PROOF OF EVIDENCE BY JOHN BIRCH
ON BEHALF OF NORTHAMPTON BOROUGH COUNCIL

Land to the East of Hardingstone,
North of Newport Pagnell Road, Northampton
Planning Inspectorate Ref: APP/V2825/A/14/2228866

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<th>Issue</th>
<th>Date</th>
<th>Description</th>
<th>Prepared By</th>
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<td>1</td>
<td>17 Mar. '15</td>
<td>1st Draft</td>
<td>John Birch</td>
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<td>2</td>
<td>31 Mar. '15</td>
<td>2nd Draft</td>
<td>John Birch</td>
<td>Tim Foxall</td>
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<td>3</td>
<td>13 Apr. '15</td>
<td>3rd Draft</td>
<td>John Birch</td>
<td>Tim Foxall</td>
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<td>27 Apr. '15</td>
<td>4th Draft</td>
<td>John Birch</td>
<td>Tim Foxall</td>
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<td>12 May '15</td>
<td>6th Draft</td>
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Contents

Qualifications & Experience ........................................................................................................ 1

1.0 Introduction ........................................................................................................................... 2

2.0 The Appeal Proposal and Its Context .................................................................................. 3

3.0 Planning Policy Framework & Relevant Guidance .............................................................. 6

4.0 The Council's Case .................................................................................................................. 12

5.0 Summary & Conclusion ........................................................................................................ 32

Appendices (bound separately)

Appendix A  Correspondence Sent to Appellant
Appendix B  Information Received from Appellant
Appendix C  Plan of Local Road Network and Key Junctions
Appendix D  Observational Study of Local Road Network
Appendix E  Evidence Provided by Hardingstone Village Action Group
Appendix F  Detailed Review of LinSig Modelling
Appendix G  Mitigation Measures Proposed by Appellant at A45 Junctions
Appendix H  NGMS Schemes at A45 Junctions
Qualifications & Experience

My name is John Birch. I have been a Director of Glanville Consultants since 2005, with responsibility for the Civil Engineering and Transport & Highways departments at the company’s Didcot office.

I hold a degree in Civil Engineering from the University of Nottingham. I am a Chartered Engineer and a Member of the Institution of Civil Engineers.

I have worked for the past 21 years in engineering consultancy, the last 16 of which have been spent specialising in highways, traffic and transport matters, in particular, assessing the impacts arising from development.

I have been involved with this case since I was appointed to act for Northampton Borough Council in early January 2015.
1.0 Introduction

1.1 This Proof of Evidence sets out the Council’s case on highway matters in defence of its refusal of planning permission for the residential led mixed use development of land east of Hardingstone, north of Newport Pagnell Road, Northampton.

1.2 Outline planning permission was sought by the appellant on 28th March 2013, and was refused by the Council’s Planning Committee in May 2014 for the following reasons:

(1) The highway mitigation measures proposed fail to sufficiently demonstrate that this major development would not have a residual cumulative impact on the A45 trunk road and associated junctions such that the cumulative impacts of the development would not be severe. These adverse highway impacts in turn will lead to a detrimental impact on the highway network adversely affecting all users including occupiers of the business premises located in Brackmills Industrial Estate thus acting as an impediment to the operation of the business park and its future sustainable economic growth. The development would therefore be contrary to the overarching intentions of the National Planning Policy Framework; and,

(2) The site is identified in the Northampton Landscape and Green Infrastructure Study 2009 as being of high-medium landscape and visual sensitivity comprising of a rural landscape which has a stronger visual connection with the surrounding countryside than with Northampton. Furthermore, Policy E7 of the Northampton Local Plan identifies part of the site as an important skyline between Great Houghton and Hardingstone as seen from the Nene Valley. Public Footpath KN6 runs across the site in a south-easterly direction providing amenity access through the rural landscape. The National Planning Policy Framework seeks to ensure that any detrimental effects on the environment, the landscape and recreational opportunities arising from major developments are moderated. The proposed development would have an urbanising effect and be of a scale and density detrimental to the existing rural character of the surrounding area and would result in the loss of land of significant amenity value. In the absence of sufficient information to demonstrate appropriate mitigation for the impact of the development on the landscape, skyline and rural character of the area the proposal is therefore contrary to Policies E1, E7 and H7 of the Northampton Local Plan and the overarching intentions of the National Planning Policy Framework.

1.3 This Proof of Evidence deals with highway matters and thus focuses specifically on reason for refusal (1) as set out above, and therefore considers the proposed development’s potential off-site traffic impact and associated proposed mitigation measures.

1.4 I have liaised with the appellant’s transport consultant (principally Jon Tricker of Phil Jones Associates) during the preparation of this Proof of Evidence. Correspondence sent to the appellant is provided in Appendix A whilst information received from the appellant is included in Appendix B.
2.0 The Appeal Proposal and Its Context

Proposed Development

2.1 The appeal seeks outline planning permission for:

“The development of a Sustainable Urban Extension to include up to 1,000 dwellings (Class C3); Local Centre up to 1,320 square metres net floor space of retail, professional and financial services, restaurants/cafes (Classes A1, A2 and A3); up to 375 square metres net public house (Class A4); 2.09ha of land for a two-form entry primary school (Class D1); up to 750 square metres of community uses to include medical centre, pharmacy and community centre (Class D1). Infrastructure improvements including a pumping station, green infrastructure and highway access from Landimore Road and Newport Pagnell Road.”

2.2 All matters are reserved except for means of access.

2.3 The proposed development is visually presented in Figure 2.3 (Drawing No. 3238/200) and reproduced at Appendix A of the Environmental Statement (ES) that accompanies the appeal. The drawing is labelled as an ‘Illustrative Masterplan’, although the assessment of environmental effects within the ES has been based upon this Masterplan and a number of ‘Design Parameters’ taken from the Design and Access Statement. These are as follows:

- Access and Movement Framework;
- Land Use Framework;
- Layout Framework;
- Scale Framework;
- Green Infrastructure Framework;
- Blue Infrastructure Framework; and,
- Urban Structure and Legibility Framework

2.4 The Framework Plans illustrate the distribution of the proposed uses within the site, and the scale of development within the specific areas.

2.5 Vehicular access is taken from new junctions on Landimore Road and Newport Pagnell Road. A network of vehicular and footway/cycleway routes within the site connect blocks of development with these access points.

2.6 The residential blocks of development abut the northern, southern and western boundaries of the site. Blocks are also identified for mixed use, including a local centre, primary school, and a public house.

