the determination period for the planning application.

3.5 Walk and Cycle Provision

3.5.1 **Figure 3.9** illustrates the existing and consented pedestrian and cycling routes, along with the location of the nearest bus stops.

Existing Provision

3.5.2 Camp Road provides walk and cycle access from the proposed development towards Upper Heyford to the west, and commuting, education and leisure opportunities to the east.

3.5.3 There is a footpath running adjacent to Camp Road on the south side. This starts at the junction with Larsen Road, and runs all the way to the Kirtlington Road junction. Along its length, the footpath is separated from the carriageway by verge and hedgerow. Beyond Kirtlington Road, the path adjoins the southern side of Camp Road to become a footway, approximately 1m to 1.5m wide.

3.5.4 There is a footpath running adjacent to Camp Road on the north side. A 1-2m wide footpath begins at the junction with Larsen Road and runs up until the Main Gate access to Heyford Park. The footpath then continues from approximately 125m east of Dacey Drive for a further 300m to the west. There are no controlled pedestrian crossing points on Camp Road, however, dropped kerbs and tactile paving are provided to enable uncontrolled crossing via the splitter islands on the approaches to the Main Gate roundabout. This provides access to the main employment area and Heyford Park Free School. Street lighting is provided on Camp Road for its entire length.

3.5.5 For the final 120m of Camp Road, towards Somerton Road and Upper Heyford at the western end of the road, there are footways on both sides of the road of between 0.5 and 1m width. It is therefore possible to walk from the proposed development site to the existing bus stops on Camp Road close to the Somerton Road junction.

3.5.6 There is a consented S278 scheme, currently under construction along Camp Road, which is set out in Woods Hardwick plans at **Appendix B** . This scheme will provide a footway on the northern side of Camp Road, separated from the road along much of its length by a verge retaining existing hedgerows. On the southern side of Camp Road, shared footway/cycleway is to be provided, separated from the carriageway in most places by a verge with trees planted. The footway is up to 2m to the north of Camp Road and the foot/cycleway is up to 3m to the south of Camp Road.

3.5.7 To the west of Heyford Park, in Upper Heyford Village, there is a footway of about 0.5m width on the east side of Somerton Road where it meets Camp Road. This runs for about 60 metres in a northerly direction, and then switches to the other side of the road. The footway / footpath runs to the end of the village of Upper Heyford in a northerly direction for another 300m. This provides access to The Barley Mow Public House and village allotments. There are no footways/footpaths along Station Road from the junction with Camp Road.

3.5.8 There are a number of existing Public Rights of Way (PRoWs) criss-crossing the local area and these existing rural links are made up of the following:

- A network of public footpaths and bridleways to the south and east of the site linking Camp Road to Caulcott to the south, and Ardley at the northeast of the site;
- A network of public footpaths and bridleways to the northern perimeter of Heyford Park linking Fritwell with Somerton; and
- A network of public footpaths and bridleways to the south and west of the site linking Upper Heyford, Lower Heyford and Steeple Aston.

3.5.9 Historically, there were a number of PRoWs crossing Heyford Park, but some of these were curtailed when the site came into military use, circa 1915.

3.5.10 The key routes which were curtailed when the site came into military use include:

- Portway – a bridleway to the west of the runway running in a north – south direction; and
- Aves Ditch – a bridleway to the east of the runway running in a north – south direction.

3.5.11 In addition, there were two further historical routes crossing Heyford Park, one running in a southwest – northeast direction (on the approximate alignment of the existing runway) and one running in a northwest – southeast direction crossing the runway.

3.5.12 There are no dedicated cyclepaths or cycleways in the local area, other than that proposed along the north side of Camp Road as part of the consented scheme. The closest National Cycle Network (NCN) route is NCN 5, the West Midlands Cycle Route which connects Reading to Bangor through Oxford. The route can be accessed off A4260 Banbury Road, about 7.5km west of Heyford Park. However, being a rural area, traffic is light and therefore most cyclists use the local road network.

Consented Provision

3.5.13 As part of the consented development at the Former RAF Upper Heyford some of the original PRoWs on the site will be reinstated / re-routed and improvements will be made to connections to existing PRoWs elsewhere. In addition, the consented housing will be connected by a network of new walk and cycle links penetrating the residential areas and providing a permeable site which facilitates and encourages walking and cycling within the local area. The existing and consented walking and cycling provision is shown at **Figure 3.9**.

3.5.14 Reinstating the Portway and Ave's Ditch form part of the consented 1,075 scheme. These routes are illustrated on **Figure 3.9**. However, reinstating Ave's Ditch and Portway will not provide access to the flying field due to the need to retain security fencing; rather they will just pass around/through it.

3.5.15 The realignment of Ave's Ditch facilitates the opportunity for further enhancement of surrounding routes, for example, an extension of the existing bridleway 109/29 is proposed to the southeast of the Aves Ditch re- alignment.

3.5.16 The consented walking and cycling improvements as part of the 1,075 scheme also include funding towards the 'Heritage Trail' which will be a circular route around the flying field utilising improved existing off-site public footpaths (some of which are not in Dorchester Group control) providing east-west links with the circular route being complete in the north-south direction with the Portway and Ave's Ditch routes reinstated.

3.5.17 Likewise, a potential link from the southern residential area south of Camp Road connecting to the existing footpath 388/4 may be delivered by OCC as part of the existing S106 works.

3.5.18 As well as the off-road PRoWs, low levels of traffic in the predominantly rural area currently allow the potential for additional routes for walkers, cyclists and equestrians along the highway network. The Developer cannot commit to upgrading existing footpaths or changing footpaths to bridle paths across land not in their ownership, however, funding has been provided as part of the approved 1,075 scheme to OCC to enable joining up of the network in the local area. Additional contributions may be required as part of the new 1,600 dwellings Local Plan allocation application to achieve further connections.

3.6 Public Transport

3.6.1 **Figure 3.9** illustrates the route of the local bus services; location of the nearest bus stops to the site; and Heyford and Bicester Rail Stations.

Existing Provision

Bus

3.6.2 Heyford Park is currently served by one bus service, the 25A, which runs between Oxford and Bicester, via Heyford Park along Camp Road. There are currently 3 pairs of bus stops on Camp Road. One bus stop is located on the small loop to the south of Camp Road, to the west of the Main Gate access and serves buses operating in either direction. There is another bus stop located on the northern side of Camp approximately 150m to the east of Main Gate. The third pair of bus stops are located close to the junction with Station Road.

3.6.3 As part of the Section 106 for the consented 1,075 scheme, Dorchester Group funded an hourly bus service to compliment and augment the then-existing hourly service operated by Thames Travel, thereby providing a half-hourly bus service. Subsequently funding for the existing service was withdrawn, leaving an hourly 25A service funded wholly by Dorchester Group. The bus service number 25A is operated by Thames Travel. This service and frequency is set out in **Table 3.1** and shown on **Figure 3.9**.

Table 3.1: Local Bus Services and Frequencies

Service/ Operator	Route	Frequency		
		Monday – Friday Daytime	Saturday Daytime	Sunday Daytime
25A Thames Travel	Oxford – Kirtlington – **Upper Heyford** – Bicester	Approximately every hour between 0617-1954	Approximately every hour between 0645-1954	No service

Note: Bus routes and frequencies correct as at November 2017.

Rail

3.6.4 The nearest railway stations to the development are Heyford Station which is located approximately 3.3km south west of the site and Bicester North and Bicester Village which are located approximately 8km south east of the site.

3.6.5 Great Western Railways operate the line from Heyford Station which runs from Banbury to Oxford. Services are provided approximately every 90-120 minutes with reduced services on Sundays. From Oxford, there are onward direct connections to London Paddington. The journey time from Heyford to Banbury is approximately 18 minutes and to Oxford is approximately 16 minutes. The service from Heyford Station is summarised in **Table 3.2**.

Table 3.2: Train Services from Heyford and Frequencies

Operator	Route	Frequency	
		Mon – Sat	Sundays
Great Western Railways	Didcot Parkway – Oxford – **Heyford** – Banbury	120 mins with additional peak trains	None

3.6.6 Chiltern Railways operate both Bicester North and Bicester Village stations. Bicester North provides a service between London Marylebone and Banbury approximately every 60 minutes and a service between London Marylebone and Birmingham Snow Hill approximately every 60 minutes. The services are summarised in **Table 3.3**.

Table 3.3: Train Services from Bicester North and Frequencies

Operator	Route	Frequency	
		Mon – Sat	Sundays
Chiltern Railways	London Marylebone – Beaconsfield – High Wycombe – **Bicester North** – Banbury	60 mins	60 mins
Chiltern Railways	London Marylebone – **Bicester North** – Banbury – Leamington Spa – Warwick Parkway – Solihull – Birmingham Snow Hill	60 mins	60 mins

3.6.7 Bicester Village Station provides a service between London Marylebone and Oxford approximately every 30 minutes. The service from Bicester Village is detailed in **Table 3.4**.

Table 3.4: Train Services from Bicester Village and Frequencies

Operator	Route	Frequency	
		Mon – Sat	Sundays
Chiltern Railways	London Marylebone – High Wycombe* – **Bicester Village** – Oxford Parkway - Oxford	30 mins	30 mins

* Certain journeys only

3.6.8 In addition to the Chiltern Railways service through Bicester Village, East West Rail is a project to establish a railway connecting East Anglia with central, southern and western England. The project is split into a western, central and eastern section.

3.6.9 The western section has involved an upgrade to the Oxford to Bicester Village line by Chiltern Railways and Network Rail, this upgrade is part of Phase 1 of the western section. The phase introduced a new service between Oxford, Bicester and London Marylebone. Chiltern Railways began services from Oxford to London Marylebone via Bicester in December 2016.

Future Provision

3.6.10 Phase 2 of the East West Rail project covers the western section comprising the route from Bicester Village to Bedford via Bletchley, Woburn Sands and Ridgmont which is due to open in 2022.

3.6.11 The central and eastern sections of the project will provide connections to Cambridge, Ipswich and Norwich. Previously these areas were only accessible via London but the project will enable direct connection cross-country. The central section of the project is anticipated to be in operation by 2030. A study has been undertaken to identify future rail enhancement schemes as options for investment and delivery for the eastern section, it is not yet known when the eastern section will be in operation. The project will afford greater connectivity and the opportunity to reach further destinations from Bicester Village.

3.7 Local Facilities

3.7.1 There are a variety of local facilities, either consented or proposed, as part of the Heyford Park masterplan. These facilities are illustrated on **Figure 3.10** with indicative walk / cycle distances shown. Details of the facilities are provided below.

3.7.2 Higher order services are located in the nearby towns of Bicester, Oxford, and Banbury and can be accessed by bus, train or car dependant on the activity being undertaken. The site lies approximately 7.5km north west of Bicester, 20km north of Oxford and 16km south of Banbury.

Retail

Consented

3.7.3 There are a range of food and non-food retail opportunities consented as part of the Heyford Park masterplan in the Village Centre, located to the south of Camp Road close to the centre of the development area.

Proposed

3.7.4 There are several retail units proposed as set out below:

- Retail floor space (929m^2) is proposed as part of the Village Centre to the north of Camp Road; and
- The Flying Field Park will comprise an element of A1 and A3 uses and is located to the north of the main development area.

Education

Consented

3.7.5 There is an existing and operational school on the Heyford Park site serving both primary and secondary school students, known as Heyford Park Free School. At the time of writing (March 2018) a temporary nursey is also under construction. The Free School is located on two campuses; one to the north of Camp Road, just to the east of the Village Centre and one south of Camp Road and east of the Phase 9 development area. The nursery is located to the north of Camp Road on the western edge of the development area. It is currently proposed that the nursery will be re-located to a site close to the Village Centre once a permanent plot becomes available.

Proposed

3.7.6 It is proposed to expand the existing Heyford Park Free School to provide:

- Additional school buildings and facilities located at the existing Campus to the south of Camp Road; and
- Additional school buildings located to the north of Camp Road, close to the proposed Flying Field Park.

Leisure

Consented

3.7.7 There are several consented leisure facilities at the development as follows:

- A community centre / village hall which is located to the south of Camp Road in the vicinity of the Local Centre;
- A sports centre / gym with sports pitches which are located at the school campus to the south of Camp Road, except for a cricket pitch which is located to the south of the Village Centre;
- A boutique hotel (16 beds) with associated spa, bowling alley and cinema which is located to the south of Camp Road as part of the Village Centre;
- A pub / restaurant which is located to the south of Camp Road as part of the Village Centre; and
- A heritage facility which is located to the north of Camp Road as part of the Village Centre.

Proposed

3.7.8 It is proposed to provide further leisure facilities at Heyford Park as set out below:

- The Flying Field Park, Control Tower Park and Visitor Destination Area will contain open space, an observation tower with zip wire and ancillary visitor facilities. The Flying Field Park will be located to the north of Camp Road between the main development area and flying field. It is proposed that the Heritage Facility is relocated to this area of the development;
- A Community Centre and / or indoor sports provision is to be located south of the school campus to the south of Camp Road; and
- An outdoor sports park will be located in the south west corner of the development area.

Healthcare

Consented

3.7.9 There are no consented healthcare facilities on site.

Proposed

3.7.10 A new medical centre and dentist (670m^2) is proposed to be located to the north of Camp Road, close to the Village Centre. 60 close care dwellings are proposed to be located to the north of the Village Centre.

Employment

Consented

3.7.11 There are 1,700 jobs currently consented at the development; the majority of these are located on the Flying Field located to the north of the site and accessed via Gate 7 at the western edge of the development area. Some of the jobs are located in the development area to the north of the Village Centre.

Proposed

3.7.12 It is proposed to provide a further 1,500 jobs across the Heyford Park site, the majority of which will be located in the Creative City and Commercial Areas to the west of Chilgrove Drive. As part of the proposed development it is proposed to relocate access to the Flying Field from Gate 7 to Chilgrove Drive at the eastern edge of the development area.

3.8 Personal Injury Collision Data

Background

3.8.1 Personal Injury Collision (PIC) data was obtained from Oxfordshire County Council, the local Highway Authority, for a five-year and two-month period between 1st January 2012 to 28th February 2017 comprising a total of 62 months. The PIC data was collected to establish the existing highway safety in the vicinity of the site, identify any highway safety issues and include improvement measures where necessary.

3.8.2 The PIC study area assessed includes key local links and junctions. The area extends south from Camp Road and includes strategic corridors such as the B430, A43 and A4260 as well as local roads such as Camp Road, the B4030 and Station Road. The links and junctions assessed is shown in **Figure 3.11**. The full report can be found in **Appendix D** .

Methodology

3.8.3 The PIC data assessment provides an overview of the number and severity of accidents and a summary of the vulnerable road users involved in the casualties. The assessment also compares the number of observed PICs against the predicted number of PICs that could be expected for the time period when the observations were recorded (5 years, 2 months), in accordance with the Department for Transport's '*Design Manual for Roads and Bridges, Volume 13'*. The calculations are based on variables including: observed AADT traffic flow, road speed, length of road section and type of road.

Accident and Casualty Overview

3.8.4 A total of 171 collisions were observed in the study area. Of the observed incidents:

- 3 were classified as fatal collisions;
- 36 were classified as serious collisions; and
- 132 were classified as slight collisions.

3.8.5 There were 258 casualties as a result of the 171 collisions. Of these 258 casualties, 33 involved vulnerable road users. Vulnerable road users are classed as pedestrians, cyclists and powered two wheeled vehicles (P2W). A summary of the casualties by severity involving vulnerable road users is presented in **Table 3.5** below.

Table 3.5: Summary of Vulnerable Road User Casualties by Severity

	Fatal	Serious	Slight	Total
Pedestrian	1	1	3	5
Cycles	0	2	3	5
P2W	0	14	9	23
Total	**1**	**17**	**15**	**33**

Predicted Personal Injury Collisions

3.8.6 As stated above, the number of observed PICs has been compared against the predicted number of PICs which have been calculated using the Department for Transport's '*Design Manual for Roads and Bridges, Volume 13'* for the same five-year period. The tables below provide a comparison of links and junctions and observed PICs against their predicted PICs.

Link Collisions

Table 3.6 below shows that one link is identified as having a notably higher than anticipated incident rate (Link 31, identified in red), one link is identified as having one more incident than anticipated, although this is not considered to be of significance (Link 30, identified in orange). The observed records on all other links were equal to, or lower than, those anticipated.

Table 3.6: Summary of Observed and Anticipated Personal Injury Collisions on Links (5 years)

Link Reference	Link Description	Link Length (km)	Observed PICs	Anticipated PICs
1	A4260 Oxford Road - N Aston Rd (J14) to dualling of A4260	0.53	0	1
2	A4260 Oxford Road - Dualling of A4260	1.45	3	3
3	A4260 Oxford Road - End of dualling to Fenway	0.48	1	1
4	A4260 Oxford Road - Fenway to Hopcrofts Holt (J15)	1.10	1	4
5	A4260 Banbury Road - Hopcrofts to Unnamed Road (J16)	2.60	5	10
6	A4260 Banbury Road - Unnamed Road (J16) to A4260 Banbury Road Staggered Crossroads (J17)	3.00	3	11
7	A4260 Banbury Road - A4260 Banbury Road Staggered Crossroads (J17) to A4260/B4027 Crossroads (J18)	0.72	2	2
8	A4260 Banbury Road - South of A4260/B4027 Crossroads (J18) to speed change	0.70	1	2
9	B4030 - Hopcrofts Holt (J15) to station entrance	1.75	1	3
10	B4030 - Station entrance to south of Hillside Barn	0.40	0	3
11	B4030 - South of Hillside Barn to south of Heyford Vegan B&B	0.37	0	1
12	B4030 - South of Heyford Vegan B&B to B4030/Freehold St junction (J11)	0.17	0	0
14	Station Rd - Freehold St junction (J11) to Camp Road	1.35	1	1
15	Camp Road - Somerton Road to Chilgrove Dr	2.11	3	6
16	B4030 - B4030/Freehold St junction (J11) to B4030 Lower Heyford Road/Unnamed Rd junction (J9)	3.49	6	6
17	Unnamed Road - Camp Road to B4030 Lower Heyford Road	1.20	2	1

Link Reference	Link Description	Link Length (km)	Observed PICs	Anticipated PICs
18	B4030 - B4030/Unnamed Rd junction (J9) to Middleton Stoney Road junction (J6)	1.25	3	2
19	Unnamed Road - Camp Road to B430/Unnamed Road junction (J5)	1.5	1	1
20	B430 - B430/Unnamed Road junction (J5) to north of Middleton Stoney	1.4	1	5
21	B430 - Middleton Stoney residential area	0.8	1	9
22	B430 - Middleton Stoney to A4095/B430 Oxford Road junction (J7)	1.1	2	2
23	B430 - A4095/B430 Oxford Road junction (J7) to Akeman Street	0.8	1	2
24	B430 Northampton Road - Akeman Street to B430/Northampton Road roundabout (J4a)	3.0	3	29
25	B430 - B430/Northampton Road roundabout (J4a) to A34 onslip	0.6	1	1
26	B430 - B430/Unnamed Road junction (J5) to south of Ardley	1.4	4	6
27	B430 - Ardley residential area	0.7	2	3
28	B430 - Ardley residential area to A43/B430 (Ardley) Roundabout (J2c)	0.2	0	1
29	A43 - A43/B430 (Ardley) Roundabout (J2c) to A43/Services Roundabout (J2b)	0.25	1	1
30	A43 - A43/M40 onslip/Services Roundabout (J2b) to A43/M40 offslip Roundabout (J2a)	0.2	2	1
31	A43 - A43/M40 offslip Roundabout to A43/B4100 Roundabout (J3)	0.6	8	4
32	M5 - north of slip road	0.3	5	5
33	M5 - between slip roads	1.5	5	22
34	M5 - northbound onslip	0.4	2	2
35	M5 - southbound onslip	0.7	1	2

Notes: Link only rates have also been calculated for roads where there are no adjoining junctions along its length.

Collisions within 20m of the major junctions identified in this table have been allocated to the junctions. Any other collision occurring at minor unspecified junctions are allocated to the link in question. The link rates have therefore been calculated as a combined link and minor junction personal injury collision rate apart from those identified separately in the table above.

3.8.7 **Table 3.6** shows that the observed PICs were equal to, or less than, the anticipated PICs on all Link References except link 30 and 31. As the number of anticipated PICs on Link Reference 30 was only slightly higher than that observed, analysis will focus on Link Reference 31 only.

3.8.8 On Link Reference 31 'A43 - A43/M40 offslip Roundabout to A43/B4100 Roundabout (J3)', 8 accidents occurred when 4 were anticipated. It was observed that:

- All accidents were classed as slight;
- Three accidents were caused by careless driving or drivers being distracted; and
- Five accidents were rear shunts due to slow moving or stationary traffic.

3.8.9 Mitigation for the link (approaching Junction 3) will be provided through the mitigation of Junction 3 which is discussed in **Section 11**.

3.8.10 **Table 3.7** below shows that one junction is identified as having a notably higher than anticipated incident rate (Junction 18, identified in red). The observed records on all other links were equal to, or lower than, those anticipated.

Table 3.7: Summary of Observed and Anticipated Personal Injury Collisions at Junctions (5 years)

Junction Reference	Junction Description	Observed PICs	Anticipated PICs
2a	M40 Junction 10 Southbound Off-slip/A43 Roundabout	3	55
2b	M40 Junction 10 Southbound On-slip/A43/Services	5	40
1	Camp Road / Chilgrove Drive	1	3
2c	M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout	1	34
3	A43 / B4100 Roundabout	13	39
5	B430/Unnamed Road Junction	1	4
7	A4095/B430	5	6
9	B4030 Lower Heyford Road / Unnamed Road	1	4
11	B4030 / Freehold St	1	3
14	A4260 / Somerton Road Crossroads	2	5
15	Hopcroft Holt	5	16
16	A4260 Banbury Road/Unnamed Road	4	5

Junction Reference	Junction Description	Observed PICs	Anticipated PICs
18	A4260 / B4027	10	7
19	A4260 Banbury Road Priority with Ghost Island	3	4
20	B4030 / Portway Junction	3	5

Notes: Link only rates have also been calculated for roads where there are no adjoining junctions along its length. Collisions within 20m of the major junctions identified in this table have been allocated to the junctions. Any other collision occurring at minor unspecified junctions are allocated to the link in question. The link rates have therefore been calculated as a combined link and minor junction personal injury collision rate apart from those identified separately in the table above.

3.8.11 **Table 3.7** shows that the observed PICs were equal to or less than the anticipated PICs at all junctions except Junction 18.

3.8.12 At Junction 18 'A4260 / B4027', 10 accidents occurred when 7 were predicted. It was observed that:

- Two accidents were classed as serious and seven accidents were classed as slight;
- Two accidents involved OAPs;
- Eight accidents were a result of vehicles on the B4027 failing to look/give way to vehicles on the A4260;
- One accident was a rear shunt caused by slowing traffic on the A4260 to turn onto the B4027; and
- One accident was caused by a driver being dazzled by the headlights of an oncoming vehicle and losing control of the vehicle.

3.8.13 Mitigation for the junction will be discussed in **Section 10**.

4 Development Proposals

4.1 Masterplan

4.1.1 This Transport Assessment has been carried out based on a comprehensive Parameter Plan for the CDC Local Plan Allocation at Heyford as illustrated on Pegasus Drawing P16-0631_08 Revision Y included at **Appendix A** .

4.1.2 The Parameter Plan for the Local Plan Allocation is shown in the context of the wider Heyford park site for which planning consents have previously been granted and delivery of housing and supporting social and community infrastructure ongoing.

4.2 Development Proposals

4.2.1 The Parameter Plan for the current Local Plan Allocation includes development on land both north and south of Camp Road covered by planning application submissions and proposals as set out in **Table 4.1**, **Table 4.2** and **Table 4.3** below and illustrated in Pegasus Drawing P16-0631_08 Revision Y included at **Appendix A** .

Table 4.1: Planning Applications Submitted

Planning Application Submissions	Parameter Plan Reference	Summary of Development Proposals	Planning Status
Full application (15/01357/F) July 2015 Pye Homes	"Pye Homes"	Provision of 79 residential dwellings north of Camp Road	Resolution to Grant consent subject to planning conditions S106 and resolution of Highways Objection September 2017
Full Application (16/02446/F) December 2016	"Land South of Camp Road"	Provision of 297 dwellings south of Camp Road	This application is yet to be determined.

Table 4.2: Planning Application Proposals

Planning Application Submissions	Parameter Plan Reference	Summary of Development Proposals	Planning Status
Proposed Hybrid Planning Application April 2017 Dorchester Group	All coloured areas not marked as "Existing"	1,175 new dwellings (Class C3); 60 close care dwellings (Class C2/C3); 929 m^2 of retail (Class A1); 670 m^2 comprising a new medical centre (Class D1); 35,175 m^2 of new employment buildings, (comprising up to 6,330 m^2 Class B1a, 13,635 m^2 B1b/c, 9,250 m^2 Class B2, and 5,960 m^2 B8);	Outline planning application to be submitted and determined

Planning Application Submissions	Parameter Plan Reference	Summary of Development Proposals	Planning Status
		2.4 ha site for a new school (Class D1); 925 m^2 of community use buildings (Class D2); and 515 m^2 of indoor sports, if provided on-site (Class D2); 30m in height observation tower with zip-wire with ancillary visitor facilities of up of 100 m^2 (Class D1/A1/A3); 1,000 m^2 energy facility/infrastructure with a stack height of up to 24m (sui generis); 2,520 m^2 additional education facilities (buildings and associated external infrastructure) at Buildings 73, 74 and 583 for education use (Class D1); and creation of areas of Open Space, Sports Facilities, Public Park and other green infrastructure. The change of use of the following buildings and areas is also proposed: Buildings 357 and 370 for office use (Class B1a); Buildings 3036, 3037, 3038, 3039, 3040, 3041, and 3042 for employment use (Class B1b/c, B2, B8); Buildings 217, 3102, 3136, 3052, 3053, 3054, and 3055 for employment use (Class B8); Buildings 2010, 3008, and 3009 for filming and heritage activities (Sui Generis/Class D1); Buildings 2004, 2005 and 2006 for education use (Class D1); Buildings 366, 391, 1368, 1443, 2007, 2008 and 2009 (Class D1/D2 with ancillary A1-A5 use); Building 340 (Class D1, D2, A3); 20.3ha of hardstanding for car processing (Sui Generis); and 76.6ha for filming activities (Sui Generis).	

Table 4.3: Future Residential Development Potential

Land Use Potential	Parameter Plan Reference	Summary of Development Proposals	Planning Status
Area of future residential development within Policy Villages 5	"Parcel 15"	Provision of 49 residential dwellings	No planning application submitted

4.2.2 The development proposals as set out in **Table 4.1**, **Table 4.2** and **Table 4.3** above constitute the Policy Villages 5 Local Plan Allocation for 1,600 homes and 1,500 jobs together with supporting social and community infrastructure which forms the basis upon which this transport assessment has been carried out.

5 Movement Framework

5.1 Site Access and Sustainable Transport Proposals

5.1.1 A set of transport proposals has been developed to maximise the potential to travel by modes other than the private car and hence limit the potential traffic impacts arising from the development. The transport proposals consist of the following packages of measures that are discussed in more detail within this section:

- Vehicle Access Proposals;
- Walking and Cycling Proposals;
- Public Transport Proposals; and
- Vehicle Parking Proposals.

5.2 Vehicular Access Strategy

5.2.1 An overview of the proposed vehicular site access strategy for Camp Road is set out on Pegasus Parameter Plan for the site at **Appendix A** and detail along Camp Road is illustrated on Woods Hardwick **Drawings HEYF-SK346, HEYF-5-232 F, HEFY-SK341 B** and **HEYF-SK345 D** at **Appendix E** . A revised junction layout has also been designed for the Camp Road Chilgrove Drive junction in order to provide development access via Chilgrove Drive. This junction layout is illustrated on **PBA Drawing 39304/5501/SK26 Rev C**. Vehicle tracking details for this junction are provided on **PBA Drawing 39304/5501/SK42 Rev A**. The details are summarised below.

5.2.2 Access to the proposed residential element of the development will be provided via a series of junctions from Camp Road which will form a permeable network of roads throughout the site and connect with existing infrastructure. The majority of these junctions will be simple priority junctions with Camp Road forming the major carriageway. The exception to this is the access point at Chilgrove Drive which is proposed to take the form of a signalised staggered crossroad arrangement. Access for each residential plot is detailed below, Parcel Numbers are shown on the Pegasus Parameter Plan at **Appendix A** :

- **Parcel 9:** A planning application for Parcel 9 (shown in **Appendix A** as the yellow parcel called 'Land South of Camp Road') has been submitted to CDC under reference 16/02446/F. Details of the vehicular access proposals can be found within this application and Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E** illustrates the access points. In summary the main access to this plot will be directly from Camp Road via three priority junctions. There will also be four priority junctions onto Camp Road providing access to individual parking courts.

- **Parcel 10:** Parcel 10 will be accessed via two priority junctions onto Camp Road, opposite the Heyford Park Free School campus located to the south of Camp Road, as shown on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E** .

- **Parcel 11:** Parcel 11 will be accessed via a priority junction onto an internal road as shown in **Appendix A** . The internal road can be accessed via a priority junction with Camp Road close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** , or from the signalised Chilgrove Drive junction with Camp Road, as shown in **PBA Drawing 39304/5501/SK26 Rev C**.

- **Parcel 12:** Parcel 12 will be accessed via three priority junctions onto an internal road as shown on the Parameter Plan at **Appendix A** . Two access junctions will be provided to the eastern plot located to the east of the internal road and one access junction will be provided to the western plot located to the west of the internal road. The internal road can be accessed via a priority junction with Camp Road close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** , or from the signalised Chilgrove Drive junction with Camp Road, as shown in **PBA Drawing 39304/5501/SK26 Rev C**.

- **Parcel 13:** Parcel 13 will be accessed via one priority junction onto Camp Road, adjacent to the Pye Homes development, as shown in Woods Hardwick **Drawing HEYF-SK341 Rev B** in **Appendix E** .

- **Parcel 15:** Parcel 15 is within the Policy Villages 5 allocation and is located directly to the north of the Pye Homes development. Due to it being part of the Policy Villages 5 allocation it needs to be assessed cumulatively, although currently there is no planning application or agreement with the landowner to promote this parcel. No access for this parcel has been agreed at this time.

- **Parcel 16:** Parcel 16 will be accessed via two priority junctions; one on Camp Road and one with the existing road network. The Camp Road priority junction provides access to Parcel 16 via an internal road that extends through Parcel 9, as shown in Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E** . The second priority junction is with the existing road network located to the north east of the plot and provides access to Camp Road via the existing residential streets, as shown in **Appendix A** .

- **Parcel 17:** Parcel 17 will be accessed via a priority junction onto Camp Road, close to the Pye Homes development, as shown on Woods Hardwick **Drawing HEYF-SK341 Rev B** at **Appendix E .**

- **Parcel 21:** Parcel 21 will be accessed via two priority junctions onto an internal road, as shown on the Parameter Plan in **Appendix A** . The internal road can be accessed via a priority junction with Camp Road close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** in **Appendix E** , or from the signalised Chilgrove Drive junction with Camp Road, as shown in **PBA Drawing 39304/5501/SK26 Rev C**.

- **Parcel 23:** Parcel 23 will be accessed via two priority junctions onto an internal road, as shown on the Parameter Plan in **Appendix A** . The internal road can be accessed via a priority junction with Camp Road close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** , or from the signalised Chilgrove Drive junction with Camp Road, as shown in **PBA Drawing 39304/5501/SK26 Rev C**.

- **Parcel 35:** Parcel 35 will be accessed via a priority junction onto Camp Road, close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** .

- **Pye Homes Plot:** Pye Homes Plot will be accessed via a priority junction onto Camp Road as shown in Woods Hardwick **Drawing HEYF-SK345 Rev D**.

- **Care Homes (Parcel 19):** Parcel 19 will be accessed via a priority junction onto an internal road, as shown in **Appendix A** . The internal road can be accessed via a priority junction with Camp Road close to the village centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** , or from the signalised Chilgrove Drive junction with Camp Road, as shown in **PBA Drawing 39304/5501/SK26 Rev C**.

5.2.3 The main vehicle access to the proposed employment element of the development (Parcel 22) will be via the proposed signalised Chilgrove Drive junction. The main access to the existing and proposed employment opportunities on the flying field will also be from the signalised Chilgrove Drive access. Access to the employment will also be available for light vehicles from the proposed priority junctions on Camp Road in the vicinity of the Village Centre.

5.2.4 Gate 7, which forms the existing access to the flying field, will be closed. Closing Gate 7 and opening access to the flying field via Chilgrove Drive should ensure that the majority of large HGVs will no longer need to use Camp Road through the development where there are the greatest pedestrian and cycle movements, and is more residential in nature.

5.2.5 The main vehicle access to the heritage offering at the development (Parcels 28, 29 and 30) will be via the signalised Chilgrove Drive junction, although, as with the employment, access will also be available to light vehicles from the proposed priority junctions on Camp Road in the vicinity of the Village Centre.

5.2.6 Education at the development will be provided at the two existing school sites and a new site (Parcel 31). The new site will be accessed via an internal road, as shown in **Appendix A** . The internal road can be accessed from the signalised Chilgrove Drive or via the proposed priority junctions on Camp Road close to the Village Centre.

5.2.7 Access to the proposed retail / health element of the development will be via two priority junctions. The Camp Road junction is located opposite the Village Centre, as shown in Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E** . The internal road can be accessed from Camp Road, close to the Village Centre, as shown on the Parameter Plan in **Appendix A** .

5.2.8 In facilitating vehicle access to the development an impact assessment has been undertaken on the local highway network and where necessary mitigation proposals have been identified. This assessment is set out within **Section 9, 10** and **11**.

5.3 Walking and Cycling Strategy

5.3.1 Pedestrian and cycle accessibility is given a high priority in the proposed access strategy and this is reflected in the standard of provision. The proposed internal network is based on a combination of low speed zones and clear, convenient and safe connections and adjoining footways and footpaths. The walking and cycling strategy is illustrated on **Figure 5.1**.

5.3.2 Camp Road provides a primary pedestrian and cycle route through the development, which is predominantly off road. The S278 3m foot/cycleway is in place on the southern side of Camp Road between Larsen Road and Wellington Road and between Dacey Drive and Izzard Road, with central elements still to be completed, cycling provision through this central part will be on road as part of a shared surface scheme. The S278 will also provide a 2m footway on the northern side of Camp Road through the residential development, separated from the road along much of its length by an approximately 3m wide verge retaining existing hedgerows.

5.3.3 Between approximately Izzard Road and the Portway bridleway a 3m foot / cycleway will be provided on the north side of Camp Road and 2m footway will be provided along the south side of the road (see Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**). An extension to the 3m foot / cycleway will also be provided to the east of Larson Road until the approximate location of the Pye Plot where a crossing will be provided. A 1.0m to 1.5m footway will continue east beyond the Pye Plot to the connect with the foot / cycle provision on Chilgrove Drive (see Woods Hardwick **Drawing HEYF-SK345 Rev D** at **Appendix E**).

5.3.4 An off-road foot / cycleway will be provided from the Village Centre to the Flying Field Park (as shown on **Figure 5.1**) and from Camp Road along the alignment of Chilgrove Drive forming a loop back to the village centre. A connection will also be provided to the south of the Creative City (as shown on **Figure 5.1**) between Chilgrove Drive and the connection to the Flying Field Park.

5.3.5 A secondary cycle and pedestrian route is provided throughout the plots of the development with on-road cycling and footways alongside the carriageway that connect back onto Camp Road providing a permeable network of walking and cycling routes throughout the wider site.

5.3.6 Heyford Park includes several existing footpaths and bridleways that extend to the far north and south of the site. Historically, sections of these footpaths and bridleways have been closed. It is proposed to introduce bridleway/footpath connections as well as potential links with PRoW to complete routes that were previously dead ends and provide access to the wider neighbourhood and surrounding villages including Somerton, Ardley, Fritwell and Kirtlington. S106 funds have been given to OCC to be used for walking and cycling improvements; OCC will determine where this funding is used.

5.3.7 In addition to these hard measures the following proposals will support and encourage sustainable travel by walking and cycling by residents and employees at the development. More details on these measures are provided within the Travel Plan(s):

- Cycle Parking: Cycle parking will be secure, covered, convenient and visible. Cycle parking will be provided to OCC standards or better. See **Section 5.5** for details;
- Bike Hire / Bike Pool Scheme: To facilitate travel through the development for those without a bike or who have travelled to the site on the bus for example;
- Bicycle User Group;
- Cycle Repair Scheme such as Dr Bike; and
- Adult Cycle Training Sessions.

5.4 Public Transport Strategy

5.4.1 A number of meetings have been held with OCC and the operators to discuss the public transport strategy for the development and a strategy has been agreed in principle as follows.

5.4.2 The focus for the bus service strategy should be on Bicester where significant growth is planned, with 18,500 new jobs, 10,000 new homes and regeneration of the town centre in the period of the Cherwell Local Plan to 2031.

5.4.3 It has also been agreed with OCC that there should continue to be a regular service to Oxford, as it's the regional centre and where major growth is also planned.

5.4.4 Consideration has been given to a service to Banbury, but the level of demand, and consequently revenue, compared to the cost of operation means that the service would not be commercially sustainable. Instead, it is proposed to provide opportunities to access Banbury via the rail network at Bicester and Heyford.

5.4.5 Further details of the proposed bus services are provided below.

Bicester Service

5.4.6 For Bicester, it is proposed to operate a frequent daytime service on Monday to Saturday with operating hours that facilitate commuting to and from London by rail. It is also proposed to operate a lower frequency Sunday service. The Monday to Saturday daytime frequency of the service is likely to start with a half hourly service that is increased to a 20 minute, and potentially 15 minute service as the development is built out and patronage increases.

5.4.7 In Heyford, the Bicester service would be routed via Chilgrove Drive and through the new development to the north of Camp Road, re-joining Camp Road at the Village Centre. This would give access from the majority of the new development to bus stops within 400 metres walk distance. The bus service would then continue along Camp Road to give access to the western and southern areas of development, it will turn within Parcel 9 and terminate on Camp Road.

5.4.8 Consideration has been given to whether the service should operate through the development north of Camp Road on its return to Bicester, or run direct along Camp Road. Running direct along Camp Road would mean that passengers from the northern areas of development would need to board the bus as it went through the development, then travel in the "wrong" direction to Gate 7 and double-back along Camp Road. This would add at least 5 minutes to their journey time and would be perceived negatively, adversely impacting on demand for the service. It is therefore proposed to operate the bus service through the development in both directions. The proposed route is shown in **Figure 5.2** and detail through the development is shown in **Figure 5.3** along with 400 metre catchment areas for each proposed bus stop location.

5.4.9 The need to operate through the development north of Camp Road means that a round trip from Bicester to Heyford could not be reliably completed within 45 minutes. Therefore, the service would need to run on a 60-minute cycle; this does have the advantage of providing sufficient time to serve key attractors in Bicester. The 45 minute cycle has more recovery time to aid reliability.

5.4.10 Several route options within and approaching Bicester have been considered; these are set out in **Table 5.1** with details of the points served and relative merits of each.

Table 5.1: Route Options within Bicester

Option	1	2	3	4
Route	**Via Middleton Stoney Rd and extended to Bicester Village stn**	**As #1 with dogleg to serve outlet centre stops on Oxford Rd**	**Via Vendee Drive and extended to Bicester Village station**	**Via Vendee Drive, loop to serve station and town centre**
Journey time *(minutes)*	23	24	27	25
Schedule cycle *(minutes)*	60	60	60	60
Places served:				
• Bicester town centre	✓	✓	✓	✓
• Bicester Village station	✓	✓	✓	✓
• Bicester Village outlet centre	✗	✓	✓	✗ (no suitable stop)
• Bicester park & ride	✗	✗	✓	✓
Comments	Limited new market opportunities	Good fallback if unreliability affects #3	Serves all points	Risk of delay at level crossing
			Direct route to/from town centre	Indirect route towards town centre

5.4.11 Each option requires the same number of buses. **Option 3** is the only option that provides links to all of the key destinations and also maintains a direct link to and from the town centre therefore it is proposed to adopt this option.

5.4.12 It is desirable for the service to use the bus stops at the main entrance to Bicester Village station to give a high quality interchange between bus and rail. This will require approval to travel over private roads to access the station and confirmation that the stops have sufficient capacity, although observation suggests that this would be the case.

5.4.13 An indicative timetable is shown in **Appendix F** .

Oxford Service

5.4.14 It is proposed to operate an hourly daytime service to Oxford on Monday to Saturday, following the route of the current service 25a between Oxford and Upper Heyford.

5.4.1 Within Heyford Park, the service would operate along the full length of Camp Road then via Chilgrove Drive and the new development north of Camp Road. This would function as a one-way terminal loop with the service re-joining Camp Road at the village centre and then continuing back to Oxford. Alternatively, there is the possibility of running the Oxford service directly through to Bicester, thereby removing the need to transfer between the two buses. The proposed route is shown in **Figure 5.2** and detail through the development is shown in **Figure 5.3** along with 400 metre catchment areas for each proposed bus stop location.

5.4.2 An indicative timetable is shown in **Appendix F** .

Community Minibus

5.4.3 The Bicester and Oxford services provide the main elements of the public transport strategy for Heyford Park. It is proposed to support these with a community minibus operated by Dorchester Group. The minibus would provide timetabled journeys, meeting train services, to and from Heyford rail station for commuters at peak times on Monday to Friday and would be available in the inter-peak period for local trips not covered by the main bus services on a demand responsive basis. The proposed route is shown in **Figure 5.2** and detail through the development is shown in **Figure 5.3** along with 400 metre catchment areas for each proposed bus stop location.

Bus Stops

5.4.4 Bus stops would be provided within 400m of the majority of homes and employment opportunities proposed at the Heyford development (excluding those located on the flying field for security and operational reasons). It is proposed that the stops would be DDA / Equality Act compliant and provide shelter, seating and timetable information. Real time information will be provided by way of a phone application and on screens at the main bus stops at the development. The proposed bus stop locations are illustrated in **Figure 5.3**.

5.5 Parking Strategy

Vehicular Parking

5.5.1 Vehicular parking will be provided in accordance with the latest OCC parking standards (maximum) which were provided to PBA by OCC in January 2018. The parking standards for residential dwellings are described in **Table 5.2** and the parking standards for non-residential purposes are described in **Table 5.3.**

Table 5.2: OCC Residential Car Parking Provision

No. of Dwellings	Maximum Number of Allocated Car Spaces
1 bed	1 spaces
2/3 bed	2 spaces
4 bed+	2+ spaces

Table 5.3: OCC Non-Residential Car Parking Provision

Land Use	Maximum Number of Allocated Car Spaces
B1 and A2 Offices	1 space per 30m^2
B2 General Industry	1 space per 50m^2
B8 Warehousing	1 space per 200m^2
D2 Assembly and Leisure	1 space per 22m^2
Higher Education	1 space per 2 staff 1 space per 15 students
A3 Restaurant / Pubs	1 space per 5m^2 of public space

*Coach parking treated separately

5.5.2 The parking strategy for the site will encourage vehicles which are associated with the development to park in suitable locations on site.

Cycle Parking

5.5.3 Cycle parking will be provided in accordance with the latest OCC cycle parking standards (minimum). The cycle parking standards are described in **Table 5.4**.

Table 5.4: OCC Cycle Parking Standards

Land Use	Minimum Number of Cycle Parking
A2 – Banks and Professional Services	1 space per 12 staff*
A3 – Restaurant / Pubs	1 space per 12 staff*
B1 - Offices	1 space per 150m^2
B2 - General Industry	1 space per 350m^2
B8 Warehousing	1 space per 500m^2
D2 Assembly and Leisure	1 space per 12 staff*
Cinema and Conference	1 stand per 12 staff*
Higher Education	Subject to individual assessment

Where number of staff is not known: * 1 staff per 7m^2

6 Assessment Methodology

6.1 Introduction

6.1.1 During scoping discussions with Oxfordshire Count Council (OCC) and Highways England (HE), it was agreed that any development proposals forming part of the Heyford Park allocation needed to be considered in the context of the cumulative impact of the full 1,600 residential units and 1,500 jobs development allocation. This report sets out to undertake this assessment.

6.1.2 The methodology used to undertake the traffic impact assessment for the proposed development allocation of 1,600 residential units and 1,500 jobs at Heyford Park is detailed in Technical Note 001 Rev D (TN001) which was prepared by Peter Brett Associates in April 2017 (see **Appendix G**). The methodology within TN001 has been agreed with OCC and HE, the details of the agreed methodology for assessment is set out in the following sections.

6.1.3 The assessment of the development has been undertaken in a spreadsheet model using a first principles approach based on the assumptions set out below.

6.2 Model Scenarios

6.2.1 The model scenarios to support the full cumulative modelling work are summarised as follows:

- 2016 Base year;
- 2031 Reference Case;
  - Includes consented Heyford Park development; and
  - Includes committed Local Plan / third party development sites.
- 2031 Test Case:
  - Includes consented Heyford Park development;
  - Includes committed Local Plan / third party development sites; and
  - Includes the full Heyford Park Allocation (1,600 resi units, 1,500 jobs).
- 2018 Reference Case (for assessment of the Strategic Road Network):
  - Includes consented Heyford Park development; and
  - Includes committed Local Plan / third party development sites;
- 2018 Test Case (for assessment of the Strategic Road Network):
  - Includes consented Heyford Park development;
  - Includes committed Local Plan / third party development sites; and
  - Includes the full Heyford Park Allocation (1600 resi units, 1500 jobs).

6.2.2 In addition to these scenarios it is considered that an assessment will need to be undertaken of the development thresholds for any mitigation that is proposed to be delivered in support of the Heyford Park development. A number of scenarios are likely to be required in order to undertake this work, however, as the mitigation for the development is not fully agreed with HE and OCC at this time, this exercise will be undertaken during the determination period for the planning application.

6.3 Geographical Scope

6.3.1 The geographic scope that was agreed for the traffic impact assessment includes the following junctions (illustrated on **Figure 3.2**):

1. Site Access junctions (approximately 13 including Chilgrove Drive / Camp Road);
2. M40 Junction 10 (made up of three parts; a, b and c);
3. A43 / B4100 roundabout;
4. A34 / B430 junction (made up of two parts; a and b);
5. B430 / Unnamed Road junction;
6. B430 / B4030 (Middleton Stoney) junction;
7. A4095 / B430 junction;
8. A4095 / B4030 junction;
9. B4030 / Unnamed Road junction;
10. Camp Road / Kirtlington Road junction;
11. Camp Road / Somerton Road;
12. B4030 / Port Way junction;
13. B4030 / Station Road junction;
14. A4260 / Somerton Road junction;
15. A4260 / B4030 (Hopcrofts Holt) junction;
16. A4260 / Unnamed Road junction;
17. A4260 / Banbury Road / Unnamed Road junction;
18. A4260 / B4027 junction;
19. A4095 / Portway junction;
20. A4095 / Bletchingdon Road junction; and
21. A4095 / B4027 junction

6.3.2 Base year traffic flows have been obtained for the majority of junctions listed above via Manual Classified Counts undertaken in November 2016, however:

- For junctions 10, 11 and Camp Road / Chilgrove Drive surveys were undertaken in 2013;
- For junctions 5 and 12 surveys were undertaken in 2014; and

- A survey for junction 17 was undertaken in January 2017 due to a traffic survey error during the initial surveys in November 2016.

6.3.3 As set out at **Section 3.4**, in November 2017 OCC requested that the following additional junctions were included within the Heyford Park assessment:

- B430 / Ardley Road;
- B430 / Somerton Road;
- B430 / Church Road; and
- A4260 / A4095.

6.3.4 Surveys for these junctions were undertaken on the 8th February 2018, however, the work to assess these junctions has not been completed. On this basis these junctions have been excluded from this report and will be considered in detail during the determination period for the planning application.

6.4 Traffic Growth

6.4.1 The following assessment years were included in the traffic impact assessment of the full allocated development:

- Base year: 2016;
- End of Local Plan Period: 2031; and
- Year of opening for assessment of Strategic Road Network: 2018.

6.4.2 It was agreed that traffic at the five junctions surveyed in 2013 or 2014 were growthed to 2016 levels using a factor obtained from the surveys of Middleton Stoney and Hopcrofts Holt junctions, these surveys were undertaken in both 2013 and 2016.

6.4.3 To obtain growth to the 2018 and 2031 forecast years, local growth factors were extracted from TEMPro 7.2 and NTM dataset AF15 for TEMPro zone Cherwell 010, E02005930, illustrated on **Figure 6.1**.

6.4.4 A review of housing numbers within the TEMPro database (for TEMPro zone Cherwell 010) against the projections in the 2015 Cherwell Annual Monitoring Report (AMR) (for RAF Upper Heyford) up to 2021 indicated that the two appear closely aligned as shown in **Table 6.1**.

Table 6.1: Comparison of TEMPro Housing to Cherwell AMR Projection

Year	Households in TEMPro	Household Growth in TEMPro	Number of Years	Cherwell Annual Monitoring Report 2015 Projections for RAF Upper Heyford*	
2011	3129	-	-	-	
2012	3183	54	1	0	
2013	3237	54	1	0	
2014	3290	53	1	68	Completions to 31/3/15
2015	3344	54	1	70	Projection 15/16
2016	3398	54	1	150	Projection 16/7
2021	3948	550	5	473	Projection 17/198-20/21

Year	Households in TEMPro	Household Growth in TEMPro	Number of Years	Cherwell Annual Monitoring Report 2015 Projections for RAF Upper Heyford*	
Total (2014-2021)	-	711	10	761	

*Appendix 2 Housing Delivery Monitor

6.4.5 The data in **Table 6.1** demonstrated that while the housing delivery trajectories differ slightly year-on-year, by 2021 there is only a difference of 50 households between the TEMPro planning assumptions and the projections included within the Cherwell 2015 AMR. Given that no other sites allocated for residential development have been identified within the Cherwell 010 TEMPro zone, this forecast growth in housing numbers was considered to be related to development at Heyford Park.

6.4.6 In order to provide further validation of this assumption at the request of OCC, TEMPro was contacted directly to determine if it was possible to provide confirmation that the consented development at Heyford Park development was included within these extracted figures. TEMPro advised that "*nowhere in the derivation of the NTEM planning data is there an explicit assumption that particular developments do or do not go ahead*" and that *"for modelling purposes, TEMPro figures must be used as control totals over a larger area, usually the district level."* However, TEMPro also confirmed that the source of the future numbers of dwellings input into the NTEM model for Cherwell 010 is the same 2015 AMR report against which the TEMPro data is compared in **Table 6.1**. The TEMPro response is provided at **Appendix H** .

6.4.7 On that basis, PBA was content that it had been demonstrated beyond reasonable doubt that the TEMPro data took account of the level of housing currently consented at Heyford Park.

6.4.8 However, it was considered the application of TEMPro growth factors to all recorded traffic flows within the study area would not necessarily provide an accurate reflection of the impact of the consented development on the local highway network. This was because every turning movement at the junctions in the study area would not be affected by the development traffic to the same degree. Therefore, the quantum of consented but unbuilt / unoccupied residential units and employment floorspace at the time of the 2016 traffic surveys which would not already be present on the surrounding network was removed from the TEMPro planning assumptions. This provided adjusted growth factors which were then applied to the surveyed traffic flows to take account of the background growth in the area.

6.4.9 The traffic flows associated with the unbuilt / unoccupied consented development were manually added on to the local highway network which provided a more accurate indication of where the impact of the trips associated with the outstanding residential and employment development occurred. **Table 6.2** provides a summary of the number of consented dwellings / jobs that were still to be built-out / occupied at Heyford Park at the time of the 2016 traffic surveys (data provided by Dorchester Group).

Table 6.2: Consented Development Remaining Build Out

Residential Units	Jobs
562	191

6.4.10 In order to adjust the growth factors to remove the impact of the unbuilt / unoccupied consented development, TEMPro was interrogated for the assumptions relating to new households and new dwellings for 2016 to 2018 and 2016 to 2031. The unbuilt / unoccupied dwellings / jobs at the time of the surveys shown in **Table 6.2** were then subtracted from these figures to create new assumptions which are shown in **Table 6.3** and **Table 6.4**.

6.4.11 For the 2016 to 2018 scenario all of the growth has been removed as the growth predicted in TEMPro is considered to be less than that constructed as part of the consented Heyford Park development.

Table 6.3: TEMPro Default and Adjusted Assumptions for 2018 Forecast Year

	Residential			Employment		
	2016 Houses	2018 Houses	Total Increase	2016 Jobs	2018 Jobs	Total Increase
TEMPro Default Assumption	3398	3618	220	3398	3444	46
Alternative Assumptions Applied by PBA	3398	3398	0	3398	3398	0

Table 6.4: TEMPro Default and Adjusted Assumptions for 2031 Forecast Year

	Residential			Employment		
	2016 Houses	2031 Houses	Total Increase	2016 Jobs	2031 Jobs	Total Increase
TEMPro Default Assumptions	3398	4571	1173	3398	3608	210
Alternative Assumptions Applied by PBA	3398	4009	611	3398	3417	19

6.4.12 On the basis of these alternative assumptions, TEMPro was used to determine new adjusted growth factors which excluded the unbuilt / unoccupied dwellings / jobs. These adjusted growth factors are shown in **Table 6.5**. Screenshots of the TEMPro data extract process are provided at **Appendix I** .

Table 6.5: TEMPro Growth Factors

	AM Peak	PM Peak
2016 – 2018	1.0081	1.0068
2016 – 2031	1.1462	1.1517

6.4.13 The adjusted growth factors as shown in **Table 6.5** were applied to the 2016 surveyed traffic flows within the study area. The remaining build out / occupations from the consented development were added to the baseline traffic using the same trip rates, mode split, distribution and assignment as set out below for the allocated 1,600 residential units and 1,500 jobs.

6.4.14 It should be noted that the 2015 AMR, on which the TEMPro growth factors have been based, projects increasing numbers of houses at Heyford Park up to 2031, beyond the delivery of 1,075 dwelling consented scheme. This is done to reflect the assumed delivery of the Local Plan allocation of 1,600 additional dwellings. Therefore, it was considered that a significant proportion, if not all, of the 557 new households forecast with the Cherwell 010 MSOA on which the adjusted TEMPro growth factor is based are actually associated with the assumed delivery of the Local Plan allocation. On this basis, it was considered that the proposed approach to growthing the background traffic using the adjusted TEMPro factors was highly robust as some element of double counting was likely to have occurred.

6.5 Committed Development

6.5.1 A number of applications have been submitted at Heyford Park in recent years. For the purpose of the full allocation assessment it was proposed that the following be treated as committed developments:

- Remaining build out of the consented 1,075 units and around 1,700 jobs (08/00716/OUT and 10/01642/OUT);
- Consented application for 60 residential dwellings south of Camp Road (13/01811/OUT / 16/00627/REM); and
- Consented application for 43 residential dwellings south of Camp Road (16/00263/F).

6.5.2 At the scoping meeting with OCC and HE on 1st February 2017, a list of committed developments in the vicinity of Heyford Park was provided by OCC for inclusion within the traffic impact analysis. However, not all of the committed developments set out by OCC would necessarily impact on the geographic study area as set out in **Section 6.3**. Therefore, reference has been made to the Transport Assessments (TAs) prepared in support of the various committed developments which determined whether their study areas contained any overlap with the defined study area for the Heyford Park traffic impact analysis.

6.5.3 The list of committed developments specified by OCC along with the potential impact of these developments on the Heyford Park study area, and the location this impact is likely to occur (based on the junction numbering shown in **Section 6.3** and **Figure 3.2**) is summarised in **Table 6.6**.

Table 6.6: Committed Development and Impact on Heyford Park Study Area

Committed Development	Overlapping Study Area	Further Details	Planning Reference
North West Bicester (Application 1)	Yes	Junction 2, Junction 8	14/01384/OUT
North West Bicester (Application 2)	Yes	Junction 8, Junction 2	14/01641/OUT
Kingsmere	Yes	Junction 8	06/00967/OUT
Network Bicester	Yes	Junction 8	14/01675/OUT
Bicester Gateway	Yes	Junction 2	16/02505/OUT
Bicester Village	No (No increase on permitted 2012 application, and original application did not include an overlapping study area)	-	12/01209/F
RAF Croughton	No (No documents in public domain due to the nature of the development (MOD))	-	S/2016/1645/MAF
Deddington	No (Application does not have an overlapping study area.)	-	13/00301/OUT

Committed Development	Overlapping Study Area	Further Details	Planning Reference
The Paddocks, Chesterton	No (Application does not have an overlapping study area.)	-	14/01737/OUT
Chesterton	No (Application does not have an overlapping study area.)	-	12/00305/OUT

6.5.4 The location of these committed developments in shown on **Figure 6.2**.

6.5.5 It can be seen that the only junctions likely to have been significantly affected by traffic associated with the committed developments specified by OCC are Junction 2 – M4 Junction 10 and Junction 8, the A3095/B4030 roundabout junction. It was considered that beyond these junctions, the traffic flows associated with the committed development are likely to be sufficiently dispersed to have a negligible impact on the operation of the highway network within the Heyford Park study area.

6.5.6 Traffic associated with Bicester Village and RAF Croughton have not been included directly within the assessment for the reasons set out within **Table 6.6**.