2.7 Green links and corridors run alongside vehicular and pedestrian access routes serving the blocks of development. Areas are also identified for amenity green space, allotments and a multi-use games area as part of the school. Swale ditches and infiltration/attenuation basins also form part of the green links and corridors, and amenity green spaces.

2.8 Measures are proposed to mitigate the traffic impact of the development on the local highway network through a combination of physical junction improvements and a financial contribution towards improvements to the A45 corridor via the Northampton Growth Management Strategy.
2.9 In relation to the A45 trunk road junctions, physical alterations are proposed at the Queen Eleanor and Brackmills Interchanges that are intended to increase capacity and achieve nil-detriment, i.e. ensure traffic conditions post-development and with mitigation are no worse than would be the case if the development did not occur.

Site Context

2.10 The appeal site is approximately 45ha of greenfield land in agricultural use in the open countryside, and outside the urban area of Northampton. The site is approximately 3.7 kilometres to the south east of Northampton Town Centre, and is bounded by the residential areas of Hardingstone to the west and south west of the site.

2.11 Vehicular access to the proposed development is to be obtained from Newport Pagnell Road and Landimore Road which connect the surrounding residential and employment areas (including Brackmills Industrial Estate) with the A45 trunk road. The A45 trunk road is a strategic highway link of regional significance serving the town of Northampton, and linking the M1 with the A14 trunk road.

2.12 As noted above, to the north of the appeal site, lies the Brackmills Industrial Estate which is one of the largest business parks within the Northampton area and a significant contributor to the economic success of the wider region. The Brackmills Interchange on the A45 provides the principal access to the industrial estate. Brackmills Industrial Estate Ltd, which represents the businesses located on the estate, has expressed concerns relating to the effect of increased traffic congestion on the operation of the estate and its future growth.

Existing Highway Conditions

2.13 My colleagues and I have carried out a thorough study of the operational characteristics of the local road network through observations carried out at peak times and throughout the day on a number of separate days. This is important in order to establish accurately baseline conditions, in accordance with the Department for Transport’s Guidance on Transport Assessment. A plan showing the local road network and key junctions is included at Appendix C. A detailed report of the observational study is included at Appendix D and the findings are summarised below.

2.14 The sixth paragraph of the Executive Summary of the Transport Assessment prepared by consultants Parsons Brinckerhoff on behalf of the Homes and Communities Agency and submitted with the planning application acknowledges that the wider highway network is already congested, and our observations support this statement.

Queen Eleanor Interchange

2.15 During the morning peak period (typically 08:00 to 09:00 hours), significant queueing was observed in both lanes on the A5076 Mere Way approach to the roundabout with queues extending back as far as the next roundabout upstream, at the junction of Danes Camp Way / Towcester Road.
2.16 During the evening peak period (typically 17:00 to 18:00 hours), as with the morning peak period, extensive queuing was observed in both lanes on the A5076 Mere Way approach to the roundabout. In addition, queueing traffic on the northern section of the roundabout’s circulatory carriageway was observed to extend back from the stop line at the junction with the southbound exit slip road from the A45, this blocked the roundabout exit to the A45 northbound entry slip road and the entry from London Road. This appeared to have a knock-on effect by increasing queuing on London Road and Mere Way.

Brackmills Interchange

2.17 During the morning peak period, the principal direction of traffic flow at the Brackmills Interchange is towards Brackmills Industrial Estate, to both Caswell Road and Pavilion Drive. Congestion within the industrial estate was observed to cause a queue of vehicles to extend back from the Pavilion Drive access to the industrial estate up the southbound entry slip road to the A45 and onto the circulatory carriageway of the roundabout. This blocked the exit from the roundabout to the southbound carriageway of the A45 and at times prevented vehicles from Caswell Road entering the roundabout’s circulatory carriageway.

2.18 Also during the morning peak, a queue was observed to extend back from the Caswell Road / Rhosili Road junction back along Caswell Road to the Brackmills Interchange, this blocked the exit from the roundabout and caused queues to build up on the circulatory carriageway.

2.19 During the evening peak period, traffic flows from Brackmills Industrial Estate appear to coincide with working patterns and are particularly concentrated for short periods around 4:30pm, 5:00pm and 5:30pm rather than spread evenly across the peak period. Queues were observed to build quickly at locations within the industrial estate, for example at the Pavilion Drive approach to the Caswell Road / Rhosili Road roundabout, but these dissipated relatively quickly.

2.20 Also during the evening peak, a slow moving queue was observed on the northbound carriageway of the A45 typically from around 17:15 hours that worsened progressively, with vehicle speeds on the A45 reducing to a crawl, and remained in evidence typically until after 18:15 hours. This caused a queue to form back from the A45 mainline up the northbound entry slip road to the A45 on exit from the Brackmills Interchange, that blocked back to the roundabout and in turn caused queues to build up on both the northbound exit slip road from the A45 and on the circulatory carriageway on the roundabout (on approach to the junction with the exit slip road), reducing the capacity of both approaches to the traffic signals.
3.0 Planning Policy Framework & Relevant Guidance

Planning Policy Framework

3.1 This section provides a summary of relevant local and national planning policy relevant to the transport and highways impacts of the development. The following documents have been reviewed and summarised below:

- National Planning Policy Framework, Department for Communities and Local Government;
- Joint Core Strategy Local Plan Part One, West Northamptonshire;
- Planning Obligations Strategy Supplementary Planning Document, Northampton Borough Council;
- Planning Obligations Framework and Guidance Document, Northamptonshire County Council; and
- Northamptonshire Highways Development Management Strategy - Fit for Purpose, Northamptonshire County Council, December 2013;

National Planning Policy Framework

3.2 The NPPF was published by the Department for Communities and Local Government in March 2012. It sets out the Government’s planning policies for England and how these are expected to be applied.

3.3 Paragraph 29 states that Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.

3.4 According to paragraph 32, 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.

West Northamptonshire Joint Core Strategy Local Plan Part One (JCS)

3.5 The JCS forms Part 1 of the suite of Local Plans for West Northamptonshire. It provides a long term vision for the area for the plan period up to 2029, and a broad planning strategy aimed at meeting that vision. The JCS provides a strategic framework to guide the preparation of Part 2 Local Plans which will provide more detailed planning policies and site allocations.
3.6 The JCS was adopted on 15\textsuperscript{th} December 2014 by the West Northamptonshire Joint Strategic Planning Committee. This decision was therefore taken after the planning application the subject of this appeal was refused by the Council.