6.5.7 It was agreed that the traffic associated with the developments with an overlapping study area would be included within the Heyford Park assessment based upon the traffic flows set out within the TA for each individual site. However, for the North West Bicester Application 1 and 2, OCC requested that data should be extracted from the County's Bicester SATURN model. Traffic flow data was supplied by WYG on behalf of OCC from the County's Bicester SATURN model for 2016 and 2031, for further details see Tehnical Note 003 (TN003) in **Appendix J** .

6.5.8 For the purposes of this assessment committed development traffic has been included in full in both the 2018 and 2031 forecast assessments.

6.6 Trip Rates and Mode Split

Person Trip Rates

6.6.1 The TRICS database has been interrogated in order to derive multi-modal trip rates for the proposed development. Sites in the database were selected on the basis of a set of criteria that best reflect the development type, size and location as set out below. Results from Greater London, Scotland and Ireland have been removed.

6.6.2 Whilst in definition, the Heyford Park site would most suitably be described as 'Neighbourhood Centre' or 'Free Standing Site' location categories within TRICS, no sites were returned under these categories for any of the required land uses once a site size similar to that of the proposed development was set.

6.6.3 Therefore, PBA consulted the TRICS User Guide prepared by JMP to understand what other location categories are considered appropriate comparisons to 'Neighbourhood Centre' and 'Free Standing Sites'. **Table 6.7** from the TRICS User Guide confirms that both 'Edge of Town' and 'Suburban Area' location categories are 'possibly compatible' with the 'Neighbourhood Centre', and that the 'Edge of Town' location category is 'possibly compatible' with 'Free Standing'.

Table 6.7: Extract from TRICS User Guide (JMP)

Location Type	Town Centre	Edge of Town Centre	Suburban Area	Edge of Town	Neighbourhood Centre	Free Standing
Town Centre	-	Possibly compatible	Not compatible	Not compatible	Not compatible	Not compatible
Edge of Town Centre	Possibly compatible	-	Possibly compatible	Possibly compatible	Not compatible	Not compatible
Suburban Area	Not compatible	Possible compatible	-	Possibly compatible	Possibly compatible	Not compatible
Edge of Town	Not compatible	Possibly compatible	Possibly compatible	-	Possibly compatible	Possibly compatible
Neighbourhood Centre	Not compatible	Not compatible	Possibly compatible	Possibly compatible	-	Not compatible
Free Standing	Not compatible	Not compatible	Not compatible	Possibly compatible	Not compatible	-

6.6.4 Using **Table 6.7**, sites have been taken from the location types which are 'possibly compatible' with the 'Free Standing' and 'Neighbourhood Centre' sites. On this basis, trip rates were obtained under the 'Suburban Area' and 'Edge of Town' location categories.

6.6.5 The following TRICS land use category and criteria were chosen for the Heyford Park Development:

- **Residential:** 'Houses, Privately Owned' (03/A). Sites ranging from between 108 units to 432 units was selected.
- **B1 trip rates:** 'Employment, Office' (02/A). The TRICS sites selected were predominately B1(a) sites, however, some of the sites included a mixture of B1(a) and B1(b) which is deemed suitable to represent the B1(a) and B1(b/c) element of the proposals. Sites ranging from between 186m^2 to 70,291m^2 were selected. Surveys undertaken on Monday and Friday were excluded from the search.
- **B2 trip rates:** 'Employment, Industrial Unit' (02/C). Sites ranging from between 1,100m^2 to 11,375m^2 were selected. Site DC-02-C-07 was excluded from the search as it was deemed to have unsuitable trip rates and was not representative of the Heyford Park proposals.
- **B8 trip rates:** 'Employment, Warehousing (Commercial)' (02/F). Sites ranging from between 2,950m^2 to 32,300m^2 were selected.

6.6.6 Details of the resulting TRICS sites associated with this search are summarised in **Appendix K** . The person trip rates derived from TRICS are shown below in **Table 6.8**.

Table 6.8: TRICS Person Trip Rates

Land Use	Time Period	Arrivals	Departures	Total
Residential (per dwelling)	AM Peak Hour	0.200	0.674	0.874
	PM Peak Hour	0.484	0.322	0.806
B1 (per 100m^2)	AM Peak Hour	1.857	0.344	2.201
	PM Peak Hour	0.250	1.583	1.833
B2 (per 100m^2)	AM Peak Hour	1.187	0.108	1.295
	PM Peak Hour	0.057	1.050	1.107
B8 (per 100m^2)	AM Peak Hour	0.096	0.023	0.119
	PM Peak Hour	0.011	0.048	0.059

Mode Split

Mode Split – Residential

6.6.7 It was considered that the residential trips need to be split by journey purpose in order to accurately reflect the mode splits and trip distributions of the different journey purposes. The split of residential journey purposes were calculated based on TEMPro data for the Zone E02005930: Cherwell 010 (illustrated on **Figure 6.1**). The splits are set out within **Table 6.9** and a summary of the calculations used are provided at **Appendix L** .

Table 6.9: Residential Journey Purpose Split

Journey Purpose	AM Peak	PM Peak
Residential – Employment	43.3%	34.6%
Residential – Education	29.3%	7.9%
Residential – Other	27.4%	57.6%
Total	**100%**	**100%**

6.6.8 A mode split was calculated for residential development traffic for each journey purpose as follows:

- Residential to employment: based on 2011 Census journey to work data for the MSOA E02005930: Cherwell 010, (illustrated on **Figure 6.1**).
- Residential to education and residential to other: based on TEMPro 7.1 data for the Zone E02005930: Cherwell 010 (illustrated on **Figure 6.1**).

6.6.9 While these sources of modal split data were considered to be the most suitable for breaking down the multi-modal trip generation of the residential aspect of the development, at the scoping meeting on 1st February 2017, OCC requested the provision of alternative modal splits for comparison purposes. These additional modal splits have been obtained and are shown alongside PBA's proposed figures in order to provide validation and confirm that they are appropriate to be used within the analysis.

Residential to Employment

6.6.10 The agreed mode split for residential to employment trips is summarised in **Table 6.10** and **Appendix M** .

Table 6.10: Modal Splits for Residential to Employment Trips

Mode	TEMPro	Census	Heyford Park TP Survey
Car Driver	**80.3%**	80.6%	84.8%
Car Passenger	**9.2%**	4.5%	12.8%
Cyclist	**1.5%**	1.2%	0.3%
Pedestrian	**5.0%**	5.0%	0.9%
Public Transport	**4.1%**	8.7%	1.3%
Total	**100%**	100%	100%

6.6.11 The TEMPro 'home based work' trip purpose data was chosen as being most appropriate for this journey purpose. The 2011 Census data and results of the 2014 Travel Plan survey completed by existing employees at Heyford Park was used to validate the proposed modal split taken from the 2017 TEMPro outputs. It was considered that all three modal splits were broadly comparable, particularly in terms of the percentage of car drivers. While the 2014 Travel Plan survey data seemed to suggest a slightly greater level of car drivers than the other data sources, this is most likely associated with the nature of the existing business types operating from the development and it not necessarily likely to be replicated by residents on site. The Census data was considered to have too high a public transport mode split.

Residential to Education

6.6.12 The mode split for residential to education trips is summarised in **Table 6.11** and **Appendix L** .

Table 6.11: Proposed Mode Split for Residential to Education Trips

Mode	TEMPro		NTS
	AM	PM	
Car Driver	**19.8%**	**34.4%**	23.0%
Car Passenger	**44.6%**	**36.4%**	23.9%
Cyclist	**1.2%**	**1.0%**	1.8%
Pedestrian	**23.0%**	**20.0%**	37.2%
Public Transport	**11.4%**	**8.1%**	14.2%
Total	**100%**	**100%**	100%

6.6.13 In order to validate the residential to education modal splits extracted from TEMPro for the Cherwell 010 zone, reference was made to the National Travel Survey.

6.6.14 It was considered that the mode split data from TEMPro differs in the AM and PM peak hours because this data is for the network peak periods (07:00 – 10:00 and 16:00 – 19:00). In the AM peak this is likely to encompass the majority of trips to education. In the PM peak the majority of education trips are likely to have already passed as schools tend to finish before the network peak period begins. The few remaining trips in the PM peak will be associated with after school clubs etc. and it is likely that any school transport (bus etc) may not be available at this time, this would account for a higher car mode share in this PM peak.

6.6.15 The proposed TEMPro modal split was broadly validated by the comparison of the National Travel Survey data, especially for car driver trips. On the basis of the lack of local context associated with the National Travel Survey, the TEMPro modal split was considered the most appropriate to inform this aspect of the traffic impact analysis.

Residential to Other

6.6.16 The mode split for residential to other trips is summarised in **Table 6.12** and **Appendix L**.

Table 6.12: Mode Split for Residential to Other Trips

Mode	TEMPro		TRICS	
	AM	PM	AM	PM
Car Driver	**52.0%**	**48.0%**	60.6%	61.6%
Car Passenger	**31.3%**	**34.8%**	17.1%	21.6%
Cyclist	**1.6%**	**2.7%**	1.4%	2.0%
Pedestrian	**11.6%**	**10.5%**	19.4%	13.8%
Public Transport	**3.4%**	**4.0%**	1.5%	1.2%
Total	**100%**	**100%**	100%	100%

6.6.17 In order to provide some validation of the modal split taken from TEMPro for the Cherwell 010 zone, reference was made to the modal split associated with the multi-modal trip generation within the TRICS database. It was considered that the TRICS modal split is broadly comparable albeit with a slightly higher car driver modal share. However, the TRICS modal split related to all trip purposes and furthermore, given that TEMPro data reflected local conditions within the vicinity of Heyford Park, it was considered that the proposed TEMPro figures were the most appropriate for this trip purpose.

Mode Split – Employment

6.6.18 A mode split was calculated for employment development traffic using 2011 Census journey to work data for workers in the MSOA which included Heyford Park and Camp Road (E02005930: Cherwell 010). This mode split is summarised in **Table 6.13** and **Appendix L**.

Table 6.13: Proposed Mode Split for Employment Trips

Mode	Census	TRICS	TEMPro	TP Survey
Car Driver	**82.3%**	75.5%	79.7%	84.8%
Car Passenger	**4.7%**	11.8%	9.4%	12.8%
Cyclist	**1.8%**	1.4%	1.6%	0.3%
Pedestrian	**8.3%**	5.2%	5.2%	0.9%
Public Transport	**2.9%**	6.1%	4.0%	1.3%
Total	**100%**	100%	100%	100%

6.6.19 In line with OCC's request, TEMPro data, the 2014 Travel Plan survey of existing employees at Heyford Park and the data informing the employment multi-modal trip rates from TRICS was all used to validate the proposed mode Census split. Since all the mode splits shown in **Table 6.13** are broadly comparable, especially with regard to car driver trips, it was considered that the Census modal split was appropriate for this trip purpose.

Vehicular Trip Rates

6.6.20 Applying the journey purpose splits (**Table 6.9**) and mode splits (**Table 6.10** to **Table 6.13**) to the person trip rates (**Table 6.8**), results in the vehicle trip rates shown in **Table 6.14**. These are the vehicle trip rates used in the traffic impact assessment.

Table 6.14: Vehicle Trip Rates (per dwelling/per 100m^2)

	AM Peak Hour			PM Peak Hour		
	Arrival	Departure	Total	Arrival	Departure	Total
Residential – Employment	0.070	0.234	0.304	0.134	0.089	0.224
Residential – Education	0.012	0.039	0.051	0.013	0.009	0.022
Residential – Other	0.028	0.096	0.125	0.134	0.089	0.223
Residential – All Purposes	0.110	0.369	0.479	0.281	0.187	0.469
B1 Employment	1.528	0.283	1.811	0.206	1.303	1.509
B2 Employment	0.977	0.089	1.066	0.047	0.864	0.911
B8 Employment	0.079	0.019	0.098	0.009	0.040	0.049

Sensitivity Test

6.6.21 It was considered that the residential trip rates set out above are consistent with a large mixed use and sustainable development of the type being developed at Heyford Park, however, it was acknowledged that these rates are likely to be at the lower end of what a site of this type might generate. On this basis, and for robustness, it was agreed that a sensitivity test should be undertaken using higher residential person trip rates as a starting point should any junction within the study area be approaching capacity once the initial assessment had been completed. Junctions where sensitivity testing is required has been agreed with OCC and/or HE.

6.6.22 The person trip rates set out within **Table 6.15** were used to undertake this sensitivity test Details of the TRICS data used to obtain these rates is provided at **Appendix M** . The modal split data, set out at **Table 6.13**, was then applied to these trip rates to obtain a revised vehicle trip rate. These trip rates are also set out within **Table 6.15**.

Table 6.15: Residential Trip Rates for Sensitivity Test

	Time Period	Arrivals	Departures	Total
Person Trip Rates (per dwelling)	AM Peak Hour	0.268	0.825	1.093
	PM Peak Hour	0.548	0.283	0.831
Vehicle Trip Rates (per dwelling)	AM Peak Hour	0.147	0.452	0.599
	PM Peak Hour	0.319	0.165	0.483

Trip Summary

6.6.23 On this basis, the assumptions set out above in **Table 6.16** sets out the predicted number of trips that the allocation of 1,600 residential units and 1,500 will generate. The range in the number of trips set out in the table indicates the difference between the standard (Low) and sensitivity (High) trip rates.

Table 6.16: Trip Generation for the full Heyford Park development allocation

Mode	AM						PM					
	Arrival		Departure		Total		Arrival		Departure		Total	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Car Driver	694	634	808	675	1,502	1,310	570	511	652	688	1,223	1,199
Car Passenger	136	108	343	281	479	389	232	205	140	156	372	362
Cyclist	16	14	20	17	37	32	20	18	18	19	38	37
Pedestrian	98	84	168	138	266	223	88	78	81	87	169	166
Public Transport	42	35	82	68	124	103	40	35	33	36	73	72
Total	**986**	**878**	**1,422**	**1,181**	**2,409**	**2,059**	**951**	**849**	**925**	**988**	**1,877**	**1,837**

6.7 Distribution and Assignment

Distribution – Residential to Employment and Residential to Other Trips

6.7.1 It was agreed that the distribution of 'residential to employment' and 'residential to other' trips be derived from 2011 Census journey to work data (resident based) for MSOA E02005930 – Cherwell 010 (illustrated on **Figure 6.1**). Distribution is based on Census MSOA areas and are summarised within **Appendix N** .

Distribution – Residential to Education Trips

6.7.2 The School provision (ages 4 – 18) for residents of Heyford Park is to be provided on site. On this basis it was considered that trips to education will be primarily internal to the development. Notwithstanding this, to account for anyone who might choose to travel outside of the development to school the following assumptions were applied and have been agreed with OCC:

- 80% of car education trips internal to the development;
- 10% of car education trips to local primary school at Steeple Aston; and
- 10% of car education trips to local secondary school at Bicester.

Distribution – Employment Trips

6.7.3 It was agreed that the distribution of employment trips be derived from 2011 Census journey to work data (workplace based) for MSOA E02005930 – Cherwell 010 (illustrated on **Figure 6.1**). Distribution is based on Census MSOA areas and are summarised within **Appendix N**.

Assignment

6.7.4 The assignment of trips within the study area defined in **Section 6.3** has been determined based on Google Maps estimated journey times for the typical AM peak hour. Where there is more than one possible route to the notional centre of an MSOA, with similar journey times, the trips have been split proportionally between routes.

6.7.5 After applying this assignment methodology, the resulting proportion of residential (to other & employment) and employment trips to destination links within the study area is summarised in **Table 6.17** and set out at **Figure 6.3** and **Figure 6.4** respectively. The routes, and proportion of trips using each route, is presented at **Appendix N** for the residential and employment trips.

Table 6.17: Proportion of Car Driver Trips to Destination Links Within Study Area

Destination within Study Area	Residential	Employment
	% Car Trips	% Car Trips
M40 North	15.52	16.55
M40 South	6.79	2.59
A43 North	18.46	29.61
A34 South (via Middleton Stoney and Weston-on-the-Green)	14.67	5.80
A34 South (via the M40 junction 10)	1.38	0.90
A34 South (via Middleton Stoney and outskirts of Bicester)	0.98	0.75
A4260 North	11.77	17.66
A4260 South (via A4260/B4030 Hopcrofts Holt junction)	0.09	0.07
A4260 South (via Rousham)	12.96	5.81
Ardley Road	2.59	2.35
B4030 South	0.53	0.11
B4030 West	3.14	6.33
Middleton Stoney Road	8.28	9.15
B4027 W (via Rousham and A4260)	0.79	1.03
B4027 West (via Kirtlington and Enslow)	2.05	1.28
Total	**100**	**100**

7 Proportional Impact Analysis

7.1 Introduction

7.1.1 The proportional impact of the development on the junctions within the study network, identified in **Section 6.3**, is demonstrated in the tables below. Any junction at which the development is considered to have a significant impact required further capacity testing. It was considered that junctions with an increase in flows due to the development of 10% on a single arm, or an increase in flows of 5% on the junction as a whole, required further capacity testing. This approach was agreed with OCC at a meeting on the 11th May 2017. The arms and junction totals that exceed these thresholds have been shown in red in the tables below, highlighting the need for further capacity testing.

7.2 Junction Impacts

Junction 2a - M40 Junction 10 Southbound Offslip / A43 Roundabout

7.2.1 **Table 7.1** details the proportional impact of the development on Junction 2a when compared to 2031 reference case flows.

Table 7.1: Proportional Impact on Junction 2a - M40 J10 Southbound Offslip / A43 Roundabout

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A43 (E)	1,601	1,289	1,930	1,578	2,119	10%	1,677	6%
A43 (S)	1,094	1,617	1,314	1,896	1,439	9%	2,085	10%
M40 Offslip	495	435	667	530	780	17%	607	15%
Total	**3,190**	**3,341**	**3,910**	**4,004**	**4,338**	**11%**	**4,369**	**9%**

Junction 2b - M40 Junction 10 Southbound Onslip / A43 / Services Junction

7.2.2 **Table 7.2** details the proportional impact of the development on Junction 2b when compared to 2031 reference case flows.

Table 7.2: Proportional Impact on Junction 2b – M40 J10 Southbound Onslip / A43 / Services

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A43 (N)	1941	1602	2405	1967	2707	13%	2143	9%
Services	430	415	494	478	494	0%	478	0%
A43 (W)	1266	1725	1530	2032	1701	11%	2260	11%
Total	**3,637**	**3,742**	**4,428**	**4,477**	**4,902**	**11%**	**4,881**	**9%**

Junction 2c - M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout

7.2.3 **Table 7.3** details the proportional impact of the development on Junction 2c when compared to 2031 reference case flows.

Table 7.3: Proportional Impact on Junction 2c - M40 J10 N/B slips / A43 / B430 (Ardley) Rbt

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A43 (E)	803	616	1,096	832	1,399	28%	1,008	21%
M40 Offslip	1,062	1,387	1,224	1,612	1,256	3%	1,649	2%
B430	442	543	638	695	906	42%	1,044	50%
Total	**2,307**	**2,546**	**2,958**	**3,139**	**3,561**	**20%**	**3,701**	**18%**

Junction 3 - A43 / B4100 Roundabout

7.2.4 **Table 7.4** details the proportional impact of the development on Junction 3 when compared to 2031 reference case flows.

Table 7.4: Proportional Impact on Junction 3 - A43 / B4100 Roundabout

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
A43 (N)	1710	1347	2037	1724	2226	9%	1823	6%
B4100 (E)	505	663	675	786	675	0%	786	0%
A43 (S)	1269	1749	1528	2075	1652	8%	2264	9%
B4100 (W)	498	359	611	433	611	0%	433	0%
Total	**3484**	**3759**	**4239**	**4585**	**4553**	**7%**	**4873**	**6%**

Junction 4a - B430 / Northampton Road Mini Roundabout

7.2.5 **Table 7.5** details the proportional impact of the development on Junction 4a when compared to 2031 reference case flows.

Table 7.5: Proportional Impact on Junction 4a - B430 / Northampton Road Mini Roundabout

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
B430 Oxford Road (N)	558	184	677	254	760	12%	323	27%
B430 (E)	42	44	48	53	48	0%	53	0%
Northampton Road	136	309	168	512	223	32%	579	13%
Total	**736**	**537**	**893**	**820**	**1030**	**15%**	**955**	**16%**

Junction 4b - B430 / Oxford Road T-Junction

7.2.6 **Table 7.6** details the proportional impact of the development on Junction 4b when compared to 2031 reference case flows.

Table 7.6: Proportional Impact on Junction 4b – B430 / Oxford Road T-Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
B430 (N)	40	36	46	44	46	0%	44	0%
Oxford Road	105	45	120	52	120	0%	52	0%
B430 (S)	544	192	661	263	744	13%	332	26%
Total	**689**	**273**	**827**	**359**	**910**	**10%**	**428**	**19%**

Junction 5 - B430 / Minor Road T-Junction

7.2.7 **Table 7.7** details the proportional impact of the development on Junction 5 when compared to 2031 reference case flows.

Table 7.7: Proportional Impact on Junction 5 - B430 / Minor Road Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
B430 (N)	680	266	953	481	1307	37%	710	47%
B430 (S)	240	409	310	544	310	0%	544	0%
Minor Road	93	119	234	231	521	123%	602	160%
Total	**1012**	**794**	**1497**	**1256**	**2139**	**43%**	**1856**	**48%**

Junction 6 - B430 / B4030 (Middleton Stoney) Staggered Crossroads

7.2.8 **Table 7.8** details the proportional impact of the development on Junction 6 when compared to 2031 reference case flows.

Table 7.8: Proportional Impact on Junction 6 - B430 / B4030 (Middleton Stoney) Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
B430 Ardley Road (N)	457	201	647	332	647	0%	332	0%
B4030 Bicester Road (E)	336	294	464	475	537	16%	526	11%
B430 Oxford Road (S)	240	504	290	653	344	19%	720	10%
B4030 (W)	336	273	473	371	625	32%	516	39%
Total	**1369**	**1272**	**1875**	**1830**	**2153**	**15%**	**2093**	**14%**

Junction 7 - A4095 / B430 Oxford Road Staggered Crossroads

7.2.9 **Table 7.9** details the proportional impact of the development on Junction 7 when compared to 2031 reference case flows.

Table 7.9: Proportional Impact on Junction 7 - A4095 / B430 Oxford Road Staggered Crossroads

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
B430 Oxford Road	594	207	714	258	796	12%	327	27%
A4095 (E)	240	126	300	202	300	0%	202	0%
B430 Northampton Road	103	378	130	511	185	42%	578	13%
A4095 (W)	182	266	255	389	255	0%	389	0%
Total	**937**	**711**	**1144**	**971**	**1282**	**12%**	**1106**	**14%**

Junction 8 - A4095 / Middleton Stoney Road Roundabout

7.2.10 **Table 7.10** details the proportional impact of the development on Junction 8 when compared to 2031 reference case flows.

Table 7.10: Proportional Impact on Junction 8 – A4095 / Middleton Stoney Road Roundabout

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
Howes Lane	813	373	1102	592	1102	0%	592	0%
Middleton Stoney Road	300	245	564	491	628	11%	534	9%
Vendee Drive	265	774	438	1075	445	2%	1082	1%
B4030 Bicester Road	219	297	501	688	568	13%	763	11%
Total	**1378**	**1392**	**2104**	**2157**	**2175**	**3%**	**2207**	**2%**

Junction 9 - B4030 Lower Heyford Road / Minor Road T-Junction

7.2.11 **Table 7.11** details the proportional impact of the development on Junction 9 when compared to 2031 reference case flows.

Table 7.11: Proportional Impact on Junction 9 – B4030 Lower Heyford Rd / Minor Rd T-Junction

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
Minor Road	165	154	247	213	398	61%	358	68%
B4030 (S)	305	316	374	409	501	34%	528	29%
B4030 Lower Heyford Road	192	151	220	174	220	0%	174	0%
Total	**662**	**621**	**841**	**797**	**1119**	**33%**	**1060**	**33%**

Junction 10 – Camp Road / Kirtlington Road T-Junction

7.2.12 **Table 7.12** details the proportional impact of the development on Junction 10 when compared to 2031 reference case flows.

Table 7.12: Proportional Impact on Junction 10 - Camp Road / Kirtlington Road Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
Camp Road (E)	104	169	193	245	398	106%	490	100%
Kirtlington Road	13	26	16	34	27	63%	44	29%
Camp Road (W)	132	67	186	132	407	119%	283	115%
Total	**249**	**263**	**395**	**411**	**832**	**110%**	**817**	**99%**

Junction 11 – Station Road / Camp Road T-Junction

7.2.13 **Table 7.13** details the proportional impact of the development on Junction 11 when compared to 2031 reference case flows.

Table 7.13: Proportional Impact on Junction 11 – Station Road / Camp Road Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
Camp Road (E)	99	149	182	219	375	106%	452	106%
B4030 Station Road	76	100	122	169	339	179%	318	88%
Somerton Road	118	63	136	73	139	2%	76	4%
Total	**293**	**312**	**439**	**461**	**853**	**94%**	**845**	**83%**

Junction 12 – B4030 / Port Way Staggered Crossroads

7.2.14 **Table 7.14** details the proportional impact of the development on Junction 12 when compared to 2031 reference case flows.

Table 7.14: Proportional Impact on Junction 12 – B4030 / Port Way Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
Port Way (N)	19	19	26	25	39	47%	37	49%
B4030 Lower Heyford Road (E)	151	179	173	206	173	0%	206	0%
Port Way (S)	22	54	27	66	38	37%	75	15%
B4030 Lower Heyford Road (W)	205	137	235	157	235	0%	157	0%
Total	**397**	**388**	**461**	**454**	**484**	**5%**	**476**	**5%**

Junction 13 – Station Road / Freehold Street / B4030 Crossroads

7.2.15 **Table 7.15** details the proportional impact of the development on Junction 13 when compared to 2031 reference case flows.

Table 7.15: Proportional Impact on Junction 13 – Station Rd / Freehold St / B4030 Crossroads

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
Station Road (N)	151	98	242	160	431	79%	389	143%
B4030 (E)	191	192	219	221	219	0%	221	0%
Station Road (S)	262	207	335	292	551	65%	440	50%
Freehold Street	20	12	23	14	24	6%	15	8%
Total	**624**	**509**	**818**	**687**	**1226**	**50%**	**1065**	**55%**

Junction 14 – A4260 / Somerton Road Crossroads

7.2.16 **Table 7.16** details the proportional impact of the development on Junction 14 when compared to 2031 reference case flows.

Table 7.16: Proportional Impact on Junction 14 – A4260 / Somerton Road Crossroads

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
A4260 Oxford Road (N)	775	414	905	499	1019	13%	561	12%
Somerton Road	77	63	88	73	88	0%	73	0%
A4260 Oxford Road (S)	360	712	440	841	518	18%	956	14%
N Aston Road	84	38	96	44	96	0%	44	0%
Total	**1296**	**1227**	**1529**	**1456**	**1722**	**13%**	**1633**	**12%**

Junction 15 – A4260 / B4030 (Hopcrofts Holt) Staggered Crossroads

7.2.17 **Table 7.17** details the proportional impact of the development on Junction 15 when compared to 2031 reference case flows.

Table 7.17: Proportional Impact on Junction 15 – A4260 / B4030 (Hopcrofts Holt) Junction

	2016		2031 Ref. Case		2031 Test Case			
					AM		PM	
	AM	PM	AM	PM	Flow	% diff	Flow	% diff
A4260 Oxford Road	757	344	884	418	998	13%	480	15%
B4030 (E)	242	189	312	245	414	32%	399	63%
A4260 Banbury Road	345	756	396	871	396	0%	871	0%
B4030 (W)	215	127	252	152	291	16%	170	12%
Total	**1559**	**1416**	**1844**	**1686**	**2099**	**14%**	**1920**	**14%**

Junction 16 – A4260 / Minor Road Staggered Crossroads

7.2.18 **Table 7.18** details the proportional impact of the development on Junction 16 when compared to 2031 reference case flows.

Table 7.18: Proportional Impact on Junction 16 – A4260 / Minor Road Junction

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A4260 Banbury Road (N)	871	327	999	377	999	0%	377	0%
Minor Road (E)	34	16	70	37	149	113%	108	189%
A4260 Banbury Road (S)	328	792	388	937	447	15%	1001	7%
Minor Road (W)	17	10	19	12	19	0%	12	0%
Total	**1250**	**1145**	**1476**	**1363**	**1615**	**9%**	**1498**	**10%**

Junction 17 – A4260 Banbury Road Staggered Crossroads

7.2.19 **Table 7.19** details the proportional impact of the development on Junction 17 when compared to 2031 reference case flows.

Table 7.19: Proportional Impact on Junction 17 – A4260 Banbury Road Staggered Crossroads

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A4260 Banbury Road (N)	871	353	1029	426	1109	8%	497	17%
Minor Road	66	57	76	66	76	0%	66	0%
A4260 Banbury Road (S)	330	741	390	877	442	13%	937	7%
Banbury Road (W)	48	23	56	28	63	12%	32	15%
Total	**1315**	**1174**	**1551**	**1396**	**1689**	**9%**	**1531**	**10%**

Junction 18 – A4260 / B4027 Staggered Crossroads

7.2.20 **Table 7.20** details the proportional impact of the development on Junction 18 when compared to 2031 reference case flows.

Table 7.20: Proportional Impact on Junction 18 – A4260 / B4027 Staggered Crossroads

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A4260 Banbury Road (N)	901	343	1062	413	1136	7%	477	16%
B4027 (E)	257	129	299	152	311	4%	163	8%
A4260 Banbury Road (S)	413	829	485	978	537	11%	1038	6%
B4027 (W)	215	123	248	145	259	4%	155	7%
Total	**1786**	**1424**	**2094**	**1688**	**2243**	**7%**	**1834**	**9%**

Junction 19 – Port Way / A4095 T-Junction

7.2.21 **Table 7.21** details the proportional impact of the development on Junction 19 when compared to 2031 reference case flows.

Table 7.21: Proportional Impact on Junction 19 – Port Way / A4095 Junction

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
Port Way	147	135	173	158	185	7%	170	7%
A4095 (E)	266	195	305	225	305	0%	225	0%
Port Way / A4095 (S)	173	270	200	315	210	5%	324	3%
Total	**586**	**600**	**678**	**698**	**700**	**3%**	**719**	**3%**

Junction 20 – A4095 / Bletchingdon Road T-Junction

7.2.22 **Table 7.22** details the proportional impact of the development on Junction 20 when compared to 2031 reference case flows.

Table 7.22: Proportional Impact on Junction 20 – A4095 / Bletchingdon Road Junction

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A4095 (N)	492	293	569	340	581	2%	352	3%
Bletchingdon Road	60	100	69	115	69	0%	115	0%
A4095 (S)	285	458	329	531	339	3%	541	2%
Total	**837**	**851**	**966**	**987**	**988**	**2%**	**1008**	**2%**

Junction 21 – B4027 / A4095 T-Junction

7.2.23 **Table 7.23** details the proportional impact of the development on Junction 21 when compared to 2031 reference case flows.

Table 7.23: Proportional Impact on Junction 21 – B4027 / A4095 Junction

	2016		2031 Ref. Case		2031 Test Case			
	AM	PM	AM	PM	AM		PM	
					Flow	% diff	Flow	% diff
A4095 Lince Lane	271	227	315	264	327	4%	276	4%
B4027 Station Road	106	322	121	371	121	0%	371	0%
A4095 Station Road	576	548	662	635	672	2%	644	2%
Total	**953**	**1097**	**1099**	**1270**	**1121**	**2%**	**1291**	**2%**

7.3 Summary

7.3.1 The proportional impact of development has been assessed and results shown in **Table 7.1 – Table 7.20** show that Junctions 2a to 18 will require further capacity testing. **Tables 7.21 – 7.23** show that Junctions 19, 20 and 21 have not exceeded a 10% increase in flows on any arm or 5% increase in flows on the junction total between the 2031 Reference and 2031 Test Case. Therefore, further capacity testing will not be required, at these junctions and they have therefore been excluded from further assessment. **Figure 7.1** illustrates the junctions that require further capacity testing.

8 2016 Baseline Modelling

8.1 Introduction

8.1.1 This section provides an overview of the baseline junction capacity assessments for Heyford Park. It sets out the methodology employed in the construction and validation of the base junction capacity models along with the results of their assessments.

8.1.2 The results of the junction modelling will establish the current baseline operational performance of each junction and highlight any existing capacity issues.

8.2 Model Setup

Junctions 9 Models

8.2.1 Junctions 2c to 5, 8 to 14, 16 and 18 have been modelled as either a priority roundabout, T-junction or crossroads in the latest modelling software, 'Transport Research Laboratories (TRL) Junction 9', using the ARCADY Roundabout and the PICADY Priority Intersection Modules. The details of Junctions 2c to 5, 8 to 14, 16 and 18 are listed below:

2. M40 Junction 10 (part c);
3. A43 / B4100 roundabout;
4. A34 / B430 junction (made up of two parts; a and b);
5. B430 / Minor Road junction;
8. A4095 / B4030 junction;
9. B4030 / Minor Road junction;
10. Camp Road / Kirtlington Road junction;
11. Camp Road / Somerton Road junction;
12. B4030 / Port Way junction;
13. B4030 / Station Road junction;
14. A4260 / Somerton Road junction;
16. A4260 / Minor Road junction; and
18. A4260 / B4027 Staggered Crossroads junction.

8.2.2 To create the base junction capacity models, measurements were taken from a combination of OS mapping and recent aerial photography. Measurements were taken in accordance with the ARCADY Roundabout and the PICADY Priority Intersection Modules user guide and input into the base junction capacity models.

TRANSYT 15 Models

8.2.3 Junctions 2a, 2b, 7 and 17 have been modelled within TRANSYT 15. Junctions 2a and 2b have been modelled as part of one network to allow for potential blocking effects between the junctions. Junctions 7 and 17 are both staggered T-junctions with complicated priority intersection and have therefore been modelled in TRANSYT as this was considered simpler than undertaking multiple runs in Junctions 9 for each junction. In this case the giveway coefficients have been obtained from PICADY module of Junctions 9. The details of Junction 2a, 2b, 7 and 17 are listed below:

2. M40 Junction 10 (part a and b);

7. A4095 / B430 junction; and

17. A4260 Banbury Road Staggered Crossroads junction.

8.2.4 The base models have been created using measurements from OS mapping and aerial photography in a similar manner to the priority junction models.

8.2.5 Signal specifications have been obtained from Highways England for Junction 2b. The signal specifications have been used to set up the phasing and staging within the base model. No signal information is required for Junctions 7 and 17 as they are priority junctions.

8.2.6 The model for Junctions 2a and 2b contains a mixture of signalised and giveway stoplines and therefore giveway coefficients and slopes have been calculated using the same measurements that would be used in ARCADY.

8.2.7 A cycle time of 60 seconds has been used within the model of Junctions 2a and 2b. This cycle time has been chosen as Junction 2b is similar in layout to a partially signalised roundabout and therefore a long cycle time is not recommended due to the need to manage queues on the circulating links.

LinSig 3 Models

8.2.8 Junctions 6 and 15 have been modelled in LinSig. LinSig has been used for these junctions as they are simple signalised junctions and there are no blocking effects that need to be modelled hence TRANSYT is not required in this case. The details of Junction 6 and 15 are listed below:

6. B430 / B4030 (Middleton Stoney) junction; and

15. A4260 / B4030 (Hopcrofts Holt) junction.

8.2.9 The base models have been created using measurements from OS mapping and aerial photography in a similar manner to the priority junction models.

8.2.10 Signal specifications have been obtained from Oxfordshire County Council. The signal specifications have been used to set up the phasing and staging within the base models.

8.3 Traffic Flow Input

8.3.1 The 2016 Classified Junction Turning Count Surveys which were undertaken between 07:00 – 10:00 and 16:00 – 19:00 were used to identify the network peak hours of 07:45 – 08:45 and 17:00 – 18:00 in the AM and PM peaks respectively. These network peak hour flows are illustrated in **Figures 3.3** and **3.4**.

Junctions 9 Models

8.3.2 The 2016 Classified Junction Turning Count Survey flows were input into the Junctions 9 base junction capacity models for each peak period. For all junctions a FLAT profile input was used. Analysis of the traffic flows in each 15-minute segment in the AM and PM peak hour showed that the flows were evenly distributed across each of the 15 minute segments. **Table**

8.1 and **Table 8.2** show the average distribution of flows across all junctions in each 15-minute segment in the AM and PM peak hour, respectively.

Table 8.1: Traffic Flow Distribution Across the AM Peak Hour

AM Peak Hour Segment	Traffic Flow Distribution
07:30 – 07:45	24%
07:45 – 08:00	25%
08:00 – 08:15	26%
08:15 – 08:30	25%

Table 8.2: Traffic Flow Distribution Across the PM Peak Hour

PM Peak Hour Segment	Traffic Flow Distribution
17:00 – 17:15	25%
17:15 – 17:30	25%
17:30 – 17:45	25%
17:45 – 18:00	25%

8.3.3 The proportion of HGVs making each turning movement, as identified from the 2016 Classified Junction Turning Count Survey flows, were input into the models.

TRANSYT 15 / LinSig 3 Models

8.3.4 The 2016 Classified Junction Turning Count Survey flows were input into the base TRANSYT and LinSig junction capacity models for each peak period. For all junctions the default flat flow profiles have been used.

8.4 Model Validation

8.4.1 This section of the report sets out the validation of the priority and signalised base junction capacity models.

8.4.2 Validation of junction models is undertaken to ensure the model represents the existing capacity of the junction as accurately as possible.

8.4.3 Where practically possible, the junction models have been validated against queue surveys that were recorded at each junction at the time of undertaking the turning count surveys.

8.4.4 The validated models will provide a base against which to test future scenarios.

8.4.5 It should be noted that 2016 queue survey information is not available for Junctions 5 (B430 / Minor Road junction), 10 (Camp Road / Kirtlington Road junction), 11 (Camp Road / Somerton Road) and 12 (B4030 / Port Way junction) and therefore these models have been validated against survey information from 2013 and 2014. Queue surveys were also not available for Junction 18 (A4260 / B4027 staggered crossroads junction) and therefore the modelled queues have been set out for this junction but no comparison against surveyed data has been made. The 2013 and 2014 traffic flows that were used to validate the models are shown in **Figures 3.5** and **3.6** and **Figures 3.7** and **3.8**, respectively. The full model outputs for the 2013 and 2014 Junction Assessments of junction 5, 10, 11 and 12 are provided in **Appendix O** .

Priority Junction Models

8.4.6 The queue surveys recorded the stationary traffic that was queueing in each approach lane to the junction, at the end of each five-minute period. This method of queue survey is as recommended by TRL.

8.4.7 As part of the calibration process of the base roundabout capacity models, a review was undertaken of the modelled and observed queues on each arm of each junction. Where the base junction capacity models have been run but the modelled queues do not reflect the observed queues, capacity adjustment has been applied to provide a robust assessment.

8.4.8 The details of the capacity adjustments which have been applied to the base junction capacity models have been set out for the respective junctions below.

Signalised Junction Models

8.4.9 The queue surveys recorded the stationary traffic that was queueing in each approach lane to the junction, at the end of a red period on the arm at approximately 5 minute intervals.

8.4.10 As part of the calibration process of the base signalised capacity models, a review was undertaken of the modelled and observed queues on each arm of each junction. If necessary, the signal timings were adjusted to better reflect the queuing at the junctions.

8.5 Model Validation Results

Junction 2a – M40 Junction 10 Southbound Off-slip / A43 Roundabout

8.5.1 The M40 Junction 10 Southbound Off-slip / A43 junction is a three arm roundabout that forms part of a gyratory system with Junction 2b. There are no footways provided along the carriageways.

8.5.2 The base junction capacity model for the M40 Junction 10 Southbound Off-slip / A43 Roundabout was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.3 A comparison of queues from the model and surveyed queues have been provided in **Table 8.3**.

Table 8.3: M40 J10 Southbound Off-slip / A43 Roundabout 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A43 (N)	1.6	1.7	1.2	0.5
M40 off-slip southbound	0.3	1.3	0.5	2.8
A43 (S)	0.1	0.0	0.2	0.0

8.5.4 From the results in **Table 8.3** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.5 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 2b - M40 Junction 10 Southbound On-slip / A43 / Services Junction

8.5.6 The M40 Junction 10 Southbound On-slip / A43 / Services junction is a four arm part-signalised, part-priority junction that forms a gyratory type system with Junction 2a. Footways are provided on the northern side of the A43 (N) and connecting to the western arm of the A43 (S). No other footways are provided along the carriageways.

8.5.7 The base junction capacity model for the M40 Junction 10 Southbound On-slip / A43 / Services junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.8 A comparison of queues from the model and surveyed queues have been provided in **Table 8.4.**

Table 8.4: M40 J10 Southbound On-slip / A43 / Services 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A43 (N)	16.0	16.0	9.9	10.4
Services (E)	4.8	7.3	4.2	5.8
A43 (S)	0.4	0.0	1.2	0.3

8.5.9 From the results in **Table 8.4** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.10 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 2c – M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout

8.5.11 The M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout junction is a three arm priority roundabout junction. The inscribed circle diameter of the roundabout is 72.0m. A footway is provided from the B430 to the A43.

8.5.12 The base junction capacity model for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.13 The initial results of the model showed that the model was overestimating queues on the M40 off-slip. Therefore, to replicate the observed queue, an ARCADY capacity adjustment of 115% was applied to the M40 off-slip arm in the AM scenario and 125% was applied in the PM scenario.

8.5.14 A comparison of queues from the calibrated model and surveyed queues have been provided in **Table 8.5**.

Table 8.5: M40 J10 Northbound slips / A43 / B430 (Ardley) 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A43	0.6	0.0	0.4	0.2
M40 off-slip northbound	1.4	1.3	1.7	0.7
B430	0.5	0.8	0.8	1.2

8.5.15 From the results in **Table 8.5** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.16 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 3 – A43 / B4100 Roundabout

8.5.17 The A43 / B4100 junction is a four arm priority roundabout junction. The roundabout has an inscribed circle diameter of 75.0m. There are no footways provided at this junction.

8.5.18 The base junction capacity model for the A43 / B4100 junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.19 The initial results of the model showed that the model was underestimating queues on the B4100 (E) and B4100 (W) in the AM and underestimating queues on the A43 (N), B4100 (E) and B4100 (W) in the PM. The model was also overestimating queues on the A43 (N) in the AM and A43 (S) in the PM. Therefore, to replicate the observed queue, an ARCADY capacity adjustment of 130% was applied to the A43 (N), 80% to the B4100 (E) and 85% to the B4100 (W) in the AM scenario. In the PM scenario, capacity adjustment of 85% was applied to the A43 (N), 75% to the B4100 (E), 105% to the A43 (S) and 70% to the B4100 (W) in the PM scenario.

8.5.20 A comparison of queues from the model and surveyed queues have been provided in **Table 8.6.**

Table 8.6: A43 / B4100 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A43 (N)	2.2	1.4	3.3	2.9
B4100 (E)	4.5	4.8	6.4	5.3
A43 (S)	2.1	1.3	6.6	4.1
B4100 (W)	2.9	2.8	6.7	6.2

8.5.21 From the results in **Table 8.6** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.22 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 4a – B430 / Northampton Road Mini Roundabout

8.5.23 The B430 / Northampton Road mini roundabout is a three arm priority mini-roundabout junction. There are footways provided along all arms of the carriageway except for the southern side of B430 (E) and the eastern side of B430 (S).

8.5.24 The base junction capacity model for the B430 / Northampton Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.25 A comparison of queues from the model and surveyed queues have been provided in **Table 8.7**.

Table 8.7: B430 / Northampton Road Mini Roundabout 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
B430 / Northampton Road	1.1	0.0	0.2	0.0
B430 (E)	0.1	0.0	0.1	0.1
B430 (S)	0.1	0.0	0.3	0.0

8.5.26 From the results in **Table 8.7** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.27 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 4b – B430 / Oxford Road T-Junction

8.5.28 The B430 / Oxford Road junction is a priority T-junction.

8.5.29 The B430 forms the major arm and Oxford Road forms the minor arm. There is a short stretch of footway provided along the eastern side of the B430, opposite Oxford Road. No other footways are provided at the junction.

8.5.30 The base junction capacity model for the B430 / Oxford Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.31 A comparison of modelled and surveyed queues is provided in **Table 8.8**.

Table 8.8: B430 / Oxford Road 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Oxford Road	0.3	0.3	0.1	0.0
B430 (S)	0.2	0.0	0.1	0.0

8.5.32 From the results in **Table 8.8** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.33 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 5 – B430 / Minor Road Junction T-Junction

8.5.34 The B430 / Minor Road junction is a priority T-junction. The B430 forms the major arm and the Minor Road forms the minor arm. There are no footways provided along any of the carriageways.

8.5.35 The base junction capacity model for the B430 / Minor Road junction was run using 2014 Classified Junction Turning Count Survey flows and junction geometries, because surveys were undertaken for this junction in 2014. The model has been validated through comparison of 2014 survey queues with 2014 traffic flows. Once validated, the model has been run using 2016 traffic flows as set out in **Section 6.4**.

8.5.36 A comparison of modelled queues and 2014 survey queues are provided in **Table 8.9**.

Table 8.9: B430 / Minor Road 2014 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Minor Road (Left)	0.1	1.1	0.2	1.2
Minor Road (Right)	0.0		0.0	
B430	0.3	0.0	0.1	0.3

8.5.37 From the results in **Table 8.9** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.38 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 6 – B430 / B4030 (Middleton Stoney) Junction Staggered Crossroads

8.5.39 The B430 / B4030 junction is a signalised right left staggered crossroads. The B430 forms the major arms and the B4030 forms the minor arms. Footways are provided along all sides of the carriageway except from the western side of the B430 (S).

8.5.40 The base junction capacity model for the B430 / B4030 junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.41 A comparison of modelled and surveyed queues has been provided in **Table 8.10**.

Table 8.10: B430 / B4030 (Middleton Stoney) Junction 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
B430 Ardley Road (N)	19.1	8.8	7.0	3.6
B4030 Bicester Road (E)	16.7	10.6	11.1	8.7
B430 Oxford Road (S)	8.8	2.8	16.2	6.7
B4030 Heyford Road (W)	15.3	3.3	10.3	2.8

8.5.42 From the results in **Table 8.10** it can be seen that the model generally over-predicts the queues in both peaks. This is largely due to a discrepancy between how LinSig reports queues and the queue surveys. The end of red queue in LinSig is similar to that seen in the queue survey but the model shows the queue continuing to grow during the green period as vehicles continue to join the back of the queue. This was not recorded by the queue surveys which reported the stationary queue at the end of red period.

8.5.43 In addition, the junction operates under Vehicle Activation (VA) which will change the timings and cycle time to best balance the queue and capacity. The observed cycle time varies from around 60 to around 120 seconds. This variability (and optimisation) can't be re-created in LinSig and therefore the model is likely to over-predict the queues to some extent.

8.5.44 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 7 – A4095 / B430 Oxford Road Staggered Crossroads

8.5.45 The A4095 / B430 junction is a right left staggered crossroads. The B430 form the major arms and the A4095 form the minor arms. There are no footways provided along any of the carriageways.

8.5.46 The base junction capacity model for the A4095 / B430 Oxford Road Staggered Crossroads junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.47 A comparison of modelled and surveyed queues has been provided in **Table 8.11**.

Table 8.11: A4095 / B430 Oxford Road Staggered Crossroads 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
B430 Oxford Road	0.2	0.0	0.0	0.0
A4095 (E)	0.2	0.4	0.0	0.2
B430 Northampton Road	0.0	0.0	0.1	0.0
A4095 (W)	0.0	0.3	0.1	0.6

8.5.48 From the results in **Table 8.11** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.49 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 8 – A4095 / Middleton Stoney Road Roundabout

8.5.50 The A4095 / Middleton Stoney Road roundabout is a four arm standard priority roundabout. The roundabout has an inscribed circle diameter of approximately 55m. Footways are provided along all sides of the carriageway.

8.5.51 The base junction capacity model for the A4095 / Middleton Stoney Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.52 A comparison of the modelled and surveyed queues has been provided in **Table 8.12**.

Table 8.12: A4095 / Middleton Stoney Road 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Howes Lane	1.8	0.3	0.4	0.3
Middleton Stoney Road	0.7	0.8	0.3	0.0
Vendee Drive	0.2	0.1	1.0	0.0
B4030	0.2	0.0	1.5	0.6

8.5.53 From the results in **Table 8.12** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.54 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 9 – B4030 Lower Heyford Road / Minor Road T-Junction

8.5.55 The B4030 Lower Heyford Road / Minor Road T-junction is a priority T-junction. Lower Heyford Road forms the major arm and the Minor Road forms the minor arm. There are no footways provided along any of the carriageways.

8.5.56 The base junction capacity model for the B4030 Lower Heyford Road/Minor Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.57 A comparison of modelled and surveyed queues has been provided in **Table 8.13**.

Table 8.13: B4030 Lower Heyford Road/Minor Road 2016 Modelled and Surveyed Queues

<table>
<tr><th rowspan="2">Link</th><th colspan="2">AM Peak</th><th colspan="2">PM Peak</th></tr>
<tr><th>Modelled Queue (veh)</th><th>Queue Survey (veh)</th><th>Modelled Queue (veh)</th><th>Queue Survey (veh)</th></tr>
<tr><td>Minor Road (Left)</td><td>0.3</td><td rowspan="2">0.0</td><td>0.2</td><td rowspan="2">0.0</td></tr>
<tr><td>Minor Road (Right)</td><td>0.1</td><td>0.0</td></tr>
<tr><td>B4030</td><td>0.3</td><td>0.1</td><td>0.4</td><td>0.0</td></tr>
</table>

8.5.58 From the results in **Table 8.13** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.59 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 10 – Camp Road / Kirtlington Road T-Junction

8.5.60 The Camp Road / Kirtlington Road T-junction is a priority T-junction. Camp Road comprises the major arm and Kirtlington Road comprises the minor arm. Footways are provided on the southern side of Camp Road.

8.5.61 The base junction capacity model for the junction was run using 2013 Classified Junction Turning Count Survey flows and junction geometries because surveys were undertaken for this junction in 2013. The model has been validated through comparison of 2013 survey queues with 2013 traffic flows. Once validated, the model has been run using 2016 traffic flows as set out in **Section 6.4**.

8.5.62 A comparison of modelled and 2013 surveyed queues can be found in **Table 8.14**.

Table 8.14: Camp Road / Kirtlington Road 2013 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Kirtlington Road	0.0	0.0	0.1	0.0
Camp Road (W)	0.0	0.0	0.0	0.0

8.5.63 From the results in **Table 8.14** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.64 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 11 – Station Road / Camp Road T-Junction

8.5.65 The Station Road / Camp Road T-junction is a priority T-junction. Station Road comprises the major arm and Camp Road comprises the minor arm. A footway is provided along the eastern side of Somerton Road on the northern arm and on both the north and south of Camp Road.

8.5.66 The base junction capacity model for the junction was run using 2013 Classified Junction Turning Count Survey flows and junction geometries because surveys were undertaken for this junction in 2013. The model has been validated through comparison of 2013 survey queues with 2013 traffic flows. Once validated, the model has been run using 2016 traffic flows as set out in **Section 6.4**.

8.5.67 A comparison of queues from the modelled and 2013 survey queues have been provided in **Table 8.15**.

Table 8.15: Station Road / Camp Road 2013 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Camp Road (Left)	0.1	0.0	0.1	0.0
Camp Road (Right)	0.1	0.0	0.2	0.0
Station Road	0.1	0.0	0.1	0.0

8.5.68 From the results in **Table 8.15** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.69 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 12 – B4030 / Port Way Staggered Crossroads

8.5.70 The B4030 / Port Way Staggered Crossroads is a two-way right-left stagger crossroads junction. The B4030 comprises the major arm and Port Way comprises the minor arm. There are no footways provided along any of the carriageways.

8.5.71 The base junction capacity model for the junction was run using 2014 Classified Junction Turning Count Survey flows and junction geometries because surveys were undertaken for this junction in 2014. Therefore, the model has been validated through comparison of 2014 survey queues with 2014 traffic flows. Once validated, the model has been run using 2016 traffic flows as set out in **Section 6.4**.

8.5.72 A comparison of queues from the modelled and 2014 survey queues have been provided in **Table 8.16**.

Table 8.16: B4030 / Port Way 2014 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Port Way (S) (Left)	0.0	0.2	0.0	0.3
Port Way (S) (Right)	0.0		0.0	
B4030 (E)	0.0	-	0.0	-
Port Way (N) (Left)	0.0	0.0	0.0	0.0

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
Port Way (N) (Right)	0.0		0.0	
B4030 (W)	0.0	-	0.0	-

8.5.73 From the results in **Table 8.16** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.74 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 13 – Station Road / Freehold Street / B4030 Crossroads

8.5.75 The Station Road / Freehold Street / B4030 crossroads junction is a two-way crossroads junction. Station Road comprises the major arm and Freehold Street and the B4030 comprise the minor arms. A footway is provided along the northern side of Freehold Street and leads to the western side of Station Road (N). No other footways are provided.

8.5.76 The base junction capacity model for the junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.77 A comparison of queues from the modelled and surveyed queues have been provided in **Table 8.17**.

Table 8.17: Station Road / Freehold Street / B4030 2016 Modelled and Surveyed Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
B4030 (E) (Left)	0.4	0.3	0.4	0.0
B4030 (E) (Right)	0.0		0.1	
Station Road (N)	0.0	0.0	0.0	0.0
Freehold Street	0.0	0.2	0.0	0.2
Station Road (S)	0.6	0.0	0.3	0.0

8.5.78 From the results in **Table 8.17** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.79 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 14 – A4260 / Somerton Road Crossroads

8.5.80 The A4260 / Somerton Road crossroads junction is a two-way crossroads junction. The A4260 and Oxford Road comprise the major arms and Somerton Road and N Aston Road comprise the minor arms. There are no footways provided along any of the carriageways.

8.5.81 The base junction capacity model for the A4260 / Somerton Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.82 A comparison of queues from the modelled and surveyed queues have been provided in **Table 8.18**.

Table 8.18: A4260 / Somerton Road 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A4260 Oxford Road	0.1	0.0	0.1	0.2
Somerton Road	0.3	0.8	0.2	0.8
A4260	0.0	0.0	0.0	0.0
N Aston Road	0.2	0.3	0.1	0.4

8.5.83 From the results in **Table 8.18** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.84 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 15 – A4260 / B4030 (Hopcrofts Holt) Junction Staggered Crossroads

8.5.85 The A4260 / B4030 (Hopcrofts Holt) Junction is a signalised right left staggered crossroads. The A4260 forms the major arms and the B4030 forms the minor arms. There is a footway provided along the eastern side of the A4260 Oxford Road (N). There are no other footways provided along the carriageways.

8.5.86 The base junction capacity model for the A4260 / B4030 (Hopcrofts Holt) junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.87 A comparison of modelled and surveyed queues has been provided in **Table 8.19**.

Table 8.19: A4260 / B4030 (Hopcrofts Holt) Junction 2016 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A4260 Oxford Road (N)	22.0	7.3	4.1	3.0
B4030 (E)	7.3	4.3	5.5	3.1
A4260 Banbury Road (S)	6.2	2.2	13.3	6.4
B4030 (W)	8.0	3.9	4.1	2.6

8.5.88 From the results in **Table 8.19** it can be seen that the model generally over-predicts the queues in both peaks.

8.5.89 This is for similar reasons to those outlined with Junction 6. The discrepancy is mostly due to how the queues are reported in LinSig (the end of red queues are much more similar to the observed queues) and that the junction runs under VA control which can't be accurately replicated within the model.

8.5.90 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 16 – A4260 / Minor Road Staggered Crossroads

8.5.91 The A4260 / Minor Road junction is a two-way left-right stagger crossroads junction. The A4260 forms the major arm and Minor Road (E) and (W) form the minor arms. There are no footways provided along any of the carriageways.

8.5.92 The base junction capacity model for the A4260 / Minor Road junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries.

8.5.93 A comparison of queues from the modelled and surveyed queues have been provided in **Table 8.20**.

Table 8.20: A4260 / Minor Road 2016 Modelled and Survey Queues

<table>
<tr><th rowspan="2">Link</th><th colspan="2">AM Peak</th><th colspan="2">PM Peak</th></tr>
<tr><th>Modelled Queue (veh)</th><th>Queue Survey (veh)</th><th>Modelled Queue (veh)</th><th>Queue Survey (veh)</th></tr>
<tr><td>A4260 Banbury Road (N)</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr>
<tr><td>Minor Road (W) (Left)</td><td>0.0</td><td rowspan="2">0.1</td><td>0.0</td><td rowspan="2">0.0</td></tr>
<tr><td>Minor Road (W) (Right)</td><td>0.0</td><td>0.0</td></tr>
</table>

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A4260 Banbury Road (S)	0.0	0.0	0.1	0.0
Minor Road (E) (Left)	0.1	0.2	0.0	0.2
Minor Road (E) (Right)	0.0		0.0	

8.5.94 From the results in **Table 8.20** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.95 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 17 – A4260 Banbury Road Staggered Crossroads

8.5.96 The A4260 Banbury Road junction is a left right staggered crossroads. The A4260 Banbury Road forms the major arm and Minor Road (E) and Banbury Road (W) form the minor arms.

8.5.97 The base junction capacity model for the A4260 Banbury Road Staggered Crossroads was run using the 2017 Classified Junction Turning Count Survey flows and junction geometries.

8.5.98 Traffic surveys were undertaken in January 2017 due to a traffic survey error that occurred during the initial surveys undertaken in November 2016.