3.7 Transport links and connections between places are vital, and the JCS recognises its strategic connections and junctions are particularly critical to the economic success of the area. Policy C1 of page 66 specifically requires that ‘any transport capacity improvements should support economic growth…’

3.8 However, congestion around the junctions on the strategic road network is compromising its ability to function efficiently (paragraph 6.19 on page 68) and the transport network is recognised as being at, or close to, capacity (paragraph 11.1 on page 134).

3.9 New development will therefore be required to mitigate its effects on the highway network (paragraph 6.16 on page 67). The detail of the mitigation to be required is to be assessed as part of the determination of planning applications. Policy C2 on page 67 specifically states:

‘DEVELOPMENT WILL BE REQUIRED TO MITIGATE ITS EFFECTS ON THE HIGHWAY NETWORK AND BE SUPPORTED BY A TRANSPORT ASSESSMENT AND TRAVEL PLAN PREPARED IN ACCORDANCE WITH CURRENT BEST PRACTICE GUIDELINES AS ISSUED BY THE DEPARTMENT FOR TRANSPORT OR THE RELEVANT LOCAL AUTHORITY.’

3.10 Paragraph 6.20 provides further detail as to the improvements required to enhance capacity to address congestion, and with specific reference to the A45 trunk road which serves traffic from the appeal site it states:

‘The Northampton Growth Management Scheme (NGMS) for the M1/ A45 sets out necessary mitigation measures on the A45 between the M1 Junction 15 and Great Billing Junction required to support the growth of Northampton. The Partner Councils have agreed a Memorandum of Understanding (MoU) with the Highways Agency on the delivery of NGMS. The MoU provides a mechanism for using S106 planning obligations (prior to the introduction of CIL and then CIL funding) to secure contributions to enable delivery of the NGMS. The NGMS also considers the staging of developer contributions to support the viability of developments. The specific developer funded measures on the A45 and A43 are set out in the Infrastructure Schedule in Appendix 4 of this Plan.’

3.11 Policy C3 on page 70 therefore requires traffic management measures and related junction modifications on the A45 in conjunction with development coming forward in the corridor, including the M1/A45 Northampton Growth Management Scheme.

3.12 The approach of the JCS to infrastructure delivery more generally is set out in Section 11 (page 134) and Policy INF1 which states:

‘NEW DEVELOPMENT WILL BE SUPPORTED BY, AND PROVIDE GOOD ACCESS TO, INFRASTRUCTURE, INCLUDING PHYSICAL, GREEN AND SOCIAL ELEMENTS. IT WILL INTEGRATE WITH AND COMPLEMENT ADJOINING COMMUNITIES.’
WHERE DEVELOPMENT GENERATES A NEED FOR NEW INFRASTRUCTURE DEVELOPERS WILL NEED TO DEMONSTRATE THAT PROVISION WILL BE MADE TO MEET THE NECESSARY REQUIREMENTS ARISING FROM THAT DEVELOPMENT WITHIN AN APPROPRIATE TIMESCALE.

IN ASSESSING CAPACITY, DEVELOPERS WILL PROVIDE EVIDENCE AS TO WHETHER EXISTING INFRASTRUCTURE CAN BE USED MORE EFFICIENTLY, OR WHETHER THE IMPACT OF DEVELOPMENT CAN BE REDUCED THROUGH PROMOTING BEHAVIOURAL CHANGE.

3.13 The importance of ensuring development proposals address their impact is set out at paragraph 11.12 which states:

‘When determining planning applications the Local Planning Authorities will need to be assured that existing infrastructure provision can support proposals that come forward. If this is not the case then the necessary additional infrastructure should be provided in a timely and sustainable manner.’

3.14 In seeking contributions to infrastructure, Policy INF2 requires that:

‘NEW DEVELOPMENT WILL ONLY BE PERMITTED IF THE NECESSARY ON AND OFF-SITE INFRASTRUCTURE THAT IS REQUIRED TO SUPPORT IT, AND MITIGATE ITS IMPACT, IS EITHER ALREADY IN PLACE, OR THERE IS A RELIABLE MECHANISM IN PLACE TO ENSURE THAT IT WILL BE DELIVERED.’

3.15 Policy N6 details the required elements of development at Northampton South of Brackmills SUE. Policy N6 states that necessary infrastructure is required to be phased alongside the delivery of the development.

Planning Obligations Strategy Supplementary Planning Document

3.16 The Planning Obligations Supplementary Planning Document (SPD) was published by the Borough Council in February 2013, and expands upon policies within the then emerging JCS, and Local Plan. The SPD provides details of how planning obligations will be secured.

3.17 The SPD highlights the importance attached by the Council to mitigating the impacts of new development through the timely delivery of infrastructure.

3.18 With specific reference to transport, Policy PO3: A45/M1 (j15) Northampton Growth Management Scheme (page 23) states:

‘To ensure that vehicular access and egress onto the Strategic Road Network (SRN) is managed effectively and that the safety of traffic on the A45 is maintained, over the Plan period up to 2026, proposed development that constitutes more than 30 (two way) trips on the SRN in any peak hour will be required to enter into an obligation to make a financial payment to the appropriate improvement scheme.’

3.19 This SPD is to be reviewed during 2015 to take into account the preparation of the Community Infrastructure Levy for West Northamptonshire.
Planning Obligations Framework and Guidance Document

3.20 The Planning Obligations Framework and Guidance document was published in January 2015 and outlines Northamptonshire County Council’s approach to developer contributions via planning obligations, through Section 106 agreements.

Northamptonshire Highways Development Management Strategy

3.21 This document sets out the overarching vision for highway development management within Northamptonshire and the County Council’s strategy to achieve it.

3.22 Policy DM4 states:

‘Northamptonshire County Council requires all developers to mitigate the impacts of their development in highway safety and capacity terms to a minimum Nil-Detriment basis ensuring the long term integrity of the highway network in highway safety and capacity terms.’

3.23 ‘Nil-detriment’ impact is defined as no difference in the safety and capacity of the local highway network as a result of the development proposals compared to the existing situation. If this can be demonstrated to the satisfaction of Northamptonshire Highways (i.e. a combination of the County Council and its Service Provider), this is considered by the County Council as meeting the NPPF’s policy requirement for there to not be a ‘significant residual cumulative impact’ as a result of a development.