8.5.99 A comparison of modelled and surveyed queues has been provided in **Table 8.21**.

Table 8.21: A4260 Banbury Road Staggered Crossroads 2017 Modelled and Survey Queues

Link	AM Peak		PM Peak	
	Modelled Queue (veh)	Queue Survey (veh)	Modelled Queue (veh)	Queue Survey (veh)
A4260 Banbury Road (N)	0.4	0.0	0.0	0.0
Minor Road (E)	0.0	0.5	0.0	0.1
A4260 Banbury Road (S)	0.0	0.2	0.2	0.1
Banbury Road (W)	0.0	0.3	0	0.1

8.5.100 From the results in **Table 8.21** it can be seen that the model predicts overall similar queues in the AM and PM peaks compared with the surveyed queues.

8.5.101 It is therefore considered that the model provides a robust basis to assess the forecast reference and test case scenarios.

Junction 18 – A4260 / B4027 Staggered Crossroads

8.5.102 The A4260 / B4027 Staggered Crossroads junction is a right left staggered crossroads. The A4260 Banbury Road forms the major arm and the B4027 forms the minor arms. There are no footways provided along the carriageways.

8.5.103 The base junction capacity model for the A4260 / B4027 Staggered Crossroads Junction was run using the 2016 Classified Junction Turning Count Survey flows and junction geometries. Queue surveys were not available for this junction, however, **Table 8.22** sets out the modelled queues at the junction.

Table 8.22: A4260 / B4027 Staggered Crossroads 2016 Modelled Queues

Link	AM Peak	PM Peak
	Modelled Queue (veh)	Modelled Queue (veh)
A4260 Banbury Road (N)	0	0
B4027 (E) (Left)	0.4	0
B4027 (E) (Right)	1.2	0.5
A4260 Banbury Road (S)	0.4	0.3
B4027 (W) (Left)	0	0
B4027 (W) (Right)	1.6	0.6

8.5.104 In the absence of any queue surveys for this junction it is considered that the modelled parameters provides a suitable basis for future year assessment scenarios.

8.6 Base Junction Assessment Results

8.6.1 This section of the report sets out a summary of the results for the 2016 Base Junction Capacity assessments of the priority and signalised junctions. The full model outputs for the Base Junction Assessments are provided in **Appendix P** .

8.6.2 A summary Red, Amber, Green (RAG) analysis of the junction results is provided on **Figures 8.1** and **8.2** for the AM and PM peak respectively. The colours represent the predicted capacity of the junctions as follows:

- Green: <85% for priority junctions, <90% for signalised junctions;
- Amber: 85% - 100% for priority junctions, 90% - 100% for signalised junctions; and
- Red: >100% for all junctions.

Junction 2a – M40 Junction 10 Southbound Off-slip / A43 Roundabout

8.6.3 **Table 8.23** below presents the modelled junction capacity results for the 2016 base scenario at the M40 Junction 10 Southbound Off-slip / A43 roundabout.

8.6.4 Junction 2a is a priority roundabout, however, it has been modelled in TRANSYT in order to model its interaction with Junction 2b. As it has been modelled in TRANSYT the capacity results have been presented as Degree of Saturation (DoS). As this is a priority roundabout it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 8.23: M40 J10 Southbound Off-slip / A43 Roundabout 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	80%	1.59	6.15	76%	1.18	4.61
A43 (S)	32%	0.08	0.41	43%	0.16	0.64
M40 off-slip southbound	48%	0.28	2.66	61%	0.51	5.50

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.5 **Table 8.23** shows that the M40 Junction 10 Southbound Off-slip / A43 roundabout is predicted to operate within capacity in the AM and PM peak.

Junction 2b – M40 Junction 10 Southbound On-slip / A43 / Services Junction

8.6.6 **Table 8.24** below presents the modelled junction capacity results for the 2016 base scenario at the M40 Junction 10 Southbound On-slip / A43 / Services junction.

Table 8.24: M40 J10 Southbound On-slip / A43 / Services 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	86%	15.99	19.39	70%	9.86	12.83
Services (E)	73%	4.78	38.73	65%	4.23	31.96
A43 (S)	57%	0.37	1.11	77%	1.24	2.75
Northern Circulatory (W)	61%	4.23	27.93	60%	4.39	26.43

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.7 **Table 8.24** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peak hours.

Junction 2c – M40 Junction 10 Northbound slips / A43 / B430 (Ardley) Roundabout

8.6.8 **Table 8.25** below presents the modelled junction capacity results for the 2016 base scenario at the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 8.25: M40 J10 Northbound slips / A43 / B430 (Ardley) 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.39	0.6	2.91	0.29	0.4	2.38
M40 off-slip northbound	0.58	1.4	4.65	0.63	1.7	4.35
B430	0.32	0.5	3.85	0.44	0.8	5.15

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.9 **Table 8.25** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate well within capacity in the AM and PM peak.

Junction 3 – A43 / B4100 Roundabout

8.6.10 **Table 8.26** below presents the modelled junction capacity results for the 2016 base scenario at the A43 / B4100 roundabout junction.

Table 8.26: A43 / B4100 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.69	2.2	4.59	0.77	3.3	8.96
B4100 (E)	0.83	4.5	33.22	0.87	6.4	36.42
A43 (S)	0.68	2.1	5.90	0.87	6.6	13.83
B4100 (W)	0.75	2.9	21.30	0.89	6.7	71.91

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.11 **Table 8.26** shows that the A43 / B4100 roundabout junction is predicted to operate within capacity in the AM peak and approaching capacity on the B4100 (W) arm in the PM peak.

Junction 4a – B430 / Northampton Road Mini Roundabout

8.6.12 **Table 8.27** below presents the modelled junction capacity results for the 2016 base scenario at the B430 / Northampton Road mini-roundabout junction.

Table 8.27: B430 / Northampton Road Mini Roundabout 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B430 / Northampton Road	0.53	1.1	7.17	0.18	0.2	4.29
B430 (E)	0.05	0.1	4.83	0.06	0.1	4.79
B430 (S)	0.11	0.1	3.35	0.25	0.3	3.97

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.13 **Table 8.27** shows that the B430 / Northampton Road mini-roundabout is predicted to operate well within capacity in the AM and PM peak.

Junction 4b – B430 / Oxford Road T-Junction

8.6.14 **Table 8.28** below presents the modelled junction capacity results for the 2016 base scenario at the B430 / Oxford Road T-junction.

Table 8.28: B430 / Oxford Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Oxford Road	0.21	0.3	8.90	0.08	0.1	6.83
B430 (S)	0.09	0.2	4.31	0.09	0.1	6.09

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.15 **Table 8.28** shows that the B430 / Oxford Road T-junction is predicted to operate well within capacity in the AM and PM peak.

Junction 5 – B430 / Minor Road T-Junction

8.6.16 **Table 8.29** below presents the modelled junction capacity results for the 2016 base scenario at the B430 / Minor Road priority T-junction.

Table 8.29: B430 / Minor Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.12	0.1	5.57	0.15	0.2	5.59
Minor Road (Right)	0.01	0.0	8.37	0.00	0.0	7.27
B430 Ardley Road (N)	0.24	0.3	7.15	0.11	0.1	6.17

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.17 **Table 8.29** shows that the B430 / Minor Road priority T-junction is predicted to operate well within capacity in the AM and PM peak.

Junction 6 - B430 / B4030 (Middleton Stoney) Staggered Crossroads

8.6.18 **Table 8.30** below presents the modelled junction capacity results for the 2016 base scenario at the B430 / B4030 (Middleton Stoney) Junction.

Table 8.30: B430 / B4030 (Middleton Stoney) Junction 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (N)	89%	19.1	62.90	66%	7	48.50
B4030 Bicester Road (E)	92%	16.7	91.30	77%	11.1	64.30
B430 Oxford Road (S)	87%	8.8	65.80	83%	16.2	44.10
B4030 Heyford Road (W)	90%	15.3	85.50	77%	10.3	66.40

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.19 **Table 8.30** shows that the B430 / B4030 (Middleton Stoney) Junction is predicted to operate at capacity in the AM peak with a maximum DoS of 92%. The junction is predicted to operate within capacity in the PM peak.

Junction 7 - A4095 / B430 Oxford Road Staggered Crossroads

8.6.20 **Table 8.31** below presents the modelled junction capacity results for the 2016 base scenario at the A4095 / B430 Oxford Road Staggered Crossroads.

8.6.21 Junction 7 is a priority junction, however, it has been modelled in TRANSYT in order to model the interaction between the various give-way lines within the junction. As it has been modelled in TRANSYT, the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 8.31: A4095 / B430 Oxford Road Staggered Crossroads 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Oxford Road	34%	0.15	2.27	20%	0.04	1.70
A4095 (E)	43%	0.18	8.06	25%	0.04	6.07
B430 Northampton Road	6%	0.02	6.85	23%	0.09	6.58
A4095 (W)	19%	0.03	1.09	36%	0.11	2.51

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.22 **Table 8.31** shows that the A4095 / B430 Oxford Road Staggered Crossroads is predicted to operate well within capacity in the AM and PM peak.

Junction 8 – A4095 / Middleton Stoney Road Roundabout

8.6.23 **Table 8.32** below presents the modelled junction capacity results for the 2016 base scenario at the A4095 / Middleton Stoney Road Roundabout.

Table 8.32: A4095 / Middleton Stoney Road Roundabout

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Howes Lane	0.65	1.8	8.04	0.31	0.40	4.28
Middleton Stoney Road	0.40	0.7	8.01	0.25	0.30	4.89
Vendee Drive	0.18	0.2	2.89	0.50	1.00	4.62
B4030	0.19	0.2	3.81	0.32	0.50	5.77

8.6.24 **Table 8.32** shows that the A4095 / Middleton Stoney Road Roundabout is predicted to operate well within capacity in the AM and PM peak.

Junction 9 – B4030 Lower Heyford Road / Minor Road T-Junction

8.6.25 **Table 8.33** below presents the modelled junction capacity results for the 2016 base scenario at the B4030 Lower Heyford Road / Minor Road priority T-junction.

Table 8.33: B4030 Lower Heyford Road / Minor Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.21	0.3	6.97	0.19	0.2	6.13
Minor Road (Right)	0.07	0.1	10.62	0.03	0.0	10.10
B4030	0.21	0.3	8.19	0.31	0.4	8.94

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.26 **Table 8.33** shows that the B4030 Lower Heyford Road / Minor Road priority T-junction is predicted to operate well within capacity in the AM and PM peak.

Junction 10 – Camp Road / Kirtlington Road T-Junction

8.6.27 **Table 8.34** below presents the modelled junction capacity results for the 2016 base scenario at the Camp Road / Kirtlington Road priority T-junction.

Table 8.34: Camp Road / Kirtlington Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Kirtlington Road	0.03	0.0	8.85	0.06	0.1	8.20
Camp Road (W)	0.02	0.0	7.20	0.01	0.0	6.18

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.28 **Table 8.34** shows that the Camp Road/Kirtlington Road priority T-junction is predicted to operate well within capacity in the AM and PM peak.

Junction 11 – Station Road / Camp Road T-Junction

8.6.29 **Table 8.35** below presents the modelled junction capacity results for the 2016 base scenario at the Station Road/Camp Road priority T-junction.

Table 8.35: Station Road / Camp Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Camp Road (Left)	0.12	0.1	7.14	0.11	0.1	6.37
Camp Road (Right)	0.06	0.1	8.84	0.18	0.2	9.58
Station Road / Somerton Road	0.11	0.1	7.03	0.06	0.1	6.56

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.30 **Table 8.35** shows that the Station Road/Camp Road priority T-junction is predicted to operate well within capacity in the AM and PM peak.

Junction 12 – B4030 / Port Way Staggered Crossroads

8.6.31 **Table 8.36** below presents the modelled junction capacity results for the 2016 base scenario at the B4030 / Port Way staggered crossroads.

Table 8.36: B4030 / Port Way 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Port Way (N) (Left)	0.01	0.0	5.86	0.00	0.0	5.75
Port Way (N) (Right)	0.03	0.0	8.07	0.03	0.0	7.97
B4030 (E)	0.00	0.0	4.76	0.00	0.0	4.58
Port Way (S) (Left)	0.01	0.0	5.70	0.04	0.0	5.04
Port Way (S) (Right)	0.02	0.0	6.67	0.05	0.0	6.91
B4030 (W)	0.07	0.1	5.38	0.03	0.0	5.44

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.32 **Table 8.36** shows that the B4030/Port Way staggered crossroads is predicted to operate well within capacity in the AM and PM peak.

Junction 13 – Station Road / Freehold Street / B4030 Crossroads

8.6.33 **Table 8.37** below presents the modelled junction capacity results for the 2016 base scenario at the Station Road / Freehold Street / B4030 crossroads junction.

Table 8.37: Station Road / Freehold Street / B4030 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Station Road (N)	0.01	0.0	5.12	0.00	0.0	5.13
B4030 (E) (Left)	0.30	0.4	8.65	0.26	0.4	7.73
B4030 (E) (Right)	0.03	0.0	9.06	0.05	0.1	7.33
Station Road (S)	0.34	0.6	8.77	0.20	0.3	6.72
Freehold Street	0.05	0.0	8.91	0.03	0.0	7.94

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.34 **Table 8.37** shows that the Station Road / Freehold Street / B4030 crossroads junction is predicted to operate well within capacity in the AM and PM peak.

Junction 14 – A4260 / Somerton Road Crossroads

8.6.35 **Table 8.38** below presents the modelled junction capacity results for the 2016 base scenario at the A4260 / Somerton Road crossroads junction.

Table 8.38: A4260 / Somerton Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Oxford Road	0.07	0.1	6.32	0.08	0.1	7.41
Somerton Road	0.22	0.3	13.32	0.16	0.2	10.63
A4260	0.04	0.0	8.44	0.01	0.0	6.03
N Aston Road	0.20	0.2	10.72	0.09	0.1	9.33

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.36 **Table 8.38** shows that the A4260 / Somerton Road crossroads junction is predicted to operate well within capacity in the AM and PM peak.

Junction 15 – A4260 / B4030 (Hopcrofts Holt) Staggered Crossroads

8.6.37 **Table 8.39** below presents the modelled junction capacity results for the 2016 base scenario at the A4260 / B4030 (Hopcrofts Holt) Junction.

Table 8.39: A4260 / B4030 (Hopcrofts Holt) Junction 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	81%	22.0	30.50	33%	4.1	12.80
B4030 (E)	80%	7.3	68.30	81%	5.5	71.20
A4260 Banbury Road (S)	38%	6.2	19.90	73%	13.3	19.10
B4030 (W)	77%	8.0	69.40	74%	4.1	71.50

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.38 **Table 8.39** shows that the A4260 / B4030 (Hopcrofts Holt) Junction is predicted to operate within capacity in the AM and PM peak.

Junction 16 – A4260 / Minor Road Staggered Crossroads

8.6.39 **Table 8.40** below presents the modelled junction capacity results for the 2016 base scenario at the A4260 / Minor Road staggered crossroads junction.

Table 8.40: A4260 / Minor Road 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.02	0.0	3.09	0.03	0.0	5.04
Minor Road (E) (Left)	0.07	0.1	8.36	0.03	0.0	5.94
Minor Road (E) (Right)	0.02	0.0	17.23	0.00	0.0	0.00
A4260 Banbury Road (S)	0.02	0.0	5.19	0.07	0.1	3.43
Minor Road (W) (Left)	0.03	0.0	6.02	0.02	0.0	7.45
Minor Road (W) (Right)	0.00	0.0	0.00	0.00	0.0	11.23

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.40 **Table 8.40** shows that the A4260 / Minor Road staggered crossroads junction is predicted to operate well within capacity in the AM and PM peak.

Junction 17 - A4260 Banbury Road Staggered Crossroads

8.6.41 **Table 8.41** below presents the modelled junction capacity results for the 2016 base scenario at the A4260 Banbury Road Staggered Crossroads.

8.6.42 Junction 17 is a priority junction, however, it has been modelled in TRANSYT in order to model the interaction between the various give-way lines within the junction. As it has been modelled in TRANSYT, the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 8.41: A4260 Banbury Road Staggered Crossroads 2016 Base

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Banbury Road (N)	47%	0.37	1.49	19%	0.04	0.40
Minor Road (E)	16%	0.01	0.77	10%	0.01	0.36
A4260 Banbury Road (S)	18%	0.04	0.38	39%	0.22	1.05
Banbury Road (W)	14%	0.01	0.84	5%	0.00	0.23

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

8.6.43 **Table 8.41** shows that the A4260 Banbury Road Staggered Crossroads is predicted to operate within capacity in the AM and PM peak.

Junction 18 – A4260 / B4027 Staggered Crossroads

8.6.44 **Table 8.42** below presents the modelled junction capacity results for the 2016 base scenario at the A4260 / B4027 staggered crossroads junction.

Table 8.42: A4260 / B4027 Staggered Crossroads 2016 Base

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.01	0.0	3.11	0.00	0.0	4.87
B4027 (E) (Left)	0.31	0.4	14.73	0.01	0.0	7.38
B4027 (E) (Right)	0.56	1.2	30.92	0.35	0.5	15.80
A4260 Banbury Road (S)	0.16	0.4	6.29	0.13	0.3	3.67
B4027 (W) (Left)	0.01	0.0	14.49	0.00	0.0	8.35

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (W) (Right)	0.63	1.6	28.36	0.36	0.6	16.95

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

8.6.45 **Table 8.42** shows that the A4260 / B4027 staggered crossroads junction is predicted to operate well within capacity in the AM and PM peak.

8.7 Summary

8.7.1 The baseline junction assessment shows existing capacity constraints on the network at the following junctions:

- A43 / B4100 roundabout junction (J3); and
- Middleton Stoney roundabout junction (J6).

9 Camp Road / Site Access Junctions

9.1 Introduction

9.1.1 This section sets out the results of the Camp Road / Site Access Junction forecast modelling assessment, carried out in support of the Heyford Park development allocation considering the 2031 Test Case (with full Heyford Park allocated development of 1,600 houses and 1,500 jobs). There is proposed to be a total of 19 access junctions located to the north and south of Camp Road through the development, as illustrated in **Figure 9.1,** of which 13 have been assessed as they are anticipated to provide access to the new development proposals. For robustness, the assessment has utilised Sensitivity Test flows with higher residential trip rates (as set out within **Section 6.6**). The site access junctions are illustrated on Woods Hardwick **Drawings HEYF-SK346 Rev C, HEYF-5-232 Rev F, HEYF-SK341 Rev B and HEYF-SK345 Rev D** at **Appendix E** and on **PBA Drawing 39304/5501/SK26 Rev C**.

9.1.2 The 2031 forecast scenario modelling of Heyford Park has been undertaken using base models created using topography mapping / concept junction proposals and the forecast traffic flows derived from the Heyford Park spreadsheet model, as set out at **Section 6**. The impact assessment has been undertaken for the AM and PM peak hours of 0745 – 0845 and 1700 – 1800 respectively. Traffic flows for the 2031 Sensitivity Test Case are illustrated at **Figures 9.2A** and **9.3A** for Camp Road and the wider study area respectively.

9.1.3 The full model outputs for the 2031 Sensitivity Test Case scenario are provided in **Appendix Q** .

9.2 Junction Assessments

Site Access Junction 1

9.2.1 **Table 9.1** presents the 2031 Sensitivity Test Case junction capacity results for the Site Access Junction 1 as illustrated on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**.

Table 9.1: Site Access Junction 1 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.11	0.1	10.34	0.04	0.0	9.28
Camp Road (E)	0.03	0.0	6.13	0.01	0.0	5.91
Gate 7	0.03	0.0	7.42	0.02	0.0	5.94
Camp Road (W)	0.01	0.0	6.00	0.01	0.0	5.80

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.2 **Table 9.1** shows that the Site Access Junction 1 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 2

9.2.3 **Table 9.2** presents the 2031 Sensitivity Test Case junction capacity results for the Site Access Junction 2 as illustrated on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**.

Table 9.2: Site Access Junction 2 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.20	0.3	11.88	0.08	0.1	10.47
Camp Road (W)	0.02	0.0	4.05	0.04	0.1	4.64

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.4 **Table 9.2** shows that the Site Access Junction 2 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 2A

9.2.5 **Table 9.3** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 2A as illustrated on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**.

Table 9.3 Site Access Junction 2A 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.06	0.1	8.82	0.02	0.0	7.81
Camp Road (E)	0.02	0.0	4.28	0.03	0.0	3.76

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.6 **Table 9.3** shows that the Site Access Junction 2A is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 3

9.2.7 **Table 9.4** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 3 as illustrated on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**.

Table 9.4: Site Access Junction 3 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.18	0.2	11.35	0.08	0.1	10.25
Camp Road (W)	0.02	0.0	3.86	0.04	0.1	4.65

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.8 **Table 9.4** shows that the Site Access Junction 3 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 3A

9.2.9 **Table 9.5** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 3A as illustrated on Woods Hardwick **Drawing HEYF-SK346 Rev C** at **Appendix E**.

Table 9.5: Site Access Junction 3A 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.08	0.1	11.15	0.03	0.0	9.51
Camp Road (E)	0.02	0.0	4.79	0.04	0.1	4.02

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.10 **Table 9.5** shows that the Site Access Junction 3A is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 4

9.2.11 **Table 9.6** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 4 as illustrated on Woods Hardwick **Drawing HEYF-5-515 Rev P** at **Appendix B**.

Table 9.6 Site Access Junction 4 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.19	0.2	11.55	0.07	0.1	8.68
Camp Road (W)	0.02	0.0	3.70	0.04	0.1	4.70

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.12 **Table 9.6** shows that the Site Access Junction 4 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 5

9.2.13 **Table 9.7** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 5 as illustrated on Woods Hardwick **Drawing HEYF-5-515 Rev P** at **Appendix B**.

Table 9.7 Site Access Junction 5 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.05	0.1	9.69	0.02	0.0	8.08
Camp Road (E)	0.01	0.0	4.44	0.02	0.0	3.54

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.14 **Table 9.7** shows that the Site Access Junction 5 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 8

9.2.15 **Table 9.8** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 8 as illustrated on Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E**.

Table 9.8: Site Access Junction 8 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.77	3.3	42.25	0.70	2.3	31.54
Camp Road (E)	0.33	0.8	7.55	0.40	1.2	5.99

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.16 **Table 9.8** shows that the Site Access Junction 8 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 9

9.2.17 **Table 9.9** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 9 as illustrated on Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E**.

Table 9.9: Site Access Junction 9 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.12	0.1	15.20	0.10	0.1	13.83
Camp Road (E)	0.03	0.0	3.39	0.07	0.1	5.22

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.18 **Table 9.9** shows that the Site Access Junction 10 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 10

9.2.19 **Table 9.10** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 10 as illustrated on Woods Hardwick **Drawing HEYF-5-232 Rev F** at **Appendix E**.

Table 9.10: Site Access Junction 10 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.34	0.5	16.26	0.39	0.6	14.55
Camp Road (E)	0.28	0.7	6.59	0.18	0.5	4.08

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.20 **Table 9.10** shows that the Site Access Junction 10 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 13

9.2.21 **Table 9.11** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 13 as illustrated on Woods Hardwick **Drawing HEYF-SK341 Rev B** at **Appendix E.**

Table 9.11: Site Access Junction 13 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access (N)	0.11	0.1	12.35	0.04	0.0	9.35
Camp Road (W)	0.01	0.0	3.17	0.03	0.0	4.36
Site Access (S)	0.15	0.2	14.11	0.07	0.1	13.54
Camp Road (E)	0.02	0.0	4.46	0.06	0.1	3.41

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.22 **Table 9.11** shows that the Site Access Junction 13 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Site Access Junction 15

9.2.23 **Table 9.12** presents the 2031 Sensitivity Test Case junction capacity results for Site Access Junction 15 as illustrated on Woods Hardwick **Drawing HEYF-SK345 Rev D** at **Appendix E**.

Table 9.12: Site Access Junction 15 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Site Access	0.11	0.1	13.22	0.03	0.0	9.80
Camp Road (E)	0.02	0.0	4.33	0.06	0.1	3.35

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.24 **Table 9.12** shows that the Site Access Junction 15 is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

Camp Road / Chilgrove Drive

9.2.25 As set out at **Section 5.2** a new layout for the Camp Road / Chilgrove Drive junction has been designed to facilitate site access via Chilgrove Drive. The proposed layout is illustrated on **Drawing 39304/5501/SK26 Rev C**. **Table 9.13** presents the 2031 Sensitivity Test Case junction capacity results for the proposed Camp Road / Chilgrove Drive signalised junction.

Table 9.13: Camp Road / Chilgrove Drive Junction 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
Chillgrove Drive (N)	61%	6.2	27.1	72%	9.0	17.3
Camp Road (E)	74%	12.5	25.8	48%	4.0	22.1
Chillgrove Drive (S)	82%	6.8	49.8	50%	4.8	34.2
Camp Road (W)	84%	24.3	23.7	82%	6.6	37.6
Internal Link EB	80%	10.3	30.2	69%	4.0	29.6
Internal Link WB	84%	7.7	44.2	85%	9.3	23.9

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

9.2.26 **Table 9.13** shows that the Camp Road / Chilgrove Drive junction is predicted to operate within capacity in the 2031 Sensitivity Test Case in the AM and PM peak.

10 Local Road Network

10.1 Introduction

10.1.1 This section sets out the results of the Local Road Network forecast modelling assessment carried out in support of the Heyford Park development allocation considering the 2031 Reference Case (committed development and consented development at Heyford Park) and 2031 Test Case (with full Heyford Park allocated development of 1,600 houses and 1,500 jobs). Where necessary any requirement for mitigation at these junctions is highlighted and considered in further detail within this section as a basis for agreement with OCC. Junction mitigation has been considered to meet the following criteria:

- The development mitigation should provide nil-detriment over and above the 2031 reference case for the local road network and nil-detriment over and above the 2018 HE reference case for the strategic road network;
- All mitigation measures should be deliverable within land either within client control or within the existing highway boundary; and
- Mitigation measures are necessary, directly related and reasonable in scale and kind to the development.

10.1.2 Mitigation measures have been discussed with OCC and in several cases agreement has been reached on the concept design of the junctions. The status of agreement is set out in each case.

10.1.3 The 2031 forecast scenario modelling of Heyford Park has been undertaken using the validated base models (as set out in **Section 8**) and the forecast traffic flows derived from the Heyford Park spreadsheet model, as set out at **Section 6**. The impact assessment has been undertaken for the AM and PM peak hours of 0745 – 0845 and 1700 – 1800 respectively. Traffic flows are illustrated at **Figures 10.1** and **10.2** for the 2031 Reference Case and **Figures 10.3** and **10.4** for the 2031 Test Case.

10.1.4 An assessment of the junctions using the Sensitivity Test flows with higher residential trip rates (as set out within **Section 6.6**) has also been undertaken for Junctions 4a, 5, 6, 8, 15 and 18. These junctions have been determined to be at or nearing capacity by OCC. Traffic flows for these scenarios are illustrated at **Figures 10.5** and **10.6** for the 2031 Sensitivity Reference Case and **Figure 9.2B** and **Figure 9.3B** for the 2031 Sensitivity Test Case.

10.1.5 The full model outputs for the 2031 Reference Case scenario are provided in **Appendix R** . The full model outputs for the 2031 Test Case scenario are provided in **Appendix S** . The full model outputs for the 2031 Sensitivity Reference Case scenario are provided in **Appendix T** . The full model outputs for the 2031 Sensitivity Test Case scenario are provided in **Appendix U** .

10.2 Junction Results

10.2.1 The tables below present the 2031 Reference and Test Case junction capacity results for the junctions at which the development is considered to have a significant impact. As stated in **Section 7**, it was considered that junctions with an increase in flows due to the development of 10% on a single arm or an increase in flows of 5% on the junction as a whole required further capacity testing. This approach was agreed with OCC at a meeting on the 11th May 2017.

10.2.2 Where noted above, 2031 Sensitivity Reference and Test Case junction capacity results have also been provided.

10.2.3 A summary Red, Amber, Green (RAG) analysis of the junction results is provided on **Figures 8.1** and **8.2** for the AM and PM peak respectively. The colours represent the predicted capacity of the junctions as follows:

- Green: <85% for priority junctions, <90% for signalised junctions;
- Amber: 85% - 100% for priority junctions, 90% - 100% for signalised junctions; and
- Red: >100% at all junctions.

10.3 Junction Assessments

Junction 4a – B430 / Northampton Road Mini Roundabout

10.3.1 **Table 10.1** below presents the 2031 Reference Case junction capacity results for the B430 / Northampton Road mini-roundabout junction.

Table 10.1: B430 / Northampton Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B430 / Northampton Road	0.64	1.8	9.43	0.25	0.3	4.69
B430 (E)	0.06	0.1	4.89	0.07	0.1	4.84
B430 (S)	0.14	0.2	3.44	0.42	0.7	5.08

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.2 **Table 10.1** shows that the B430 / Northampton Road mini-roundabout is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.3 **Table 10.2** presents the 2031 Test Case junction capacity results for the mini-roundabout junction.

Table 10.2: B430 / Northampton Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B430 / Northampton Road	0.72	2.5	12.01	0.31	0.5	5.05
B430 (E)	0.06	0.1	4.89	0.07	0.1	4.84
B430 (S)	0.18	0.2	3.60	0.47	0.9	5.60

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.4 **Table 10.2** shows that the B430 / Northampton Road mini-roundabout is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.5 At the request of OCC, sensitivity tests have been undertaken for the 2031 Reference and Test case scenarios. The results of the sensitivity testing are detailed below in the tables below.

10.3.6 **Table 10.3** presents the 2031 Sensitivity Reference Case junction capacity results for the mini-roundabout junction.

Table 10.3: B430 / Northampton Road 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B430 / Northampton Road	0.65	1.8	9.63	0.25	0.3	4.67
B430 (E)	0.06	0.1	4.89	0.07	0.1	4.84
B430 (S)	0.14	0.2	3.45	0.42	0.7	5.10

10.3.7 **Table 10.3** shows that the B430 / Northampton Road mini-roundabout is predicted to operate within capacity in the AM and PM peak, in the 2031 Sensitivity Reference Case scenario.

10.3.8 **Table 10.4** presents the 2031 Sensitivity Test Case junction capacity results for the mini-roundabout junction.

Table 10.4: B430 / Northampton Road 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B430 / Northampton Road	0.74	2.8	13.09	0.31	0.4	5.01
B430 (E)	0.06	0.1	4.89	0.07	0.1	4.84
B430 (S)	0.19	0.2	3.64	0.48	0.9	5.70

10.3.9 **Table 10.4** shows that the B430 / Northampton Road mini-roundabout is predicted to operate within capacity in the AM and PM peak, in the 2031 Sensitivity Test Case scenario.

10.3.10 **Table 10.1** to **Table 10.4** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 4b – B430 / Oxford Road T-Junction

10.3.11 **Table 10.5** below presents the 2031 Reference Case junction capacity results for B430 / Oxford Road T-junction.

Table 10.5: B430 / Oxford Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Oxford Road	0.25	0.3	9.74	0.09	0.1	7.07
B430 (S)	0.11	0.2	4.08	0.11	0.2	5.82

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.12 **Table 10.5** shows that the B430 / Oxford Road T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.13 **Table 10.6** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.6: B430 / Oxford Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Oxford Road	0.25	0.3	10.08	0.09	0.1	7.19
B430 (S)	0.12	0.3	3.90	0.11	0.2	5.48

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.14 **Table 10.6** shows that the B430 / Oxford Road T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.15 **Table 10.5** and **Table 10.6** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 5 – B430 / Minor Road T-Junction

10.3.16 **Table 10.7** below presents the 2031 Reference Case junction capacity results for B430 / Minor Road priority T-junction.

Table 10.7: B430 / Minor Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.29	0.4	6.77	0.31	0.4	7.35
Minor Road (Right)	0.04	0.0	11.03	0.04	0.0	9.56
B430 Ardley Road (N)	0.36	0.6	8.58	0.27	0.4	7.74

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.17 **Table 10.7** shows that the B430/Minor Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.18 **Table 10.8** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.8: B430 / Minor Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.66	1.9	13.75	0.81	4	24.30
Minor Road (Right)	0.08	0.1	25.74	0.09	0.1	20.40
B430 Ardley Road (N)	0.87	6.6	36.00	0.62	1.6	14.86

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.19 **Table 10.8** shows that the B430/Minor Road priority T-junction is predicted to operate at capacity in the AM peak, in the 2031 Test Case, with a maximum RFC of 0.87 on the B430 Ardley Road (N) arm. The junction is predicted to operate within capacity in the PM peak.

10.3.20 As the junction is predicted to operate at capacity, sensitivity tests have been undertaken for the 2031 Reference and Test case scenarios. The results of the sensitivity testing are detailed below in the tables below.

10.3.21 **Table 10.9** presents the 2031 Sensitivity Reference Case junction capacity results for the priority T-junction.

Table 10.9: B430 / Minor Road 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.32	0.5	7.05	0.29	0.4	7.15
Minor Road (Right)	0.04	0.0	11.22	0.04	0.0	9.68
B430 Ardley Road (N)	0.38	0.6	8.79	0.29	0.4	7.93

10.3.22 **Table 10.9** shows that the B430/Minor Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Sensitivity Reference Case scenario.

10.3.23 **Table 10.10** presents the 2031 Sensitivity Test Case junction capacity results for the priority T-junction.

Table 10.10: B430 / Minor Road 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.76	3.1	19.53	0.78	3.4	22.24
Minor Road (Right)	0.11	0.1	35.41	0.08	0.1	20.37
B430 Ardley Road (N)	0.92	10.9	48.67	0.68	2.1	17.42

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.24 **Table 10.10** shows that in the 2031 Sensitivity Test Case the junction operates at capacity in the AM peak with a maximum RFC of 0.92 on the B430 Ardley Road (N) arm. In the PM peak the junction operates within capacity.

10.3.25 On the basis of the results set out within **Table 10.7** to **Table 10.10** this junction has been considered for mitigation. The results of this are presented below.

Mitigation

10.3.26 The junction assessment results indicated that the B430 / Minor Road junction (Junction 5) is predicted to operate at capacity in the 2031 Test Case scenario. On this basis, mitigation options have been considered for this junction.

10.3.27 The preferred option for this junction is to provide a signalised T-junction layout with flares on each arm to provide two lanes per approach. This layout is illustrated on **Drawing 39304/101/SK04 Revision F**. Vehicle tracking through the junction is illustrated on **Drawing**

39304/5501/SK17. This layout can be accommodated within the existing highway boundary and land under the control of Dorchester Group.

10.3.28 The design has been discussed with OCC and they are in agreement with the proposals subject to the outcomes of the study into the operation of Middleton Stoney (see mitigation for Junction 6).

10.3.29 The operation of this junction has been tested in LinSig using the 2031 Sensitivity Test Case flows and a summary of the results are provided in **Table 10.11**. The full modelling output is provided at **Appendix V** .

Table 10.11: B430 / Minor Road 2031 Sensitivity Mitigation Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (S)	71%	11.9	52.7	66%	15.9	33.8
Minor Road	52%	10.7	13.7	66%	15.5	29.1
B430 Ardley Road (N)	75%	16.1	12.4	61%	12.4	20.5

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.30 **Table 10.11** indicates that the junction mitigation proposal is predicted to operate within capacity in both the AM and PM peak hours for the sensitivity mitigation case and that the proposal provides nil detriment at the junction.

10.3.31 A Road Saftey Audit has been undertaken on the junction mitigation proposals and a Designers Response has been prepared. These documents are provided at **Appendix W** .

Junction 6 – B430 / B4030 (Middleton Stoney) Staggered Crossroads

10.3.32 There is a committed improvement scheme for the B430 / B4030 (Middleton Stoney) Junction that forms part of the mitigation for the currently consented development at Heyford Park. For these forecast model runs the consented scheme has been tested. The layout of the junction is presented at **Appendix C**.

10.3.33 **Table 10.12** below presents the 2031 Reference Case junction capacity results for the B430 / B4030 (Middleton Stoney) Junction.

Table 10.12: B430 / B4030 (Middleton Stoney) Junction 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (N)	108%	56.0	218.10	52%	9.4	38.00
B4030 Bicester Road (E)	108%	41.9	227.20	95%	22.2	88.60
B430 Oxford Road (S)	46%	7.90	37.10	95%	27.9	74.90
B4030 Heyford Road (W)	109%	44.7	253.70	96%	18.9	108.30

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.34 **Table 10.12** shows that the B430 / B4030 (Middleton Stoney) Junction is predicted to operate over capacity in the AM peak in the 2031 Reference Case with a maximum DoS of 109% on the B4030 Heyford Road (W) arm in the AM peak. In the PM peak the junction is predicted to operate at capacity with a maximum DoS of 96% on the B4030 Heyford Road (W) arm.

10.3.35 **Table 10.13** presents the 2031 Test Case junction capacity results for the junction.

Table 10.13: B430 / B4030 (Middleton Stoney) Junction 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (N)	123%	94.6	432.90	55%	9.6	39.90
B4030 Bicester Road (E)	124%	80.9	438.30	112%	52.1	275.70
B430 Oxford Road (S)	63%	10.8	45.00	113%	73.6	286.70
B4030 Heyford Road (W)	122%	91.0	433.00	115%	59.5	338.10

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.36 **Table 10.13** shows that the B430 / B4030 (Middleton Stoney) Junction is predicted to operate over capacity in the AM and PM peak in the 2031 Test Case. In the AM peak the junction has a maximum DoS of 124% on the B4030 Bicester Road (E) arm, and in the PM peak it has a maximum DoS of 115% on the B4030 Heyford Road (W) arm.

10.3.37 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test case scenarios. The results of the sensitivity testing are detailed in the tables below.

10.3.38 **Table 10.14** presents the 2031 Sensitivity Reference Case junction capacity results for the junction.

Table 10.14: B430 / B4030 (Middleton Stoney) Junction 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (N)	111%	63.3	258.90	52%	9.4	38.00
B4030 Bicester Road (E)	109%	43.4	236.10	95%	22.5	90.50
B430 Oxford Road (S)	48%	8.2	38.20	96%	28.7	77.60
B4030 Heyford Road (W)	108%	43.6	237.30	95%	18.1	102.90

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.39 **Table 10.14** shows that the B430 / B4030 (Middleton Stoney) Junction is predicted to operate over capacity in the AM peak in the 2031 Sensitivity Reference Case with a maximum DoS of 111% on the B430 Ardley Road (N) arm in the AM peak. In the PM peak the junction is predicted to operate at capacity with a maximum DoS of 96% on the B430 Oxford Road (S) arm.

10.3.40 **Table 10.15** presents the 2031 Sensitivity Test Case junction capacity results for the junction.

Table 10.15: B430 / B4030 (Middleton Stoney) Junction 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Ardley Road (N)	127%	102.7	477.70	55%	9.6	39.90
B4030 Bicester Road (E)	126%	85.9	461.90	113%	56.2	298.60

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Oxford Road (S)	67%	11.5	47.20	115%	81.0	317.20
B4030 Heyford Road (W)	127%	108.4	491.60	113%	52.9	301.20

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.41 **Table 10.15** shows that the B430 / B4030 (Middleton Stoney) Junction is predicted to operate over capacity in the AM and PM peak in the 2031 Test Case. In the AM peak the junction has a maximum DoS of 127% on the B430 Ardley Road (N) and B4030 Bicester Road (W) arms and in the PM peak it has a maximum DoS of 115% on the B430 Oxford Road (S) arm.

10.3.42 On the basis of the results set out within **Table 10.12** to **Table 10.15** this junction has been considered for mitigation which is discussed below.

Mitigation

10.3.43 The junction assessment results indicated that the consented scheme for the Middleton Stoney junction was predicted to operate over capacity in the 2031 Reference and Test Case scenarios. On this basis mitigation options have been considered for this junction.

10.3.44 The junction location is particularly constrained and it is not considered that any significant further localised mitigation can be delivered over and above the consented scheme. On this basis a study was undertaken to determine whether an alternative junction arrangement might operate better in this location. Technical Note 010 (TN010) at **Appendix X** sets out the outcome of this study. In summary, following this study, it is considered that the consented signalised crossroad scheme represents the preferred junction arrangement in this location having regard to physical constraints, land ownership, traffic management and highway safety considerations.

10.3.45 On this basis it has been agreed with OCC that a further study will need to be undertaken to understand the impact on the wider highway network if no further improvements, over and above those in the consented scheme, are delivered at Middleton Stoney. Discussions are on-going with CDC and OCC with regards to this study which will consider practicable mitigation options either as a stand alone scheme or a combination of measures. The study will be undertaken utilising OCCs Bicester SATURN model.

10.3.46 Once the study has been undertaken, the mitigation for the Middleton Stoney junction and / or surrounding junctions will be considered and proposals put forward to OCC for agreement.

Junction 7 – A4095 / B430 Oxford Road Staggered Crossroads

10.3.47 **Table 10.16** below presents the 2031 Reference Case junction capacity results for the A4095 / B430 Oxford Road Staggered Crossroads junction.

10.3.48 Junction 7 is a priority junction, however, it has been modelled in TRANSYT in order to model the interaction between the various give-way lines within the junction. As it has been modelled in TRANSYT, the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 10.16: A4095 / B430 Oxford Road Staggered Crossroads 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Oxford Road	41%	0.22	2.97	25%	0.07	2.16
A4095 (E)	55%	0.35	6.01	31%	0.15	6.86
B430 Northampton Road	8%	0.03	7.27	30%	0.21	7.61
A4095 (W)	34%	0.1	2.38	59%	0.45	6.62

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.49 **Table 10.16** shows that the A4095 / B430 Oxford Road Staggered Crossroads is predicted to operate within capacity in the AM and PM peak in the 2031 Reference Case.

10.3.50 **Table 10.17** presents the 2031 Test Case junction capacity results for the junction.

Table 10.17: A4095 / B430 Oxford Road Staggered Crossroads 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Oxford Road	45%	0.29	3.15	25%	0.08	2.46
A4095 (E)	59%	0.45	9.68	33%	0.16	7.07
B430 Northampton Road	11%	0.04	7.61	34%	0.24	7.89
A4095 (W)	36%	0.11	2.76	63%	0.56	8.28

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.51 **Table 10.17** shows that the A4095 / B430 Oxford Road Staggered Crossroads is predicted to operate within capacity in the AM and PM peak in the 2031 Test Case.

10.3.52 **Table 10.16** and **Table 10.17** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 8 – A4095 / Middleton Stoney Road Roundabout

10.3.53 The A4095 / Middleton Stoney Road Roundabout Junction forms part of the access infrastructure for the North West Bicester development site. For these forecast model runs the proposed North West Bicester development layout has been tested. The layout of the junction is presented at **Appendix Y** .

10.3.54 **Table 10.18** below presents the 2031 Reference Case junction capacity results for the A4095 / Middleton Stoney Road roundabout junction.

Table 10.18: A4095 / Middleton Stoney Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Howes Lane	0.74	2.8	9.24	0.43	0.7	4.56
Middleton Stoney Road	0.89	7.4	49.85	0.58	1.3	9.96
Vendee Drive	0.33	0.5	4.00	0.78	3.4	11.57
B4030	0.46	0.9	6.19	0.88	7.0	38.42

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.55 **Table 10.18** shows that the A4095 / Middleton Stoney Road roundabout junction is predicted to operate at capacity in the AM peak on Middleton Stoney Road with an RFC of 0.89 and in PM peak on the B4030 with an RFC of 0.88, in the 2031 Reference Case.

10.3.56 **Table 10.19** presents the 2031 Test Case junction capacity results for the roundabout junction.

Table 10.19: A4095 / Middleton Stoney Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Howes Lane	0.76	3.1	10.36	0.44	0.8	4.84
Middleton Stoney Road	1.00	23.9	141.00	0.63	1.7	11.39
Vendee Drive	0.34	0.5	4.18	0.80	3.8	12.95
B4030	0.52	1.1	6.90	0.98	21.5	105.65

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.57 **Table 10.19** shows that the A4095 / Middleton Stoney Road roundabout junction is predicted to operate over capacity in the AM peak on Middleton Stoney Road with an RFC of 1.00 and at capacity on the B4030 in the PM peak with an RFC of 0.98, in the 2031 Test Case.

10.3.58 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test case scenarios. The results of the sensitivity testing are detailed in the tables below.

10.3.59 **Table 10.20** presents the 2031 Sensitivity Reference Case junction capacity results for the A4095 / Middleton Stoney Road roundabout junction.

Table 10.20: A4095 / Middleton Stoney Road 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Howes Lane	0.74	2.8	9.31	0.43	0.7	4.56
Middleton Stoney Road	0.90	7.7	51.76	0.58	1.4	10.02
Vendee Drive	0.33	0.5	4.01	0.78	3.5	11.97
B4030	0.47	0.9	6.24	0.89	7.3	40.08

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.60 **Table 10.20** shows that the A4095 / Middleton Stoney Road roundabout junction is predicted to operate at capacity in the AM peak with an RFC of 0.90 on Middleton Stoney Road and at capacity in the PM peak with an RFC of 0.89 on the B4030, in the 2031 Sensitivity Reference Case.

10.3.61 **Table 10.21** presents the 2031 Sensitivity Test Case junction capacity results for the roundabout junction.

Table 10.21: A4095 / Middleton Stoney Road 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Howes Lane	0.77	3.2	10.74	0.44	0.8	4.81
Middleton Stoney Road	1.02	30.2	173.90	0.64	1.7	11.64
Vendee Drive	0.34	0.5	4.20	0.80	4.0	13.65
B4030	0.54	1.2	7.14	0.98	20.0	99.37

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.62 **Table 10.21** shows that the A4095 / Middleton Stoney Road roundabout junction is predicted to operate over capacity in the AM peak with a maximum RFC of 1.02 on the Middleton Stoney Road. In the PM peak the junction is predicted to operate at capacity in the PM peak with a maximum RFC of 0.98 on the B4030, in the 2031 Sensitivity Test Case scenario.

10.3.63 It can be seen that the modelling undertaken by PBA at this junction predicts that it will operate just over capacity in the AM peak 2031 Sensitivity Test Case scenario. We consider that the modelling undertaken in this location is relatively simplistic and does not account for wider effects of the North West Bicester development such as the provision of new link road infrastructure in the vicinity of this junction.

10.3.64 The junction has been tested by the North West Bicester development using flows that incorporate the Heyford Park development utilising a more strategic model that is able to undertake re-assignment of traffic in the local area. The junction was predicted to operate within capacity under future transport conditions and hence the junction has been designed to accommodate the Heyford Park development. On this basis it is not considered that mitigation will be required at this junction to accommodate the Heyford Park development.

Junction 9 – B4030 Lower Heyford Road / Minor Road T-Junction

10.3.65 **Table 10.22** below presents the 2031 Reference Case junction capacity results for the B4030 Lower Heyford Road/Minor Road priority T-junction.

Table 10.22: B4030 Lower Heyford Road / Minor Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.33	0.5	8.07	0.28	0.4	6.94
Minor Road (Right)	0.09	0.1	12.01	0.04	0.0	11.31
B4030	0.28	0.4	8.93	0.43	0.8	10.62

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.66 **Table 10.22** shows that the B4030 Lower Heyford Road/Minor Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.67 **Table 10.23** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.23: B4030 Lower Heyford Road / Minor Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Minor Road (Left)	0.55	1.2	11.79	0.48	0.9	9.44
Minor Road (Right)	0.11	0.1	16.28	0.05	0.1	14.21
B4030	0.51	1.1	12.17	0.64	2	15.86

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.68 **Table 10.23** shows that the B4030 Lower Heyford Road / Minor Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.69 **Table 10.22** and **Table 10.23** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 10 – Camp Road / Kirtlington Road T-Junction

10.3.70 **Table 10.24** below presents the 2031 Reference Case junction capacity results for the Camp Road / Kirtlington Road priority T-junction.

Table 10.24: Camp Road / Kirtlington Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Kirtlington Road	0.04	0.0	9.43	0.08	0.1	8.88
Camp Road (W)	0.01	0.0	7.31	0.01	0.0	6.39

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.71 **Table 10.24** shows that the Camp Road/Kirtlington Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.72 **Table 10.25** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.25: Camp Road / Kirtlington Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Kirtlington Road	0.08	0.1	12.11	0.12	0.1	11.40
Camp Road (W)	0.02	0.0	7.90	0.01	0.0	7.12

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.73 **Table 10.25** shows that the Camp Road/Kirtlington Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.74 **Table 10.24** and **Table 10.25** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 11 – Station Road / Camp Road T-Junction

10.3.75 **Table 10.26** below presents the 2031 Reference Case junction capacity results for the Station Road/Camp Road priority T-junction.

Table 10.26: Station Road / Camp Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Camp Road (Left)	0.26	0.3	8.26	0.22	0.3	7.89
Camp Road (Right)	0.08	0.1	9.48	0.20	0.2	9.67
Station Road / Somerton Road	0.19	0.2	7.68	0.16	0.2	6.82

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.76 **Table 10.26** shows that the Station Road/Camp Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.77 **Table 10.27** presents 2031 Test Case junction capacity results for the priority T-junction.

Table 10.27: Station Road / Camp Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Camp Road (Left)	0.57	1.3	14.30	0.62	1.6	16.30
Camp Road (Right)	0.12	0.1	14.26	0.29	0.4	15.16
Station Road	0.57	1.3	14.44	0.41	0.8	9.48

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.78 **Table 10.27** shows that the Station Road/Camp Road priority T-junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.79 **Table 10.26** and **Table 10.27** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 12 – B4030 / Port Way Staggered Crossroads

10.3.80 **Table 10.28** below presents the 2031 Reference Case junction capacity results for the B4030 / Port Way staggered crossroads.

Table 10.28: B4030 / Port Way 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Port Way (N) (Left)	0.01	0.0	5.96	0.01	0.0	5.82
Port Way (N) (Right)	0.04	0.0	8.36	0.05	0.0	8.22
B4030 (E)	0.00	0.0	4.72	0.00	0.0	4.51
Port Way (S) (Left)	0.02	0.0	5.85	0.04	0.0	5.21
Port Way (S) (Right)	0.03	0.0	6.86	0.06	0.1	7.09
B4030 (W)	0.09	0.1	5.40	0.04	0.1	5.44

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.81 **Table 10.28** shows that the B4030/Port Way staggered crossroads is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.82 **Table 10.29** presents the 2031 Test Case junction capacity results for the staggered crossroads.

Table 10.29: B4030 / Port Way 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Port Way (N) (Left)	0.01	0.0	6.01	0.01	0.0	5.87
Port Way (N) (Right)	0.07	0.1	8.72	0.07	0.1	8.47
B4030 (E)	0.01	0.0	4.74	0.01	0.0	4.53
Port Way (S) (Left)	0.02	0.0	6.11	0.04	0.0	5.37
Port Way (S) (Right)	0.05	0.1	6.83	0.08	0.1	7.08
B4030 (W)	0.09	0.1	5.42	0.04	0.1	5.47

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.83 **Table 10.29** shows that the B4030/Port Way staggered crossroads is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.84 **Table 10.28** and **Table 10.29** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 13 – Station Road / Freehold Street / B4030 Crossroads

10.3.85 **Table 10.30** below presents the 2031 Reference Case junction capacity results for the Station Road / Freehold Street / B4030 crossroads junction.

Table 10.30: Station Road / Freehold Street / B4030 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Station Road (N)	0.01	0.0	4.88	0.01	0.0	5.02
B4030 (E) (Left)	0.36	0.6	9.85	0.31	0.4	8.54
B4030 (E) (Right)	0.03	0.0	10.36	0.07	0.1	8.10
Station Road (S)	0.42	0.8	9.82	0.25	0.4	6.83
Freehold Street	0.06	0.1	9.71	0.03	0.0	8.41

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.86 **Table 10.30** shows that the Station Road / Freehold Street / B4030 crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.87 **Table 10.31** presents the 2031 Test Case junction capacity results for the crossroads junction.

Table 10.31: Station Road / Freehold Street / B4030 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
Station Road (N)	0.02	0.0	4.44	0.01	0.0	4.35
B4030 (E) (Left)	0.40	0.7	11.42	0.35	0.5	10.08
B4030 (E) (Right)	0.04	0.0	13.57	0.08	0.1	10.28
Station Road (S)	0.53	1.6	10.35	0.30	0.6	6.87

Freehold Street	0.07	0.1	11.93	0.04	0.0	9.54

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.88 **Table 10.31** shows that the Station Road / Freehold Street / B4030 crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.89 **Table 10.30** and **Table 10.31** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 14 – A4260 / Somerton Road Crossroads

10.3.90 **Table 10.32** below presents the 2031 Reference Case junction capacity results for the A4260 / Somerton Road crossroads junction.

Table 10.32: A4260 / Somerton Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Oxford Road	0.08	0.1	6.64	0.10	0.1	8.09
Somerton Road	0.30	0.4	17.39	0.20	0.3	12.74
A4260	0.05	0.0	9.19	0.01	0.0	6.29
N Aston Road	0.26	0.4	13.14	0.12	0.1	11.12

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.91 **Table 10.32** shows that the A4260 / Somerton Road crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.92 **Table 10.33** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.33: A4260 / Somerton Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Oxford Road	0.09	0.1	6.93	0.10	0.1	8.70
Somerton Road	0.36	0.5	22.61	0.23	0.3	14.70
A4260	0.05	0.1	9.91	0.01	0	6.48
N Aston Road	0.30	0.4	15.76	0.14	0.2	12.97

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.93 **Table 10.33** shows that the A4260 / Somerton Road crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.94 **Table 10.32** and **Table 10.33** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 15 – A4260 / B4030 (Hopcrofts Holt) Staggered Crossroads

10.3.95 **Table 10.34** below presents the 2031 Reference Case junction capacity results for the A4260 / B4030 (Hopcrofts Holt) junction.

Table 10.34: A4260 / B4030 (Hopcrofts Holt) Junction 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	96%	35.2	56.10	42%	5.7	15.50
B4030 (E)	96%	14.6	108.10	90%	8.2	83.00
A4260 Banbury Road (S)	48%	7.7	22.60	88%	20	30.30
B4030 (W)	95%	12.9	117.90	88%	6.3	103.30

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.96 **Table 10.34** shows that the A4260 / B4030 (Hopcrofts Holt) Junction is predicted to operate at capacity in the 2031 Reference Case in the AM peak with a maximum DoS of 96% on the A4260 Oxford Road (N) and B4030 (E) arms. In the PM peak the junction is predicted to operate at capacity with a DoS of 90% on the B4030 (E) arm.

10.3.97 **Table 10.35** presents the 2031 Test Case junction capacity results for the junction.

Table 10.35: A4260 / B4030 (Hopcrofts Holt) Junction 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	114%	107.3	289.90	57%	8.3	21.90
B4030 (E)	116%	50	342.70	100%	18.3	118.20
A4260 Banbury Road (S)	58%	8.3	25.20	102%	40.6	106.10
B4030 (W)	109%	26.9	263.90	99%	9.8	159.20

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.98 **Table 10.35** shows that the A4260 / B4030 (Hopcrofts Holt) Junction is predicted to operate over capacity in the 2031 Test Case in the AM peak with a maximum DoS of 116% on the B4030 (E) arm. The junction is predicted to operate over capacity in the PM peak with a maximum DoS of 102% on the A4260 Banbury Road (S) arm.

10.3.99 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test case scenarios. The results of the sensitivity testing are detailed in the tables below.

10.3.100 **Table 10.36** presents the 2031 Sensitivity Reference Case junction capacity results for the A4260 / B4030 (Hopcrofts Holt) junction.

Table 10.36: A4260 / B4030 (Hopcrofts Holt) Junction 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	98%	38.6	67.40	43%	5.7	15.60
B4030 (E)	94%	14.2	99.00	89%	8.1	81.70
A4260 Banbury Road (S)	56%	8.0	23.50	88%	20.0	30.30
B4030 (W)	95%	12.9	117.90	89%	6.5	105.40

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.101 **Table 10.36** shows that the A4260 / B4030 (Hopcrofts Holt) Junction is predicted to operate at capacity in the 2031 Sensitivity Reference Case in the AM peak with a maximum DoS of 98% on the A4260 Oxford Road (N) arm. The junction is predicted to operate within capacity in the PM peak.

10.3.102 **Table 10.37** presents the 2031 Sensitivity Test Case junction capacity results for the junction.

Table 10.37: A4260 / B4030 (Hopcrofts Holt) Junction 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	118%	121.1	335.90	58%	8.5	22.10
B4030 (E)	113%	48.5	308.40	98%	16.7	106.00
A4260 Banbury Road (S)	58%	8.5	25.90	102%	40.6	106.20
B4030 (W)	117%	35.2	364.00	100%	10.3	168.10

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.103 **Table 10.37** shows that the A4260 / B4030 (Hopcrofts Holt) Junction is predicted to operate over capacity in the 2031 Sensitivity Reference Case in the AM peak with a maximum DoS of 118% on the A4260 Oxford Road (N) arm. The junction is predicted to operate over capacity in the PM peak with a maximum DoS of 102% on the A4260 Banbury Road (S) arm.

10.3.104 On the basis of the results set out within **Table 10.34** to **Table 10.37** this junction has been considered for mitigation, the results are presented below.

Mitigation

10.3.105 The junction assessment results indicated that the Hopcrofts Holt junction was predicted to operate over capacity in the 2031 Reference and Test Case scenarios. On this basis mitigation options have been considered for this junction. 2031 Sensitivity Test Case flows have been used to provide a robust assessment.