Relevant Guidance

3.24 This section provides a summary of relevant technical advice and guidance relevant to the transport and highways impacts of the development. The following documents have been reviewed and summarised below:

- Guidance on Transport Assessment, Department for Transport / Department for Communities and Local Government, 2007;
- Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development, Department for Transport, 2013;
- Local Transport Note 1/09 Signal Controlled Roundabouts, Department for Transport, April 2009; and

Guidance on Transport Assessment

3.25 This document is intended to assist stakeholders in determining whether an assessment is be required and, if so, what the level and scope of that assessment should be. It provides guidance on the content and preparation of Transport Assessments and Transport Statements.

3.26 A properly prepared Transport Assessment will help Local Planning Authorities assess a development’s compatibility with the relevant planning policy framework and the relevant transport strategy. It will allow the transport implications of proposed developments to be properly considered.
3.27 In relation to when an assessment is needed, Appendix B of the guidance provides suggested thresholds below which a formal assessment may not be needed, and above which the preparation of a Transport Statement or a Transport Assessment would be appropriate. Paragraph 2.11 states:

‘The thresholds in Appendix B are based upon scenarios which would typically generate 30 two-way peak hour vehicle trips. Whilst there is no suggestion that 30 two-way peak hour vehicle trips would, in themselves, cause a detrimental impact, it is a useful point of reference from which to commence discussions.’

Circular 02/2013 - The Strategic Road Network and the Delivery of Sustainable Development

3.28 This document sets out the way in which the Highways Agency will engage with communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the strategic road network.

3.29 Paragraph 9 of Circular 02/2013 states:

‘Development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (link or junction) of the strategic road network, or they do not increase demand for use of a section that is already operating at over-capacity levels, taking account of any travel plan, traffic management and/or capacity enhancement measures that may be agreed. However, development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.’

3.30 Paragraph 25 states:

‘The overall forecast demand should be compared to the ability of the existing network to accommodate traffic over a period up to ten years after the date of registration of a planning application or the end of the relevant Local Plan whichever is the greater. This is known as the review period.’

3.31 Forecast demand is defined as:

‘the existing flow plus traffic likely to be generated by development already committed, plus traffic likely to be generated by the development under consideration, less any reduction arising from any travel plan or demand management measures that are being proposed’

Local Transport Note 1/09 - Signal Controlled Roundabouts

3.32 This Local Transport Note seeks to provide assistance to those involved in the design and operation of signalised roundabouts. Advice is provided on the assessment process, including the use of LinSig software.

3.33 Paragraph 5.5.2 notes that the Transport for London Modelling Guidelines (TfL, 2009) is a useful resource to refer to for traffic modelling advice.
Transport for London Modelling Guidelines

3.34 These guidelines have been produced by Transport for London with contributions from external industry experts and represent the views and needs of a broad spectrum of traffic model practitioners. This guidance is widely considered to document best practice in the field of traffic modelling and is applied across the country, not just in London.

3.35 Part B, Section 2 provides guidance on modelling principles whilst Part B, Section 3 provides specific guidance regarding the use of LinSig software.

3.36 Paragraph B2.1 defines a model as:

‘… a simplified representation of a part of the real world ... which concentrates on certain elements considered important for its analysis from a particular point of view.’

3.37 Paragraph B2.1.2 defines a base model as:

‘… a model that has been demonstrated to accurately recreate traffic conditions as observed and measured on-street. It should be suitable for use in analysing current network performance and as a benchmark against which other modelling scenarios can be tested.’

3.38 Paragraph B2.1.3 defines a proposed model and its purpose as:

‘… a validated base model that has been modified to take account of proposed network changes. These changes can include physical layout, signal timings or predicted developments in traffic demand. By comparing proposed modelling to the original validated base model, the impact of the proposed changes can be determined, allowing informed decisions to be taken based on those impacts.’

3.39 Paragraph B2.5.2 describes the process of base model calibration as follows:

‘… the process of placing verifiable data into a traffic model to replicate observed street conditions.’

3.40 Paragraph B2.5.3 describes the process of base model validation as follows:

‘… the process of comparing model output against independently measured data that was not used during the calibration process. The purpose of validation is to verify that a model has been correctly calibrated and is therefore capable of producing valid predictions for proposed scenarios.’
4.0 The Council’s Case

4.1 In terms of highway matters, I consider that the main issues for consideration are:

- Whether the highway mitigation measures proposed by the appellant fail to sufficiently demonstrate that the development would not have a residual cumulative impact on the A45 trunk road and associated junctions such that the cumulative impacts of the development would not be severe;

- Whether the adverse highway impacts of the proposed development would lead to a detrimental impact on the highway network which would affect all users, including occupiers of the Brackmills Industrial Estate thus acting as an impediment to the operation of the business park and its future sustainable economic growth.

4.2 I have reviewed relevant documentation submitted with the planning application, principally the Transport Assessment prepared by consultants Parsons Brinckerhoff on behalf of the Homes and Communities Agency (Revision A dated December 2013). I have discussed the assessment with Northamptonshire County Council in its capacity as highway authority for the local road network and the Highways Agency (now Highways England) in its capacity as highway authority for the trunk road and motorway network. I have also reviewed further information provided by the appellant in response to deficiencies I highlighted with the planning application documentation – refer to Appendix A for copies of correspondence I have sent to the appellant and Appendix B for further information provided by the appellant.

4.3 The highway impacts arising from the proposed development and the associated mitigation measures are presented in the aforementioned Transport Assessment that was submitted with the planning application.

4.4 In my opinion, based on experience with similar schemes elsewhere, it is very surprising that the Transport Assessment is a relatively brief and rather simplistic document given the scale of development proposed and its proximity to traffic sensitive infrastructure, the A45 trunk road in particular. There is a lack of verifiable evidence to support the conclusions reached within the Transport Assessment.

4.5 I have experience with undertaking transport planning work for developments within Northamptonshire, including new Waitrose stores in Wootton (very close to the development site) and in Oundle, in the north-east of the county. Both of these schemes were significantly smaller in scale than the proposed SUE and thus generate significantly less traffic. In both cases I found that Northamptonshire County Council, in its role as local highway authority, carried out a very thorough and comprehensive review of the Transport Assessment, associated traffic modelling and mitigation measures, and proved difficult to satisfy. A similarly thorough appraisal does not appear to have been undertaken by the County Council in respect of the proposed SUE, and again this is surprising given the scale of development proposed and its proximity to the traffic-sensitive A45 and associated junctions.

4.6 I have identified numerous deficiencies with the Transport Assessment prepared by Parsons Brinckerhoff for the proposed SUE that call into question the robustness of the assessment and the conclusions drawn. An overview of my concerns is set out in the Council’s Statement of Case dated February 2015 and further detail is provided by my subsequent correspondence sent to the appellant in Appendix A. These concerns are further described within this section.
4.7 I have received correspondence from the appellant that provides information in response to the issues I have highlighted with the planning application documentation. The information received is included in Appendix B and is in the form of two technical notes, which are summarised as follows:

- Technical Note 1 – Response to NBC Traffic Modelling (17th April 2015)
- Technical Note 2 – Design Review for Improvements to Brackmills and Queen Eleanor Interchanges (May 2015)

4.8 I have dealt with the responses from the appellant as I have addressed each area of concern by topic within this section.

Scope of Assessment

4.9 The introduction at Section 1 of the Transport Assessment refers to scoping discussions between the appellant and Northamptonshire County Council that were carried out at the pre-application stage. However, there is no evidence within the Transport Assessment to support the assertion that the scope was agreed as I would expect to be the case.

4.10 I understand from my discussions with Northamptonshire County Council and information provided by paragraphs 2.2 and 2.3 of Parson Brinckerhoff’s Technical Note 1 that the scope was agreed. However, I do not consider that the scope was adequate to enable a proper assessment of the development’s impact to be carried out. My concerns are explained in the sub-section below that deals with the study area.

Existing Conditions

4.11 There is no description of existing traffic conditions within Section 2 of the Transport Assessment. For example with reference to an observational study of the local road network, similar to the study I have carried out and as described in Section 2 of this Proof of Evidence. This is important in order to demonstrate that baseline conditions have been established accurately and are understood, in accordance with paragraph 4.7 of the Department for Transport’s Guidance on Transport Assessment. This point links with those I make on calibration and validation of the base traffic models later in this section.

Development Mode Share

4.12 The forecast mode share is set out in Section 4.3 of the Transport Assessment. This is based on 2001 Census Travel to Work data for the ward of Nene Valley (within which the site is situated) and the three neighbouring wards of Rushmills, Delapre & Briar Hill and East Hunsbury. Nene Valley and East Hunsbury wards both have a modal split of 81:19 (car driver to other modes), which indicates relatively high levels of car use, whilst Rushmills is 69:31 and Delapre & Briar Hill is 65:35, which indicates much lower levels of car use.
4.13 The proposed mode share is based on an average of 74:26 across all four wards. However, there is no justification provided within the Transport Assessment for assuming the average. I consider that the mode share for the Nene Valley ward with a higher level of car use is more likely to apply to the proposed SUE than the average as the site is located within this ward and is a closer match in terms of distance from the town centre and public transport accessibility. Whilst the mode share does not appear to have been used in the subsequent estimation of traffic generation, this is one example of assumptions being made seemingly arbitrarily and without justification by Parsons Brinckerhoff. This point is also made in paragraph 2.1 of the evidence provided by the Hardingstone Village Action Group that is included at Appendix E of this Proof of Evidence.

Traffic Assessment

4.14 Details of the traffic assessment undertaken by Parsons Brinckerhoff are set out in Section 6 of the Transport Assessment. My comments on this assessment are set out in the paragraphs below.

Study Area

4.15 As mentioned above, I accept that agreement with the County Council on the scope of the assessment was reached with the applicant at the pre-application stage. However, for the reasons set out below I do not consider that the scope was wide-reaching enough to ensure the assessment was adequately robust and to sufficiently demonstrate that the development’s impact will be acceptable.

4.16 The development’s traffic impact has been considered in detail at seven existing junctions, including the Queen Eleanor and Brackmills Interchanges on the A45 trunk road. However, the impact has not been considered at the following junctions:

- A45 Southbound On-slip / Pavilion Drive to the south of Brackmills Interchange;
- A45 / A428 Barnes Meadow Interchange to the north of Brackmills Interchange; and
- A428 / Liliput Road at the north-eastern end of the Brackmills Industrial Estate

4.17 I understand from my discussions with Northamptonshire County Council that the impact of the development on the three junctions identified above was considered at the Transport Assessment scoping stage but no detailed assessments were required by the County Council for the reasons stated below and as set out in paragraph 2.4 of Parson Brinckerhoff’s Technical Note 1.

- A45 Southbound On-slip / Pavilion Drive – the A45 on-slip is not a County road and therefore is the responsibility of the Highways Agency. It was not considered that the development would generate significant additional traffic at this junction.
- A45 / A428 Barnes Meadow Interchange – a major improvement scheme undertaken relatively recently at this junction is considered by the County Council to provide capacity to accommodate the allocated sites, including the Hardingstone SUE.
• A428 / Liliput Road – the County Council considered that the A45 and A428 provide a more appropriate and attractive route (particularly with the improvements proposed along the A45) for residents of the Hardingstone SUE, rather than a more convoluted route through the industrial estate.

4.18 However, irrespective of the view of the County Council, for the reasons set out below I consider that the traffic impact of the development should have been considered in detail at these junctions to ensure the assessment was sufficiently robust and to demonstrate that the development’s impact will be acceptable.

4.19 The traffic assignment included in Appendix 5 of the Transport Assessment shows a significant proportion of development traffic is expected to route to and from the north via Gowerton Road (45.7% of arrivals and 36.8% of departures during the AM and PM peak periods), and therefore will travel via one or more of the junctions listed in paragraph 4.17 above. This equates to 176 vehicle arrivals and 222 vehicle departures in the AM peak hour and 196 vehicle arrivals and 174 vehicle departures in the PM peak hour, which are significant figures. The precise detail of this assignment is lacking from the traffic diagrams provided in Appendix 5 of the Transport Assessment so the impact at each of these junctions is not apparent.

4.20 In accordance with paragraph 2.11 of the Department for Transport’s Guidance on Transport Assessment, the traffic impact of a development should be considered in detail where the development would increase traffic flows by 30 vehicle movements in any peak hour. Indeed, paragraph 3.4.3 of Parsons Brinckerhoff’s Transport Assessment makes specific reference to the Department for Transport’s guidance and the threshold of 30 vehicle movements in any hour above which an assessment would normally be required.

4.21 Therefore, given the amount of traffic that is expected to route to and from the north via Gowerton Road, it is likely to be the case that the development will increase traffic flows at all three of these junctions by more than 30 movements in the peak hours and the resulting impact of the development could be significant, and therefore a detailed assessment should have been carried out.