10.3.106 The preferred option for this junction is to:

- Provide an extended flare on the northern arm to increase the length of the two lane approach to the junction;
- Provide an extended flare on the eastern arm to increase the length of the two lane approach to the junction; and
- Provide a flare on the western arm of the junction to provide a two lane approach to the junction.

10.3.107 This layout is illustrated on **Drawing 39304/5501/SK03 Rev F**. This layout can be accommodated within the existing highway boundary. Vehicle tracking through the junction is illustrated on **Drawing 39304/5501/SK18 Rev A**.

10.3.108 The operation of this junction has been tested in LinSig using 2031 Sensitivity Test Case Flows and a summary of the results are provided in **Table 10.38**. The full modelling output is provided at **Appendix Z**

Table 10.38: A4260 / B4030 (Hopcrofts Holt) Junction 2031 Sensitivity Mitigation Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Oxford Road (N)	103%	63.8	121.20	49%	10.4	22.40
B4030 (E)	101%	24.9	142.70	84%	14	65.70
A4260 Banbury Road (S)	65%	8.1	23.60	88%	28.6	38.00
B4030 (W)	102%	18.8	171.50	83%	7	97.90

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.109 **Table 10.38** indicates that the junction is predicted to operate over capacity in the AM peak in the 2031 Sensitivity Mitigation Case, with a maximum capacity of 103% on the A4260 Oxford Road (N) arm. In the PM peak, the junction operates within capacity.

10.3.110 The operation of the junction in this mitigation scenario is predicted to be similar to the 2031 Sensitivity Reference Case in both the standard and sensitivity scenarios and it provides significant benefit when compared to the 2031 Sensitivity Test Case scenarios. It is also proposed to upgrade the signal controller to MOVA operation as part of the mitigation proposals which is likely to further reduce delay at the junction and which should be comparable to the junction operation in the 2031 Sensitivity Reference Case Scenario.

10.3.111 The proposed mitigation scheme has taken into account both physical and land ownership constraints and offers a practical solution within the extents of the existing highway boundary.

10.3.112 A Road Saftey Audit has been undertaken on the junction mitigation proposals and a Designers Response has been prepared. These documents are provided at **Appendix AA** .

Junction 16 – A4260 / Minor Road Staggered Crossroads

10.3.113 **Table 10.39** below presents the 2031 Reference Case junction capacity results for the A4260 / Minor Road staggered crossroads junction.

Table 10.39: A4260 / Minor Road 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.03	0.0	2.89	0.04	0.1	4.97
Minor Road (E) (Left)	0.15	0.2	10.05	0.06	0.1	6.30
Minor Road (E) (Right)	0.03	0.0	21.25	0.00	0.0	0.00
A4260 Banbury Road (S)	0.07	0.1	5.43	0.18	0.6	3.66
Minor Road (W) (Left)	0.03	0.0	6.23	0.02	0.0	8.15
Minor Road (W) (Right)	0.00	0.0	0.00	0.00	0.0	13.44

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.114 **Table 10.39** shows that the A4260 / Minor Road staggered crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Reference Case.

10.3.115 **Table 10.40** presents the 2031 Test Case junction capacity results for the priority T-junction.

Table 10.40: A4260 / Minor Road 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.04	0.1	2.81	0.04	0.1	4.74
Minor Road (E) (Left)	0.34	0.5	13.11	0.18	0.2	7.20
Minor Road (E) (Right)	0.03	0.0	24.70	0.00	0.0	0.00

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (S)	0.25	0.6	6.78	0.39	1.4	4.94
Minor Road (W) (Left)	0.03	0.0	6.41	0.03	0.0	8.48
Minor Road (W) (Right)	0.00	0.0	0.00	0.00	0.0	15.12

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.116 **Table 10.40** shows that the A4260 / Minor Road staggered crossroads junction is predicted to operate within capacity in the AM and PM peak, in the 2031 Test Case.

10.3.117 **Table 10.39** and **Table 10.40** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 17 – A4260 Banbury Road Staggered Crossroads

10.3.118 **Table 10.41** below presents the 2031 Reference Case junction capacity results for the Banbury Road Staggered Crossroads junction.

10.3.119 Junction 17 is a priority junction, however, it has been modelled in TRANSYT in order to model the interaction between the various give-way lines within the junction. As it has been modelled in TRANSYT, the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 10.41: A4260 Banbury Road Staggered Crossroads 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Banbury Road (N)	55%	0.61	2.06	22%	0.06	0.51
Minor Road (E)	20%	0.02	1.10	12%	0.01	0.45
A4260 Banbury Road (S)	22%	0.05	0.46	46%	0.34	1.40
Banbury Road (W)	19%	0.02	1.34	7%	0.00	0.36

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.120 **Table 10.41** shows that the A4260 Banbury Road Staggered Crossroads is predicted to operate within capacity in the AM and PM peak in the 2031 Reference Case.

10.3.121 **Table 10.42** presents the 2031 Test Case junction capacity results for the junction.

Table 10.42: A4260 Banbury Road Staggered Crossroads 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A4260 Banbury Road (N)	59%	0.78	2.44	26%	0.09	0.62
Minor Road (E)	21%	0.03	1.22	12%	0.01	0.48
A4260 Banbury Road (S)	24%	0.07	0.55	49%	0.41	1.58
Banbury Road (W)	22%	0.03	1.67	9%	0.00	0.44

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

10.3.122 **Table 10.42** shows that the A4260 Banbury Road Staggered Crossroads is predicted to operate within capacity in the AM and PM peak in the 2031 Test Case.

10.3.123 **Table 10.41** and **Table 10.42** indicate that the Heyford Park development does not have a severe impact on the junction and therefore mitigation in this location has not been considered.

Junction 18 – A4260 / B4027 Staggered Crossroads

10.3.124 **Table 10.43** below presents the 2031 Reference Case junction capacity results for the A4260 / B4027 staggered crossroads junction.

Table 10.43: A4260 / B4027 Staggered Crossroads 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.02	0	2.90	0.00	0.0	4.75
B4027 (E) (Left)	0.71	2.2	66.85	0.01	0.0	8.20
B4027 (E) (Right)	0.85	4.6	102.04	0.47	0.9	21.82

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (S)	0.22	0.6	6.68	0.18	0.6	3.64
B4027 (W) (Left)	0.02	0	37.33	0.00	0.0	9.89
B4027 (W) (Right)	0.83	4.4	67.60	0.50	1.0	25.05

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.125 **Table 10.43** shows that the A4260 / B4027 staggered crossroads junction is predicted to operate at capacity in the 2031 Reference Case in the AM peak on the B4027 (E) with an RFC of 0.85. The junction is predicted to operate within capacity in the PM peak.

10.3.126 **Table 10.44** presents the 2031 Test Case junction capacity results for the staggered crossroads junction.

Table 10.44: A4260 / B4027 Staggered Crossroads 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (E) (Left)	1.03	12.1	376.58	0.01	0.0	9.11
B4027 (E) (Right)	1.05	17.1	349.89	0.55	1.2	27.64
A4260 Banbury Road (N)	0.03	0.0	2.82	0.00	0.0	4.54
B4027 (W) (Left)	0.97	0.6	2165.12	0.00	0.0	11.25
B4027 (W) (Right)	0.97	11.4	168.72	0.58	1.4	32.66
A4260 Banbury Road (S)	0.25	0.8	6.72	0.20	0.7	3.63

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.127 **Table 10.44** shows that the A4260 / B4027 staggered crossroads junction is predicted to operate over capacity in the 2031 Test Case in the AM peak on the B4027 (E) and the B4027 (W) with a maximum RFC of 1.05. The junction is predicted to operate within capacity in the PM peak.

10.3.128 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test Case scenarios. The results of the sensitivity testing are detailed in the tables below.

10.3.129 **Table 10.45** presents the 2031 Sensitivity Reference Case junction capacity results for the A4260 / B4027 staggered crossroads junction.

Table 10.45: A4260 / B4027 Staggered Crossroads 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (E) (Left)	0.78	2.9	89.88	0.01	0.0	8.19
B4027 (E) (Right)	0.87	5.1	112.88	0.47	0.9	21.81
A4260 Banbury Road (N)	0.02	0.0	2.89	0.00	0.0	4.76
B4027 (W) (Left)	0.02	0.0	41.60	0.00	0.0	9.92
B4027 (W) (Right)	0.84	4.6	71.27	0.50	1.0	25.13
A4260 Banbury Road (S)	0.23	0.6	6.69	0.18	0.6	3.63

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.130 **Table 10.45** shows that the A4260 / B4027 staggered crossroads junction is predicted to operate at capacity in the AM peak in the 2031 Sensitivity Reference Case scenario with a maximum RFC of 0.87 on the B4027 (E) (Right) arm. The junction is predicted to operate within capacity in the PM peak.

10.3.131 **Table 10.46** presents the 2031 Sensitivity Test Case junction capacity results for the staggered crossroads junction.

Table 10.46: A4260 / B4027 Staggered Crossroads 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (E) (Left)	1.08	15.1	471.89	0.01	0.0	9.10
B4027 (E) (Right)	1.09	22.1	445.90	0.55	1.2	27.85

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A4260 Banbury Road (N)	0.03	0.0	2.79	0.00	0.0	4.58
B4027 (W) (Left)	0.97	0.6	2185.67	0.00	0.0	11.51
B4027 (W) (Right)	0.99	13.1	193.97	0.59	1.4	33.78
A4260 Banbury Road (S)	0.26	0.8	6.72	0.20	0.7	3.62

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.132 **Table 10.46** shows that the A4260 / B4027 staggered crossroads junction is predicted to operate over capacity in the AM peak in the 2031 Sensitivity Test Case scenario with a maximum RFC of 1.09 on the B4027 (E) (Right) arm. The junction is predicted to operate within capacity in the PM peak.

10.3.133 On the basis of the results set out within **Table 10.43** to **Table 10.46** this junction has been considered for mitigation. The results of this are presented below.

Mitigation

10.3.134 The junction assessment results indicated that the A4260 / B4027 Staggered Crossroads junction was predicted to operate over capacity in the 2031 Test Case scenario. On this basis mitigation options have been considered for this junction which include both roundabout and traffic signal layouts.

10.3.135 Through technical consultation OCC have confirmed that on balance and having regard to general road safety a roundabout layout provides a preferred solution at this location. The roundabout layout is illustrated on **Drawing 39304/101/SK01 Rev A** with vehicle tracking illustrated on **Drawing 39304/5501/SK46**. This layout can be accommodated within the existing highway boundary.

10.3.136 The operation of this junction has been tested in 'Junctions 9' using 2031 Sensitivity Test Case Flows and a summary of the results are provided in **Table 10.47**. The full modelling output is provided at **Appendix BB** .

Table 10.47: A4260 / B4027 Staggered Crossroads 2031 Sensitivity Mitigation Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (E)	0.45	0.8	9.28	0.16	0.2	4.25
Banbury Road (S)	0.29	0.4	2.70	0.54	1.20	4.10

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
B4027 (W)	0.24	0.3	4.32	0.19	0.2	5.29
Banbury Road (N)	0.67	2.1	6.43	0.25	0.3	2.61

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

10.3.137 **Table 10.47** indicates that the junction mitigation proposal with sensitivity flows is predicted to operate well within capacity in both the AM and PM peak hours and that the proposal provides nil detriment at the junction.

10.3.138 At the time of writing a Road Safety Audit for this junction has not yet been undertaken.

PIC Data

10.3.139 The mitigation proposed for this junction is anticipated to reduce the number of observed collisions at the junction due to the removal of conflict between the opposing movements. Further details of the collisions recorded at the junction can be found in **Section 3.8**.

10.4 Impact on Local Villages

Introduction

10.4.1 OCC requested that an assessment of the impact of the Heyford Park development on a number of local villages should be undertaken. In order to assess the impact of Heyford Park development traffic through the local villages, the traffic generated by the development at the end of the Local Plan period (2031) has been compared against reference case flows in 2031 for each village area. The results of this comparison are detailed in **Table 10.48** below.

Assessment

10.4.2 The methodology used to derive the future traffic flows generated for the 2031 Test Case with Heyford Park development and the Reference Case flows can be found in **Section 6**. The traffic flows for the Test Case Sensitivity test (with higher residential trip rates) have been used for robustness.

Table 10.48: Impact of Heyford Park Development Traffic on Local Villages

	AM			PM		
	2031 Reference Case Sensitivity Flow (PCU)	Development Sensitivity Flow – Full Build Out (PCU)	Impact	2031 Reference Case Sensitivity Flow (PCU)	Development Sensitivity – Full Build Out Flow (PCU)	Impact
Fritwell	N/A	0	0	N/A	0	0
Ardley	845	366	43%	496	239	48%
Bucknell	N/A	0	0%	N/A	0	0%

	AM			PM		
	2031 Reference Case Sensitivity Flow (PCU)	Development Sensitivity Flow – Full Build Out (PCU)	Impact	2031 Reference Case Sensitivity Flow (PCU)	Development Sensitivity – Full Build Out Flow (PCU)	Impact
Middleton Stoney	2017	329	16%	1874	272	15%
Kirtlington	1017	26	3%	996	22	2%
Lower Heyford	896	470	52%	708	388	55%
Steeple Aston	N/A	0	0%	N/A	0	0%
Middle Aston	N/A	0	0%	N/A	0	0%
The Bartons	451	69	15%	368	57	15%
North Aston	181	0	0%	126	0	0%
Somerton	203	7	3%	395	7	2%
Upper Heyford	495	476	96%	485	395	81%

Fritwell

10.4.3 The distribution of traffic from Heyford Park, as agreed with OCC, means that no development traffic is predicted to travel through Fritwell and base traffic data is not available in this location. Notwithstanding this, it is considered that this is a limitation of the modelling undertaken and therefore it has been agreed that traffic monitoring will be undertaken in Fritwell as the development is built out to determine whether traffic calming measures need to be considered.

Ardley

10.4.4 In order to assess the impact of development in Ardley, two-way traffic flows on the B430 south of the M40, J10 (Ardley Roundabout) were taken. **Table 10.48** shows that development traffic flows increase reference case traffic flows by 43% in the AM and 48% in the PM, therefore it is considered that mitigation / traffic calming measures should be explored in this location. Further information on the mitigation measures being considered in this location are presented in the section below.

Bucknell

10.4.5 The distribution of traffic from Heyford Park as agreed with OCC means that no development traffic is predicted to travel through Bucknell and base traffic data is not available in this location. As there is no Heyford Park related impact predicted in Bucknell we consider that mitigation / traffic calming measures are not required in this location as a result of the development.

Middleton Stoney

10.4.6 In order to assess the impact of development in Middleton Stoney, total traffic flows at the Middleton Stoney junction were taken. **Table 10.48** shows that development traffic flows increase reference case traffic flows by 16% in the AM and 15% in the PM therefore mitigation / traffic calming measures should be explored in this location. Further information on the mitigation measures being considered in this location are presented in the section below.

Kirtlington

10.4.7 In order to assess the impact of the development in Kirtlington, total traffic flows at the A4095 / Bletchingdon Road junction were taken. **Table 10.48** shows that development traffic will be passing through the village of Kirtlington however the development traffic would only increase reference case traffic flows by 3% in the AM and 2% in the PM. Therefore, we consider that mitigation / traffic calming measures are not required in this location as a result of the development.

Lower Heyford

10.4.8 In order to assess the impact of the development in Lower Heyford, total traffic flows at the Station Road / Freehold Street / B4030 Crossroads were taken. **Table 10.48** shows that development traffic increases reference case traffic flows by 52% in the AM and 55% in the PM therefore it is considered that mitigation / traffic calming measures should be explored in this location. Further information on the mitigation measures being considered in this location are presented in the section below.

Steeple Aston

10.4.9 The distribution of traffic from Heyford Park, as agreed with OCC, means that no development traffic is predicted to travel through Steeple Aston and base traffic data is not available in this location. As there is no Heyford Park related impact predicted in Steeple Aston we consider that mitigation / traffic calming measures are not required in this location as a result of the development.

Middle Aston

10.4.10 The distribution of traffic from Heyford Park, as agreed with OCC, means that no development traffic is predicted to travel through Middle Aston and base traffic data is not available in this location. As there is no Heyford Park related impact predicted in Middle Aston we consider that mitigation / traffic calming measures are not required in this location as a result of the development.

The Bartons

10.4.11 In order to assess the impact of the development in The Bartons, the two-way traffic flows on the B4030 east of the A4260 / B4030 (Hopcrofts Holt) junction were taken. **Table 10.48** shows that development traffic increases reference case traffic flows by 15% in the AM and 15% in the PM, however as the Reference Case traffic flows are low, it is considered that mitigation / traffic calming measures are not required in this location as a result of the development.

North Aston

10.4.12 In order to assess the impact of the development in North Aston, two-way traffic flows on Somerton Road from the A4260 / Somerton Road Crossroads junction were taken. **Table 10.48** shows that there will be no development traffic passing through the village of North Aston, therefore traffic calming measures are not required.

Somerton

10.4.13 In order to assess the impact of the development in Somerton, two-way traffic flows on Somerton Road from the Station Road / Camp Road junction were taken. **Table 10.48** shows that development traffic will be passing through the village of Somerton however the development traffic would only increase reference case traffic flows by 3% in the AM and 2% in the PM. Notwithstanding this predicted low impact it is considered that this could be as a limitation of the modelling undertaken in that area and therefore it has been agreed that traffic monitoring will be undertaken in Somerton as the development is built out to determine whether traffic calming measures need to be considered. Further information is provided in the section below.

Upper Heyford

10.4.14 In order to assess the impact of the development in Upper Heyford, total traffic flows at the Station Road / Camp Road junction were taken. **Table 10.48** shows that development traffic flows increase reference case traffic flows by 96% in the AM and 81% in the PM, therefore it is considered that mitigation / traffic calming measures should be explored in this location. Further information on the mitigation measures being considered in this location are presented in the section below.

Mitigation in Local Villages

10.4.15 An assessment has been undertaken on the impact of the development on a number of local villages as set out at **Section 10.4**.

10.4.16 It has been agreed with OCC that traffic calming should be introduced into the villages of Ardley, Middleton Stoney, Upper Heyford and Lower Heyford in order to mitigate the impact of the development in these locations. At the time of writing (March 2018) the exact details of the traffic calming is still to be agreed, however, Dorchester are committed to working with the local Parish Councils in order to determine the requirements for calming in each location. It is proposed that calming be implemented in the following locations:

- **Ardley**: Traffic calming should be considered on the B430 through the village.
- **Middleton Stoney**: Traffic calming should be considered on the B430 and B4030 through the village.
- **Upper Heyford**: Traffic calming should be considered on Somerton Road between the village and allotments / playing fields.
- **Lower Heyford**: Traffic calming should be considered on the B4030 through the village.

10.4.17 Dorchester Group will contribute towards the delivery of the traffic calming schemes and monitoring where required with provisions secured through the S106 agreement and planning conditions.

11 Strategic Road Network

11.1 Introduction

11.1.1 This section sets out the results of the Strategic Road Network forecast modelling assessment carried out in support of the Heyford Park development allocation.

11.1.2 A 2018 scenario has been included within this section because it was agreed with HE that in accordance with the requirements of Circular 02/13, testing should be undertaken for junctions on the Strategic Road Network (SRN) for the predicted opening year of the Heyford Park development in order to establish impacts of full development and any subsequent requirements for mitigation. This is to ensure that at that time (year of opening), the strategic road network is able to accommodate existing and development generated traffic.

11.1.3 Where necessary any requirement for mitigation at these junctions is highlighted and considered in further detail within this section as a basis for agreement with HE. The assessment of junctions in the 2031 forecast scenario has been undertaken for information. Any mitigation requirements at the junctions will be based on the outcome of the 2018 Circular 02/13 assessment.

11.1.4 Through engagement with HE we understand that there are improvement schemes being considered for the M40, J10 and A43 / B4100 that would support HEs long term management strategy for the Strategic Road Network and accommodate growth associated with housing and employment commitments in the area. On this basis it is considered likely that improvements will be required at these junctions.

11.2 Junction Modelling

11.2.1 The forecast modelling assessment at the two strategic road network junctions considers the following scenarios:

- 2031 Reference Case (committed development and consented development at Heyford Park);
- 2031 Test Case (with the addition of the full Heyford Park allocated development of 1,600 houses and 1,500 jobs);
- 2031 Sensitivity Reference Case (committed development and consented development at Heyford Park with higher residential trip rates);
- 2031 Sensitivity Test Case (with the addition of the full Heyford Park allocated development of 1,600 houses and 1,500 jobs with higher residential trip rates);
- 2018 HE Reference Case (committed development and consented development at Heyford Park);
- 2018 HE Test Case (with the addition of the full Heyford Park allocated development of 1,600 houses and 1,500 jobs);
- 2018 HE Sensitivity Reference Case (committed development and consented development at Heyford Park with higher residential trip rates); and
- 2018 HE Sensitivity Test Case (with the addition of the full Heyford Park allocated development of 1,600 houses and 1,500 jobs with higher residential trip rates);

11.2.2 The future scenario modelling of Heyford Park has been undertaken using the validated base models (as set out in **Section 8**) and the forecast traffic flows from the Heyford Park spreadsheet model. The impact assessment has been undertaken for the networks AM and PM peak hours of 07.45 – 08.45 and 17.00 – 18.00 respectively. Traffic flows are illustrated at:

- **Figures 10.1** and **10.2** for the 2031 Reference Case;
- **Figures 10.3** and **10.4** for the 2031 Test Case;
- **Figures 10.5** and **10.6** for the 2031 Sensitivity Reference Case;
- **Figures 9.2B** and **9.3B** for the 2031 Sensitivity Test Case;
- **Figures 11.1** and **11.2** for the 2018 HE Reference Case;
- **Figures 11.3** and **11.4** for the 2018 HE Test Case;
- **Figures 11.5** and **11.6** for the 2018 HE Sensitivity Reference Case; and
- **Figures 11.7** and **11.8** for the 2018 HE Sensitivity Test Case.

11.2.3 The full model outputs are available at the following Appendices:

- **Appendix R** for the 2031 Reference Case scenario;
- **Appendix S** for the 2031 Test Case scenario;
- **Appendix T** for the 2031 Sensitivity Reference Case scenario;
- **Appendix Q** for the 2031 Sensitivity Test Case scenario;
- **Appendix CC** for the 2018 HE Reference Case scenario;
- **Appendix DD** for the 2018 HE Test Case scenario;
- **Appendix EE** for the 2018 HE Sensitivity Reference Case scenario; and
- **Appendix FF** for the 2018 HE Sensitivity Test Case scenario.

11.3 Junction Assessments

Junction 2a - M40 Junction 10 (Padbury Roundabout)

2031 Assessment

11.3.1 **Table 11.1** below presents the 2031 Reference Case junction capacity results for the M40 Junction 10 Southbound Off-slip / A43 junction.

11.3.2 Junction 2a is a priority junction, however, it has been modelled in TRANSYT in order to model its interaction with Junction 2b. As it has been modelled in TRANSYT the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 11.1: M40 J10 Southbound Off-slip / A43 junction 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	107%	43.87	129.34	86%	2.56	9.08
A43 (S)	39%	0.12	0.54	55%	0.33	1.02
M40 off-slip southbound	79%	1.52	10.98	99%	10.37	80.45

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.3 **Table 11.1** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM peak in the 2031 Reference Case with a maximum DoS of 107% on the A43 (N). In the PM peak the junction is predicted to operate at capacity with a maximum DoS of 99% on the M40 southbound off-slip.

11.3.4 **Table 11.2** presents the 2031 Test Case junction capacity results for the roundabout junction.

Table 11.2: M40 J10 Southbound Off-slip / A43 junction 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	117%	110.51	263.98	79%	1.45	5.44
A43 (S)	42%	0.15	0.61	59%	0.44	1.25
M40 off-slip southbound	107%	63.85	239.35	148%	132.19	732.50

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.5 **Table 11.2** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM and PM peak in 2031 Test Case. The junction is predicted to have a maximum DoS of 117% on the A43 (N) arm in the AM peak and a maximum DoS of 148% on the M40 Southbound off-slip in the PM peak.

11.3.6 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test Case scenarios. The results of the sensitivity testing are detailed in the tables below.

11.3.7 **Table 11.3** presents the 2031 Sensitivity Reference Case junction capacity results for the M40 Junction 10 Southbound Off-slip / A43 junction.

Table 11.3: M40 J10 Southbound Off-slip / A43 junction 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	106%	39.69	122.43	81%	1.74	6.53
A43 (S)	39%	0.12	0.54	54%	0.32	1.02
M40 off-slip southbound	80%	1.63	11.70	100%	10.85	84.04

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.8 **Table 11.3** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM and PM peaks in the 2031 Sensitivity Reference Case. The junction is predicted to have a maximum DoS of 106% on the A43 (N) in the AM peak and a maximum DoS of 100% on the M40 southbound off-slip in the PM peak.

11.3.9 **Table 11.4** presents the 2031 Sensitivity Test Case junction capacity results for the roundabout junction.

Table 11.4: M40 J10 Southbound Off-slip / A43 junction 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	120%	127.34	311.80	79%	1.46	5.47
A43 (S)	42%	0.16	0.63	59%	0.43	1.24
M40 off-slip southbound	112%	80.16	309.39	150%	138.28	751.88

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.10 **Table 11.4** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM and PM peak in 2031 Sensitivity Test Case. The junction is predicted to have a maximum DoS of 120% on the A43 (N) arm in the AM peak and a maximum DoS of 150% on the M40 Southbound off-slip in the PM peak.

2018 Assessment

11.3.11 **Table 11.5** below presents the modelled junction capacity results for the 2018 HE Reference Case scenario at the M40 Junction 10 Southbound Off-slip / A43 junction.

Junction 2a is a priority junction, however, it has been modelled in TRANSYT in order to model its interaction with Junction 2b. As it has been modelled in TRANSYT the capacity results have been presented as Degree of Saturation (DoS). As this is a priority junction it is considered that the Practical Reserve Capacity will have been reached at 85%.

Table 11.5: M40 J10 Southbound Off-slip / A43 Junction 2018 HE Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	86%	2.6	9.70	84%	2.2	7.73
A43 (S)	34%	0.1	0.44	44%	0.2	0.67
M40 off-slip southbound	63%	0.6	4.84	69%	0.8	8.02

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.12 **Table 11.5** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate at capacity in the AM Peak and within capacity in the PM peak in the 2018 Reference Case. The maximum DoS in the AM peak is 86% on the A43 (N).

11.3.13 **Table 11.6** below presents the modelled junction capacity results for the 2018 HE Test Case scenario at the M40 Junction 10 Southbound Off-slip / A43 junction.

Table 11.6: M40 J10 Southbound Off-slip / A43 Junction 2018 HE Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	102%	26.5	74.87	87%	2.7	9.46
A43 (S)	37%	0.1	0.51	48%	0.2	0.80
M40 off-slip southbound	87%	4.2	17.54	100%	13.8	104.46

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.14 **Table 11.6** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM and PM peak in 2018 Test Case. The maximum DoS in the AM peak is 102% on the A43 (N) and the maximum DoS in the PM peak is 100% on the M40 off-slip southbound.

11.3.15 **Table 11.7** below presents the modelled junction capacity results for the 2018 HE Sensitivity Reference Case scenario at the M40 Junction 10 Southbound Off-slip / A43 junction.

Table 11.7: M40 J10 Southbound Off-slip / A43 Junction 2018 HE Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	87%	2.73	10.10	84%	2.19	7.81
A43 (S)	34%	0.09	0.45	44%	0.17	0.66
M40 off-slip southbound	64%	0.65	5.05	70%	0.85	8.24

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.16 **Table 11.7** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate at capacity in the AM peak with a maximum DoS of 87% on the A43 (N) arm. The junction is predicted to operate within capacity in the PM peak in the 2018 HE Sensitivity Reference Case.

11.3.17 **Table 11.8** below presents the modelled junction capacity results for the 2018 HE Sensitivity Test Case scenario at the M40 Junction 10 Southbound Off-slip / A43 junction.

Table 11.8: M40 J10 Southbound Off-slip / A43 Junction 2018 HE Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	106%	54.70	117.77	87%	2.69	9.58
A43 (S)	38%	0.12	0.52	48%	0.22	0.79
M40 off-slip southbound	91%	5.37	24.78	102%	41.08	208.47

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.18 **Table 11.8** shows that the M40 Junction 10 Southbound Off-slip / A43 junction is predicted to operate over capacity in the AM and PM peaks in the 2018 HE Sensitivity Test Case. The maximum DoS in the AM peak is 106% on the A43 (N) arm and 102% in the PM peak on the M40 off-slip southbound.

11.3.19 As the junction is predicted to operate over capacity in both the 2018 Test Case scenario and 2018 HE Sensitivity Test Case Scenario the junction has been considered for mitigation. Mitigation for the junction is discussed below.