4.22 Furthermore, and irrespective of the increase in traffic, observations of existing traffic conditions undertaken on-street, as described in Section 2 of this Proof of Evidence, have identified that a queue forms on Pavilion Drive that extends back and affects the performance of Brackmills Interchange during the weekday morning peak period. As the Pavilion Drive junction has not been modelled, this interaction and exit-blocking has not been taken into account and the performance of the Brackmills Interchange will have been over-estimated in the models as a result.

4.23 Therefore, I am not satisfied with the response provided by the appellant to my concern with the study area. I consider that the scope of the assessment is deficient and that a detailed assessment of these three junctions, firstly through assessing the changes in traffic flow and secondly through junction modelling, is a significant omission from the Transport Assessment.

Traffic Data Collection

4.24 The basis of any traffic modelling is reliable and up-to-date traffic data. Without accurate data a model cannot be correctly developed, calibrated or validated. For the reasons described below, the reliability of the baseline traffic data is questionable.
4.25 Firstly, it is good practice for traffic counts to be recorded on the same day at all modelled junctions to ensure a consistent approach. Paragraph B2.4.3 of Transport for London’s *Traffic Modelling Guidelines* states that wherever possible, traffic counts should be recorded on the same day at all modelled junctions and for all modelled periods. Baseline traffic data for the Brackmills Interchange was collected via peak hour manual classified traffic counts undertaken on Wednesday 9th October 2013 and is included within Appendix 4 of the Transport Assessment. Traffic data was obtained from Northamptonshire Highways for the Queen Eleanor Interchange and is included within Appendix 7 of the Transport Assessment. This data was taken from classified manual traffic counts undertaken on Tuesday 6th November 2012. Therefore, base data was obtained from surveys on different days of the week some 11 months apart.

4.26 Secondly, whilst it is not uncommon to undertake classified turning counts on just one day, usually for cost reasons, it is good practice to compare data collected on a single day with data obtained over a longer period, for example from Automatic Traffic Counts over a 7-day period or published Annual Average Daily Traffic flows. Paragraph 3.3 of the Department for Transport’s *Guidance on Transport Assessment* states that baseline transport data should be accurately established. This has not been done, and the Transport Assessment provides no indication as to whether the base traffic data collected by various surveys each undertaken over a single day is representative of flows on different days of the week or at different times of the year.

4.27 Thirdly, there is no evidence that queue lengths surveys were undertaken at the key junctions assessed within the Transport Assessment in order to validate the results of junction modelling. This links with the points I make later regarding the validation of the base traffic models.

4.28 During my involvement with the transport planning work for a new Waitrose store in Oundle, Northamptonshire County Council required peak hour turning counts undertaken at key junction on a single day to be supplemented by Automatic Traffic Counts on key links for a 7-day period to validate the turning counts. The Council also required queue lengths to be measured alongside the turning counts to validate the junction modelling work. It is very surprising that the Council did not require the same approach to data collection here and that, irrespective of the requirements of the County Council, the applicant did not collect this level of data.

4.29 Evidence provided by the Hardingstone Village Action Group is included at Appendix E. Paragraph 3.1.1 highlights differences between the survey data provided in the Transport Assessment and surveys they carried out in 2013 and 2014. This shows significant variations in traffic flow and highlights the importance of ensuring that base traffic data is reliable and fit for purpose, and demonstrating this as part of the assessment process. Higher baseline traffic flows will result in higher future traffic flows and make it harder to avoid a severe effect.

4.30 Therefore, the data that forms the basis of the traffic assessment for the base and future years cannot be considered reliable and neither therefore can the subsequent modelling work that relies upon the base data.
Development Traffic Generation

4.31 The non-residential vehicle peak hour trip rates for the SUE are set out in Table 6-3 of the Transport Assessment and the resulting trip generation is set out in Table 6-4. Although a two-form entry (1,500m^2) primary school is included within the schedule of proposed development in Table 4-1, no trip rates or trip generation is suggested for this element, and there is no explanation for this.

4.32 A primary school of this size is likely to generate around 86 trips (two-way) in the weekday AM peak and 17 trips (two-way) in the weekday PM peak based on typical trip rates for this land use from the TRICS database. Whilst I accept that some of these trips will be linked with travel to work trips or internal to the SUE development, traffic arising from the primary school has not been taken into account in the assessment and the impact of the development on the local road network will have been under-estimated as a result.

Development Traffic Distribution

4.33 The same assignment methodology has been applied to the proposed residential and non-residential uses. Whilst I accept that the majority of the development's traffic will be generated by the residential element, this approach is too simplistic and has not been justified within the Transport Assessment. Travel patterns are likely to be different for each land use, and therefore different assignment models should be used. Travel to work data from the 2001 Census has been used to assign development traffic. The selection of ‘Nene Valley’ as the ‘Place of Residence’ and ‘All’ wards under ‘Place of Work’ for the residential element is accepted. However, for the employment element this methodology is inappropriate. Instead, ‘All’ wards should be selected for ‘Place of Residence’ with only ‘Nene Valley’ being selected for ‘Place of Work’. As a result, the development’s traffic impact on the A45 trunk road and associated junctions may have been under-estimated.

4.34 Furthermore, the traffic assignment included in Appendix 5 of the Transport Assessment shows that a significant proportion of development traffic is expected to route to and from the north via Gowerton Road and the Brackmills Industrial Estate. It is accepted that this is likely. However, no explanation of the expected assignment of traffic to the north of Gowerton Road (i.e. to / from the A45 and A428) is provided. Without that explanation it is not possible to properly understand the assignment of development traffic through the Brackmills Industrial Estate or to verify whether the impact of the development on junctions to the north of the site is either acceptable or has been mitigated appropriately. This deficiency was highlighted in the Council’s Statement of Case and the information was requested from the appellant in my letter of 10th April 2015 (point 6), but has not been forthcoming.

Assessment Years and Growth

4.35 Paragraph 25 of Department for Transport Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development states that a development’s overall forecast demand should be compared to the ability of the existing network to accommodate traffic over a period up to ten years after the date of registration of a planning application or the end of the relevant Local Plan whichever is the greater.
4.36 The Transport Assessment considers traffic conditions in a future year of 2026. Growth rates taken from TEMPRO have been used to forecast traffic growth up to 2026. However, I note that the Local Plan period is now up to 2029. Whilst I accept that a horizon year of 2026 was agreed at the scoping stage, I consider it necessary to carry out further assessments that include forecast traffic growth up to 2029 to ensure the assessment is sufficiently robust and to demonstrate that the development’s impact will be acceptable or can be mitigated to avoid a severe effect.

4.37 Applying the same methodology (i.e. TEMPRO growth rates) to forecast traffic growth to 2029, the effect would be to increase background traffic flows in both the without and with development scenarios by 30.53% in the AM peak and 31.12% in the PM peak compared with the base year of 2012 for the Queen Eleanor Interchange. This is an increase of 5.29% in the AM peak and 5.55% in the PM peak compared with growth from 2012 to 2026 as assumed in the Transport Assessment. For the Brackmills Interchange the effect would be to increase background traffic flows by 28.88% in the AM peak and 29.49% in the PM peak compared with the base year of 2013. This is an increase of 4.38% in the AM peak and 5.48% in the PM peak compared to the growth from 2013 to 2026. Given the high volume of traffic on the local road network, these increases equate to a significant number of vehicles, as quantified in the tables below.

Table 1: Future Traffic Flows at Queen Eleanor Interchange (Without Development)

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>Base Year 2012</th>
<th>Do Nothing 2026</th>
<th>Growth 2012 - 2029</th>
<th>Do Nothing 2029</th>
<th>Net Change 2026 - 2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM (08:00 – 09:00)</td>
<td>7177</td>
<td>8863</td>
<td>1.3053</td>
<td>9368</td>
<td>+505</td>
</tr>
<tr>
<td>PM (17:00 – 18:00)</td>
<td>6431</td>
<td>7970</td>
<td>1.3112</td>
<td>8432</td>
<td>+462</td>
</tr>
</tbody>
</table>

Table 2: Future Traffic Flows at Brackmills Interchange (Without Development)

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>Base Year 2013</th>
<th>Do Nothing 2026</th>
<th>Growth 2013 - 2029</th>
<th>Do Nothing 2029</th>
<th>Net Change 2026 - 2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM (08:00 – 09:00)</td>
<td>3945</td>
<td>4873</td>
<td>1.2888</td>
<td>5084</td>
<td>+211</td>
</tr>
<tr>
<td>PM (17:00 – 18:00)</td>
<td>3610</td>
<td>4476</td>
<td>1.2949</td>
<td>4675</td>
<td>+199</td>
</tr>
</tbody>
</table>

4.38 The A45 junctions are recognised as currently operating overcapacity and this will be exacerbated by the additional traffic growth to 2029 – around 500 additional vehicles per hour at the Queen Eleanor Interchange and 200 vehicles per hour at the Brackmills Interchange. The performance of junctions operating overcapacity is more sensitive to relatively small increases in traffic than junctions operating within capacity, and therefore the addition of further traffic growth at the A45 junctions will have a significant impact and mean that it will be much harder to avoid a severe effect.
4.39 Furthermore, traffic that will be generated by committed or allocated developments locally or vacant floor space within the Brackmills Industrial Estate does not appear to have been taken into account within the assessment. This issue was raised in paragraph 3.5 of the Council’s Statement of Case and raised again in point 4 of my letter to the appellant dated 10th April 2015. Paragraphs 2.5, 2.6 and 2.7 of Parson Brinckerhoff’s Technical Note 1 provide a response to this question, which confirms that the dataset used to calculate growth assumes an increase of 796 households and 1,196 jobs for the area 34UF2 Wootton / Hardingstone (Main). It is accepted that development within this area is accounted for by the application of growth rates but development beyond the boundary is not. Some traffic arising from development outside of this area, for example other SUEs outside of the 34UF2 area is likely to travel through the study area and therefore should have been taken into account in addition to growth. Therefore, future traffic flows are likely to be higher in reality than assumed, and again this will mean that it will be harder to avoid a severe effect.

Junction Capacity Analysis

4.40 Details of the junction capacity analysis work undertaken by Parsons Brinckerhoff are set out in Section 7 of the Transport Assessment. This Proof of Evidence focuses primarily on the work undertaken in respect of the A45 trunk road and associated junctions, i.e. the Queen Eleanor and Brackmills Interchanges, as the trunk road junctions are referenced specifically in the reason for refusal, although as explained below I do also have a particular concern with the development’s impact on Newport Pagnell Road due to the link’s capacity.

Existing Junction Analysis

4.41 The development’s impact on the Queen Eleanor and Brackmills Interchanges on the A45 has been assessed using the software package LinSig. LinSig, developed by JCT Consultancy Ltd, is a design and assessment tool for traffic signal junctions and urban networks.

4.42 Guidance for those involved with the design and operation of signalised roundabouts is provided by the Department for Transport’s Local Transport Note 1/09 Signal Controlled Roundabouts. Paragraph 5.5.2 also refers to the Transport for London Traffic Modelling Guidelines as a useful resource for traffic modelling advice. Both publications provide specific guidance on LinSig modelling.

4.43 As established by the observational study described in Section 2 of this Proof of Evidence, the A45 junctions are congested at peak times and exit-blocking occurs which restricts the ability of vehicles to leave the junction. Whilst the effect of exit-blocking can be accounted for to some degree in LinSig by manually manipulating the model, the cause of the exit-blocking cannot be inputted into the model, and therefore this method is relatively crude and unreliable.
4.44 Paragraph B3.6.9 of Transport for London's guidelines suggests that where endemic exit-blocking exists, consideration should be given to the use of microsimulation modelling (for example using the software packages VISSIM or Paramics) which can represent both the cause and effect, as it models the behaviour of individual vehicles within a network in real-time. Therefore, I do have a concern over the use of LinSig to model the junctions in this instance given that exit-blocking is a regular occurrence for a significant proportion of the morning and evening peak hours modelled. Microsimulation modelling would provide more reliable results, and therefore should have been undertaken here. I note that the Highways Agency has developed a microsimulation model for the A45 between M1 Junction 15 and the Great Billing Interchange that was used to develop and test highway improvement measures that form part of the A45 Northampton Growth Management Strategy (NGMS). This model could have been used as the basis for assessing the impact of the proposed development at the Queen Eleanor and Brackmills Interchanges and the combined effect of the mitigation measures proposed by the appellant and those that form part of the NGMS (which I discuss later).

4.45 Section 5.1 of Local Transport Note 1/09 Signal Controlled Roundabouts suggests that microsimulation models should be used in addition to empirical models such as LinSig if empirical models cannot clarify junction operation sufficiently (as is evidently the case here) and that in those circumstances an additional stage of investigation is required to investigate the operation of the roundabout in more detail. This has not been done.

4.46 Irrespective of the appropriateness or otherwise of using LinSig to model the performance of the Queen Eleanor and Brackmills Interchanges, I have identified that there are numerous deficiencies with the LinSig models for both junctions that cast serious doubt over whether the models are fit for purpose, and therefore question the validity of the conclusion reached within the Transport Assessment that the mitigation measures proposed would achieve nil-detriment. These deficiencies are described below.