Mitigation

11.3.20 Mitigation options for this junction have been considered in consultation with HE and it has been requested that PBA model the junction using HEs VISSIM model for the highway network including M40, J10 and Baynards Green Roundabout (J3). It is considered that this model will be able to provide a better representation of the highway network than PBAs individual junction models and will therefore provide a better basis for developing a mitigation solution in this location. At the time of writing this modelling work is still on-going in collaboration with HE and their approved consultants.

Junction 2b – M40 Junction 10 (Cherwell Roundabout)

2031 Assessment

11.3.21 **Table 11.9** below presents the 2031 Reference Case junction capacity results for the M40 Junction 10 Southbound On-slip / A43 / Services junction.

Table 11.9: M40 J10 Southbound On-slip / A43 / Services 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	83%	14.52	17.94	79%	12.5	15.62
Services (E)	84%	6.51	51.74	81%	6.04	47.37
A43 (S)	68%	0.71	1.78	81%	1.67	3.53
Northern Circulatory (W)	74%	5.34	33.09	77%	5.6	35.05

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.22 **Table 11.9** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peaks in the 2031 Reference Case.

11.3.23 **Table 11.10** presents the 2031 Test Case junction capacity results for the roundabout junction.

Table 11.10: M40 J10 Southbound On-slip / A43 / Services 2031 Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	89%	18.68	22.69	84%	14.48	18.01
Services (E)	84%	6.51	51.74	81%	6.04	47.37
A43 (S)	74%	1.04	2.39	89%	3.40	6.51
Northern Circulatory (W)	78%	5.68	33.79	86%	6.72	43.77

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.24 **Table 11.10** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the 2031 Test Case AM and PM peak.

11.3.25 As the junction is predicted to operate approaching theoretical capacity in the Test Case, sensitivity tests have been undertaken for the 2031 Reference and Test Case scenarios. The results of the sensitivity testing are detailed in the tables below.

11.3.26 **Table 11.11** presents the 2031 Sensitivity Reference Case junction capacity results for the M40 Junction 10 Southbound On-slip / A43 / Services junction.

Table 11.11: M40 J10 Southbound On-slip / A43 / Services 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	77%	12.12	14.11	82%	13.79	15.91
Services (E)	84%	6.51	51.74	81%	6.04	47.37
A43 (S)	68%	0.73	1.82	81%	1.65	3.49
Northern Circulatory (W)	81%	5.93	40.30	83%	6.24	42.81

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.27 **Table 11.11** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peak hours in the 2031 Sensitivity Reference Case.

11.3.28 **Table 11.12** presents the 2031 Sensitivity Test Case junction capacity results for the roundabout junction.

Table 11.12: M40 J10 Southbound On-slip / A43 / Services 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	88%	16.8	22.12	84%	14.46	17.96
Services (E)	84%	6.51	51.74	81%	6.04	47.37
A43 (S)	75%	1.14	2.59	89%	3.3	6.34
Northern Circulatory (W)	81%	6.04	36.35	85%	6.63	43.09

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

11.3.29 **Table 11.12** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the 2031 Sensitivity Test Case AM and PM peak.

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11.3.30 **Table 11.13** below presents the modelled junction capacity results for the 2018 HE Reference Case scenario at the M40 Junction 10 Southbound On-slip / A43 / Services Junction.

Table 11.13: M40 J10 Southbound On-slip / A43 / Services 2018 HE Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	84%	14.4	16.17	81%	13.0	16.34
Services (E)	81%	5.6	49.74	71%	4.6	37.15
A43 (S)	60%	0.5	1.27	79%	1.4	3.09
Northern Circulatory (W)	77%	5.5	39.42	68%	4.9	30.15

11.3.31 **Table 11.13** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in both the AM peak and PM peak in the 2018 HE Reference Case.

11.3.32 **Table 11.14** below presents the modelled junction capacity results for the 2018 HE Test Case scenario at the M40 Junction 10 Southbound On-slip / A43 / Services junction.

Table 11.14: M40 J10 Southbound On-slip / A43 / Services 2018 HE Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	85%	15.0	18.14	82%	13.9	16.87
Services (E)	81%	5.6	49.74	71%	4.6	37.15
A43 (S)	66%	0.6	1.65	88%	3.0	5.87
Northern Circulatory (W)	83%	6.2	42.43	77%	5.6	34.76

11.3.33 **Table 11.14** shows that the M40, Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peaks in the 2018 Test Case.

11.3.34 **Table 11.15** below presents the modelled junction capacity results for the 2018 HE Sensitivity Reference Case scenario at the M40 Junction 10 Southbound On-slip / A43 / Services Junction.

Table 11.15: M40 J10 Southbound On-slip / A43 / Services 2018 HE Sensitivity Reference Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	84%	14.45	16.22	81%	13.00	16.34
Services (E)	81%	5.61	49.74	71%	4.58	37.15
A43 (S)	60%	0.46	1.30	78%	1.42	3.08
Northern Circulatory (W)	78%	5.60	40.38	68%	4.87	30.15

11.3.35 **Table 11.15** shows that the M40 Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peaks in the 2018 HE Sensitivity Reference Case scenario.

11.3.36 **Table 11.16** below presents the modelled junction capacity results for the 2018 HE Sensitivity Test Case scenario at the M40 Junction 10 Southbound On-slip / A43 / Services junction.

Table 11.16: M40 J10 Southbound On-slip / A43 / Services 2018 HE Sensitivity Test Case

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
A43 (N)	85%	16.36	17.62	82%	13.89	16.82
Services (E)	81%	5.61	49.74	71%	4.58	37.15
A43 (S)	68%	0.70	1.76	87%	2.89	5.63
Northern Circulatory (W)	86%	6.64	46.45	76%	5.49	34.18

11.3.37 **Table 11.16** shows that the M40, Junction 10 Southbound On-slip / A43 / Services junction is predicted to operate within capacity in the AM and PM peaks in the 2018 HE Sensitivity Test Case.

11.3.38 **Table 11.13** to **Table 11.16** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 2c – M40 Junction 10 (Ardley Roundabout)

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11.3.39 **Table 11.17** below presents the 2031 Reference Case junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.17: M40 J10 Northbound slips / A43 / B430 (Ardley) 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.55	1.2	3.95	0.39	0.6	2.79
M40 off-slip northbound	0.73	2.6	7.77	0.77	3.2	7.27
B430	0.49	1.0	5.51	0.62	1.6	8.51

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.40 **Table 11.17** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate well within capacity in the AM and PM peak, in the 2031 Reference Case.

11.3.41 **Table 11.18** presents the 2031 Test Case junction capacity results for the roundabout junction.

Table 11.18: M40 J10 Northbound slips / A43 / B430 (Ardley) 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.71	2.5	6.39	0.49	1.0	3.41
M40 off-slip northbound	0.84	5.0	14.61	0.83	4.7	10.48
B430	0.69	2.2	8.91	0.93	10.8	39.12

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.42 **Table 11.18** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate at capacity in the PM peak on the B430 arm with a maximum RFC of 0.93 in the 2031 Test Case. The junction is predicted to operate within capacity in the AM peak.

11.3.43 As the junction is predicted to operate at capacity, sensitivity tests have been undertaken for the 2031 Reference and Test Case scenarios. The results of the sensitivity testing are detailed in the tables below.

11.3.44 **Table 11.19** presents the 2031 Sensitivity Reference Case junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.19: M40 J10 Northbound slips / A43 / B430 (Ardley) 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.55	1.2	4.01	0.40	0.7	2.81
M40 off-slip northbound	0.73	2.7	7.89	0.77	3.3	7.38
B430	0.51	1.0	5.69	0.62	1.6	8.39

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.45 **Table 11.19** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate within capacity in the AM and PM peak, in the 2031 Sensitivity Reference Case.

11.3.46 **Table 11.20** presents the 2031 Sensitivity Test Case junction capacity results for the roundabout junction.

Table 11.20: M40 J10 Northbound slips / A43 / B430 (Ardley) 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.73	2.7	6.88	0.50	1.0	3.49
M40 off-slip northbound	0.85	5.5	15.98	0.84	5.1	11.31
B430	0.75	2.9	10.80	0.91	9.0	33.05

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.47 **Table 11.20** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate at capacity in the AM and PM peak. In the AM peak, the M40 off-slip northbound arm has a maximum RFC of 0.85 and in the PM peak the B430 arm has a maximum RFC of 0.91 in the 2031 Sensitivity Test Case.

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11.3.48 **Table 11.21** below presents the 2018 HE Reference Case junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.21:M40 J10 Northbound Slips / A43 / B430 (Ardley) 2018 HE Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.49	0.9	3.45	0.35	0.5	2.58
M40 off-slip northbound	0.62	1.6	5.48	0.66	1.9	4.95
B430	0.42	0.7	4.50	0.50	1.0	5.80

11.3.49 **Table 11.21** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate well within capacity in the AM and PM peak, in the 2018 HE Reference Case.

11.3.50 **Table 11.22** below presents the modelled junction capacity results for the 2018 HE Test Case junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.22: M40 J10 Northbound Slips / A43 / B430 (Ardley) 2018 HE Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.65	1.8	5.17	0.44	0.8	3.10
M40 off-slip northbound	0.72	2.5	8.20	0.72	2.5	6.26
B430	0.61	1.5	6.52	0.77	3.4	12.73

11.3.51 **Table 11.22** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction is predicted to operate well within capacity in the AM and PM peak in the 2018 HE Test Case.

11.3.52 **Table 11.23** below presents the 2018 HE Sensitivity Reference Case scenario junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.23: M40 J10 N/B slips / A43 / B430 (Ardley) 2018 HE Sensitivity Reference Case Test

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.49	1.0	3.49	0.35	0.5	2.59
M40 off-slip northbound	0.62	1.7	5.54	0.66	2.0	5.00
B430	0.43	0.8	4.62	0.49	1.0	5.79

11.3.53 **Table 11.23** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout is predicted to operate well within capacity in both the AM and PM peaks in the 2018 HE Sensitivity Reference Case scenario.

11.3.54 **Table 11.24** below presents the modelled junction capacity results for the 2018 HE Sensitivity Test Case junction capacity results for the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction.

Table 11.24: M40 J10 Northbound Slips / A43 / B430 (Ardley) 2018 HE Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43	0.67	2.0	5.49	0.45	0.8	3.16
M40 off-slip northbound	0.73	2.6	8.61	0.73	2.6	6.55
B430	0.66	1.9	7.49	0.76	3.1	11.85

11.3.55 **Table 11.24** shows that the M40 Junction 10 Northbound slips / A43 / B430 (Ardley) roundabout junction is predicted to operate well within capacity in both AM and PM peaks in the 2018 HE Sensitivity Test Case scenario.

11.3.56 The results in **Table 11.21** and **Table 11.24** indicate that the Heyford Park development does not have a severe impact on the junction and therefore further mitigation in this location has not been considered.

Junction 3 – A43 / B4100 (Baynards Green Roundabout)

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11.3.57 **Table 11.25** below presents the 2031 Reference Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.25: A43 / B4100 2031 Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.84	5.1	9.14	0.98	26.6	58.05
B4100 (E)	1.37	181.6	1168.69	1.18	118.3	567.36
A43 (S)	0.81	4.3	10.16	1.04	92.3	154.62
B4100 (W)	1.09	58.9	349.85	1.33	106.5	1046.62

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.58 **Table 11.25** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peak. In the AM peak the B4100 (E) and the B4100 (W) are over capacity with RFCs of 1.37 and 1.09 respectively. In the PM peak the B4100 (E), A43 (S) and B4100 (W) operate over capacity with RFCs of 1.18, 1.04 and 1.33 respectively.

11.3.59 **Table 11.26** presents the 2031 Test Case junction capacity results for the roundabout junction.

Table 11.26: A43 / B4100 2031 Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.90	8.2	13.67	1.03	77.2	148.28
B4100 (E)	1.57	242.5	1779.83	1.21	138.9	685.17
A43 (S)	0.86	5.9	13.14	1.12	258.3	409.32
B4100 (W)	1.17	90.9	561.09	1.36	114.8	1150.71

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.60 **Table 11.26** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peaks in the 2031 Test Case scenario. In the AM peak the B4100 (E) and B4100 (W) are at capacity with RFCs of 1.57 and 1.17 respectively. In the PM peak the A43 (N), B4100 (E), A43 (S) and B4100 (W) are over capacity with RFCs of 1.03, 1.21, 1.12 and 1.36 respectively.

11.3.61 As the junction is predicted to operate over capacity, sensitivity tests have been undertaken for the 2031 Reference and Test Case scenarios. The results of the sensitivity testing are detailed in the tables below.

11.3.62 **Table 11.27** presents the 2031 Sensitivity Reference Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.27: A43 / B4100 2031 Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.84	5.1	9.20	0.98	27.9	60.62
B4100 (E)	1.37	183.8	1188.06	1.18	119.5	573.67
A43 (S)	0.82	4.4	10.43	1.03	90.2	151.39
B4100 (W)	1.10	62.2	370.07	1.33	106.4	1044.57

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.63 **Table 11.27** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peak in the 2031 Sensitivity Reference Case scenario. In the AM peak the B4100 (E) and the B4100 (W) are over capacity with RFCs of 1.37 and 1.10 respectively. In the PM peak the B4100 (E), A43 (S) and B4100 (W) operate over capacity with RFCs of 1.18, 1.03 and 1.33 respectively.

11.3.64 **Table 11.28** presents the 2031 Sensitivity Test Case junction capacity results for the roundabout junction.

Table 11.28: A43 / B4100 2031 Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.90	8.5	14.03	1.04	89.6	169.78
B4100 (E)	1.58	247.8	1841.38	1.22	140.8	696.16
A43 (S)	0.87	6.7	14.70	1.12	248.5	393.80
B4100 (W)	1.19	102.2	643.30	1.36	114.7	1148.86

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.65 **Table 11.28** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peaks in the 2031 Sensitivity Test Case scenario. In the AM peak the B4100 (E) and B4100 (W) are capacity with RFCs of 1.58 and 1.19 respectively. In the PM peak the A43 (N), B4100 (E), A43 (S) and B4100 (W) are over capacity with RFCs of 1.04, 1.22, 1.12 and 1.36 respectively.

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11.3.66 **Table 11.29** below presents the 2018 HE Reference Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.29: A43 / B4100 2018 HE Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.73	2.7	5.54	0.88	6.8	16.40
B4100 (E)	1.04	38.7	231.76	0.95	13.5	74.40
A43 (S)	0.73	2.7	7.24	0.91	9.6	19.68
B4100 (W)	0.88	6.8	47.90	1.00	18.6	182.68

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.67 **Table 11.29** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM peak on the B4100 (E) with an RFC of 1.04. The junction is predicted to operate at capacity in the PM peak hour with a maximum RFC of 1.00 on the B4100 (W) arm.

11.3.68 **Table 11.30** below presents the 2018 HE Test Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.30: A43 / B4100 2018 HE Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.8	4.0	7.24	0.92	10.9	25.18
B4100 (E)	1.18	95.7	602.82	1.00	24.5	131.70
A43 (S)	0.78	3.5	8.65	1.00	46.2	83.26
B4100 (W)	0.94	11.5	80.96	1.17	56.0	560.73

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.69 **Table 11.30** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peaks in the 2018 HE Test Case scenario. In the AM peak the B4100 (E) is over capacity with an RFC of 1.18. In the PM peak the B4100 (E), A43 (S) and B4100 (W) are over capacity with RFCs of 1.00, 1.00 and 1.17 respectively.

11.3.70 **Table 11.31** below presents the 2018 HE Sensitivity Reference Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.31: A43 / B4100 2018 HE Sensitivity Reference Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.74	2.8	5.57	0.88	6.9	16.79
B4100 (E)	1.05	39.9	238.66	0.95	13.9	77.00
A43 (S)	0.74	2.8	7.36	0.91	9.5	19.46
B4100 (W)	0.89	7.1	50.01	1.00	18.3	179.58

11.3.71 **Table 11.31** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peaks in the 2018 HE Sensitivity Reference Case scenario. In the AM peak the maximum RFC is 1.05 on the B4100 (E). In the PM peak the maximum RFC is 1.00 on the B4100 (W).

11.3.72 **Table 11.32** below presents the 2018 HE Sensitivity Test Case junction capacity results for the A43 / B4100 roundabout junction.

Table 11.32: A43 / B4100 2018 HE Sensitivity Test Case

Link	AM Peak			PM Peak		
	RFC	MMQ	Delay (Secs)	RFC	MMQ	Delay (Secs)
A43 (N)	0.81	4.1	7.43	0.92	11.2	25.70
B4100 (E)	1.19	100.9	640.92	1.00	25.2	135.04
A43 (S)	0.80	3.8	9.28	1.00	42.1	76.68
B4100 (W)	0.96	14.2	99.82	1.17	54.7	545.97

RFC = Ratio of Flow to Capacity, MMQ = Maximum Mean Queue

11.3.73 **Table 11.32** shows that the A43 / B4100 roundabout junction is predicted to operate over capacity in the AM and PM peaks in the 2018 HE Sensitivity Test Case scenario. In the AM peak the maximum RFC is 1.19 on the B4100 (E) arm. In the PM peak the maximum RFC is 1.17 on the B4100 (W) arm.

11.3.74 As the junction is predicted to operate over capacity in both the 2018 Test Case scenario and 2018 HE Sensitivity Test Case Scenario the junction has been considered for mitigation. Mitigation proposals are set out at below.

Mitigation

11.3.75 As with Junction 2a, mitigation options for this junction have been considered in consultation with HE and it has been requested that PBA model the junction using HEs VISSIM model for the highway network including M40, J10 and Baynards Green Roundabout (J3). It is considered that this model will be able to provide a better representation of the highway network than PBAs individual junction models and will therefore provide a better basis for developing a mitigation solution in this location. At the time of writing this modelling work is still on-going in collaboration with HE and their approved consultants.

11.4 Summary

11.4.1 Forecast year modelling for the 2018 horizon with full development at Heyfored Park identifies a requirement for mitigation to be considered at M40, Junction 10 (Junction 2a) and the A43/B4100 (Junction 3). Mitigation options for these junctions have been considered in consultation with HE and it has been requested that PBA model the junction using HEs VISSIM model for the highway network including M40, J10 and Baynards Green Roundabout (J3). It is considered that this model will be able to provide a better representation of the highway network than PBAs individual junction models and will therefore provide a better basis for developing a mitigation solution in this location. At the time of writing this modelling work is still on-going in collaboration with HE and their approved consultants.

11.4.2 The purpose of this exercise is to identify a mitigation package for the Local Plan Allocation set in the context of emerging proposals being developed by HE for the signalisation of the M40 Junction complex and A43/B4100 Baynards Green junction as part of the long-term planning for the management of the Strategic Road Network. It is anticipated that mitigation works for development at Heyford will be secured under S106 and delivered through a S278 Agreement or converted in to a financial contribution towards an alternative longer term scheme approved by HE.

12 Travel Plans

12.1.1 In accordance with OCC's online guidance on *"Travel Plans, Statement and Advice"* (https://www.oxfordshire.gov.uk/cms/content/travel-plans-statements-and-advice as of January 2018) Full Travel Plans have been prepared for both the residential and commercial elements of the site, as the end occupiers are largely known at this stage for the consented element of the site.

12.1.2 The Full Travel Plans apply to existing (i.e. any development already built), consented (i.e. any development granted planning permission under the previous 1,075 dwelling scheme, but is not yet built or complete) and proposed (i.e. development associated with the 1600 dwellings / 1500 jobs Local Plan allocation). Both Full Travel Plans will also cover any future development that comes forward within Dorchester ownership at Heyford Park.

12.1.3 Both Full Travel Plans sets out a suite of measures, targets and strategies to encourage the reduction of single occupancy private car trips associated with the proposed development as well as providing measures to reduce single car occupancy trips in the surrounding areas adjacent to the site. Both Full Travel Plans constitute working documents, given that the proposals will have a build out period of a number of years. The Travel Plans will be regularly monitored, reviewed and updated as the site develops, as part of a commitment to ensuring traffic impacts from the development are minimised, and that emerging and new technologies and travel practices are fully considered.

12.1.4 The Full Travel Plans set out holistic packages of measures tailored to the needs and travel behaviours or residents and, separately, employees on the site, based on current knowledge and technology, designed to reduce single occupancy car use associated with the proposed development by supporting and providing alternative forms of transport and reducing the need to travel where possible and practical. These measures will be integrated into the design, marketing, and occupation phases of the site. The Full Travel Plans will also assist in minimising localised levels of traffic congestion and improving the environmental quality of the area in line with local and national policy aims and objectives.

12.1.5 The Residential Travel Plan provides an anticipated baseline modal split calculated using the person trips rates included in this document along with supporting calculations derived from Census and School NTS data. At the occupation of the 1,000th dwelling (including the consented dwellings), residential travel surveys will be triggered so that a representative mode split can be collected and used to update the Residential Travel Plan, and its targets/measures accordingly.

12.1.6 The Commercial Travel Plan constitutes an update to an earlier 2014 Framework Travel Plan (when the masterplan and many of the future Occupiers remained unknown). The Commercial Travel Plan has calculated its employee mode split based on site-wide travel survey responses from employees across the airfield. The suite of suggested measures and the travel plan targets within the Commercial Travel Plan have been tied to the outcomes of the travel plan surveys to try and best achieve a shift towards sustainable travel.

12.1.7 Both the residential and commercial travel plans include initial targets with an on-going commitment to re-survey, and to work towards the targets set, or revised targets as necessary, as the site continues to be developed.

13 Conclusions

13.1.1 Peter Brett Associates LLP (PBA) have been commissioned by Dorchester Group to undertake a comprehensive Transport Assessment (TA) which considers the transport impacts and associated package of measures required to support the allocation of 1,600 homes and 1,500 jobs at Heyford in accordance with Policy Villages 5 of the adopted Cherwell District Council (CDC) Local Plan.

13.1.2 The Transport Assessment enables CDC and Oxfordshire County Council (OCC), as local planning and highway authorities, to consider the cumulative transport effects of the Local Plan allocation. This in turn will serve as a basis for informing planning decisions and establishing the transport requirements in terms of S106 obligations and planning conditions relating to any consents granted for planning applications submitted in respect of the Heyford Local Plan allocation.

13.1.3 The scope and assessment methodology underpinning the transport assessment has been discussed and agreed with OCC and Highways England and the following conclusions drawn from the assessment works undertaken.

13.1.4 A comprehensive transport strategy has been developed for the site which provides for essential access and local highway infrastructure together with measures which seek to encourage movement by walking, cycling and public transport.

13.1.5 A network of routes for pedestrians and cyclists will be provided within the site which would link the sites internal spaces with proposed facilities and local services via safe and convenient routes. This will facilitate strategic connections to be delivered between Heyford and neighbouring communities including Somerton, Ardley, Fritwell and Kirtlington. The proposed network of footpaths, cycleways, Bridleways and PROW routes would serve to improve local connectivity, permeability and general accessibility within, to and from the development area and thereby encourage local movement by walking and cycling.

13.1.6 A public transport strategy has been developed in conjunction with OCC and through engagement with local operators. The proposals provide for new services between Heyford, Bicester and Oxford.

13.1.7 The proposals for a Bicester Service provide for a minimum half hourly frequency with increases to a 20 minute and potentially a 15 minute frequency (Monday-Saturday) as the development builds out.

13.1.8 The proposals for an Oxford service provide for an hourly frequency (Monday-Saturday) and mirror the route of the current service 25a between Oxford and Upper Heyford.

13.1.9 In addition to the proposed commercial services, a community minibus service is proposed and would be operated by the Dorchester Group. This would provide timetabled journeys to link with commuter rail services at Heyford Station during peak times of the day. Outside the peak travel periods it is anticipated that the community minibus would operate on a demand responsive basis and facilitate local trips to destinations not covered by the main commercial bus services.

13.1.10 The site has been designed to cater for bus movements through the site and along Camp Road with bus stops located to ensure that the majority of development lies within 400m walk distance thresholds of these public transport nodes.

13.1.11 Travel Plans for both residential and commercial uses have been developed setting out a suite of measures aimed at reducing car borne travel to and from the Heyford development area.

13.1.12 The Travel Plans commit the developer to funding the appointment of a Travel Plan Co-ordinator to oversee the implementation of measures identified for walking, cycling, public transport and car park management. A monitoring framework has also been identified to enable the review of the Travel Plan performance against preliminary modal share targets for the development area together with a safeguard strategy to enable further intervention if targets are not achieved over the phased build out of the development.

13.1.13 Vehicle and cycle parking provision supporting residential and non-residential uses will be provided in accordance with OCC parking standards (January 2018) or relevant standard as agreed with the planning and highway authorities at the detailed planning stage.

13.1.14 It is anticipated that the provisions for pedestrian and cycle movement, public transport services and associated on-site infrastructure, Travel Plans and parking provision supporting the development will be secured through planning conditions and or S106 legal agreement.

13.1.15 In terms of highways, a traffic spreadsheet model has been developed to enable assessment works to be undertaken to establish the potential impacts of the Local Plan Allocation on the local and strategic road network. The model has been informed by baseline data collected for key links and junctions in the highway network to develop a 2016 baseline.

13.1.16 Technical parameters have been agreed with OCC and Highways England in respect of traffic growth, trip generation and distribution to enable assignments to be run in the model for Reference and Test Case scenarios for the AM and PM peak periods for the 2031 forecast year representing the end of the Local Plan period. Modelling assignments have also been run for Reference and Test Case Scenarios for the 2018 horizon, reflecting the year of opening assessments for the strategic road network in line with guidance set out in the government Circular 02/13.

13.1.17 Future year traffic flows derived from the model have been used to undertake local network analysis and junction capacity testing for site access junctions and key off-site junctions in the local and strategic road network.

13.1.18 Local network analysis indicates that with committed development and the full build out of the Local Plan allocation, neighbouring local villages including Somerton, Upper Heyford, Heyford and Ardley are predicted to experience increases in through traffic movements during peak periods. In order to address the potential impacts on village amenity and road safety, it has been agreed in principle with CDC and OCC that development will provide a contribution towards the delivery of local public realm and or traffic management measures in these locations which will be secured under S106 mechanisms.

13.1.19 Site access proposals for priority junctions on Camp Road serving the main residential and social and community infrastructure are predicted to operate within capacity in future years with full development of the Local Plan Allocation. Site access proposals also include improvements to the existing Chilgrove Drive junction with Camp Road which will provide for a new signalised arrangement to serve the main commercial areas of the development at Heyford and a gateway to the wider residential community accessed from Camp Road. Testing for the proposed junction indicates that the signalised arrangement will operate within capacity with full development of the Local Plan Allocation.

13.1.20 In terms of the wider network, junction modelling works have identified that highway improvements will be required to cater for future traffic demand associated with background traffic growth, committed development and the Heyford Local Plan Allocation. Highway improvements identified for the local road network include proposals for:

- Traffic signals at the B430/Minor Road Junction
- Modifications to existing traffic signals at the A4260/B4030 Hopcrofts Holt Junction including provision of MOVA control system to optimise operational performance

- A roundabout at the A4260/B4027 Staggered Crossroads

13.1.21 It is anticipated that the proposed improvements and associated triggers for delivery will be secured under a S106 agreement

13.1.22 In addition, it has been identified that highway mitigation will be required to support the full development of the Local Plan Allocation at the B430/B4030 Middleton Stoney junction over and above committed S278 improvements at this location. At the current time, further modelling and technical assessment works are being carried out in collaboration with OCC to develop a scheme and supporting measures to enable contributions towards delivery to be secured under a S106 agreement.

13.1.23 At the M40 Junction 10 and A43/B4100 Baynards Green Roundabout, modelling assessments indicate that traffic associated with planned growth including the Local Plan Allocation would necessitate highway improvements in these locations.

13.1.24 At the current time assessment works are being progressed in conjunction with HE and their appointed consultants to develop a mitigation package for the Local Plan Allocation. This is set in the context of emerging proposals being developed by HE for the signalisation of the M40 Junction complex and A43/B4100 Baynards Green junction as part of the long-term planning for the management of the Strategic Road Network. It is anticipated that mitigation works for development at Heyford will be secured under S106 and delivered through a S278 Agreement or converted in to a financial contribution towards an alternative longer term scheme approved by HE.

13.1.25 Against this background it is considered that in transport terms the impacts of the Local Plan Allocation can be mitigated and provisions secured for walk cycle, public transport and site access through planning conditions and S106 mechanisms.

13.1.26 Further work is required to determine the scope of mitigation schemes at Middleton Stoney and at M40 Junction 10 and A43 Baynards Green junction. The triggers for these schemes and those relating to other identified off-site highway schemes will also need to be agreed with OCC and HE such that they can be formalised in a S106 Agreement.

13.1.27 Notwithstanding the above, the transport provisions for the Local Plan Allocation as set out in the TA align with the requirements detailed in Policy Villages 5 and the Local Infrastructure Delivery Plan such that development can come forward as planned and make a positive contribution to housing and employment delivery in the Cherwell District and wider Oxfordshire economy.

Figures