4.47 A base traffic model is a model that has been demonstrated to accurately recreate traffic conditions as observed and measured on-street. It should be suitable for use in analysing current network performance and as a benchmark against which other modelling scenarios can be tested. All base models should be developed, calibrated and validated to an appropriate standard. Traffic models are only as accurate as the calibration and validation processes undertaken during the development stage.

4.48 Calibration is the process of placing verifiable data into a traffic model to replicate conditions observed on-street and may require the adjustment of model parameters to recreate observed behaviour. All input data should be auditable, such as signal timings and on-street measurements (for example lane lengths / widths, cruise times and saturation flows).

4.49 Validation is the process of comparing a model's output against independently measured data that was not used during the calibration process. The purpose of validation is to verify that a model has been correctly calibrated and is therefore capable of producing valid predictions for future scenarios. The overarching aim of validation is to produce a model that is fit for purpose. A comparison should be made between the results from the calibrated model and existing conditions as observed on-street.
4.50 As stated in paragraph B3.8 of Transport for London’s guidance, the following are normally used as validation criteria for LinSig models:

- Degrees of saturation within 5% of observed values; and
- Average queue lengths at the start of green approximately equal to observed values.

If modelled flows are based on surveyed stop line turning counts then degrees of saturation at those stop lines should not exceed 100%.

4.51 The development of the base traffic models is not documented at all within the Transport Assessment and there is no evidence that the 2012 base models have been calibrated or validated. The issue of base model calibration and validation was raised by point 9 of my letter to the appellant dated 11\textsuperscript{th} February 2015. Paragraph 4.2 of Parson Brinckerhoff’s Technical Note 1 confirms that the base models have not been calibrated or validated, and this is a fundamental flaw in the assessment.

4.52 A comparison between my site observations and the results of the LinSig base models presented in Tables 7-13 and 7-14 of the Transport Assessment highlight the following significant anomalies in respect of the Queen Eleanor Interchange (a detailed review of the LinSig modelling is provided at Appendix F):

- In the AM peak, I have observed very long queues on the Mere Way approach, typically extending as far as the next upstream junction at Danes Camp Way / Towcester Road. The distance between these two junctions is over 1.2 kilometres. The default PCU length used in LinSig is 5.75m so this equates to in excess of 200 PCUs. This queue length is significantly in excess of the queue predicted by the base model (20 PCUs).
- In the PM peak, I have also observed very long queues on the Mere Way approach, typically around 750 metres, or in excess of 130 PCUs. This queue length is also significantly in excess of the queue predicted by the base model (9 PCUs).
- In the PM peak, I have observed very long queues on the London Road approach, typically around 350 metres, or in excess of 60 PCUs. This queue length is significantly in excess of the queue predicted by the base model (13 PCUs).

4.53 A similar comparison between my site observations and the results of the LinSig base models for the Brackmills Interchange presented in Tables 7-15 and 7-16 of the Transport Assessment also highlights significant anomalies as follows:

- In the AM peak, I have observed relatively long queues on the Caswell Road approach, typically around 200 metres or in excess of 30 PCUs. At times the queue length extended as far back of the Caswell Road / Rhosili Road junction located approximately 320 metres (56 PCUs) to the south-east of the Brackmills Interchange. This queue length is significantly in excess of the queue predicted by the base model (0.4 PCUs).
- In the AM peak, I have observed longer queues on the A45 southbound off-slip, typically around 95 metres, or in excess of 16 PCUs. This queue length is in excess of the queue predicted by the base model (12 PCUs).
• In the AM peak, I have also observed very long queues on the A45 northbound off-slip, typically around 240 metres, or in excess of 40 PCUs. This queue length is significantly in excess of the queue predicted by the base model (12 PCUs).

• In the PM peak, I have also observed very long queues on the A45 northbound off-slip, typically around 200 metres, or in excess of 30 PCUs. This queue length is significantly in excess of the queue predicted by the base model (10 PCUs).

4.54 The results from the base models are therefore unreliable and do not accurately recreate traffic conditions as observed and measured on-street. As such, they are not suitable for use either in analysing current network performance or as a benchmark against which other modelling scenarios can be tested.

4.55 By way of example, the observed exit-blocking reduces the capacity of the road network upstream of where the blockage occurs. The results of the junction modelling presented within the Transport Assessment are therefore more favourable as exit-blocking was not taken into account than would be the case if it were accounted for. This is evident by comparing the results of the base models with observed traffic conditions. Future junction performance for both Queen Eleanor and Brackmills Interchanges will be worse in reality than predicted within the Transport Assessment in all scenarios.

4.56 It may be argued that deficiencies in all models (i.e. base, without development, with development and with development plus mitigation) would have the same relative effect on the results of each model, and therefore a comparison of the relative performance of each model would remain valid. However, the junctions are already operating overcapacity and, as such, their performance is very sensitive to small increases in traffic flow such that the relationship between traffic flow and congestion is not linear. Therefore, it is vital that deficiencies in the modelling are addressed to ensure that the true impact of the development is quantified and severe effects are demonstrably avoided.

4.57 I communicated the numerous specific and detailed issues which I had identified with the LinSig base models for the Queen Eleanor and Brackmills Interchanges to the appellant by letters sent on 11th February 2015 and 10th April 2015 – correspondence sent to the appellant is provided at Appendix A. The detailed review of the LinSig modelling at Appendix F was sent to the appellant on 6th May 2015. The appellant responded to the points raised in my letters in its Technical Note 1, however many of the responses provided support my view that the traffic modelling is deficient and not fit for purpose. In addition to the acknowledgement at paragraph 4.2 of the Technical Note that the base models were not calibrated or validated – which as discussed above is a fundamental flaw in the assessment – examples include the following:

- Paragraph 4.2 of Technical Note 1 acknowledges that the base models were prepared with relatively limited information. It cannot be right that the impact of a development of this scale and in such a sensitive location is assessed based on only limited information.

- Paragraph 7.3 acknowledges that saturation flows should be observed on site but suggests that limited time and resources prevented this. Again, it cannot be right that limited time and resources should prevent the proper assessment of the development's impact.
• Paragraph 11.2 confirms that exit-blocking has not been modelled. It is very evident from my site observations that exit-blocking is a frequent occurrence at peak times at both the Brackmills and Queen Eleanor Interchanges and this has a significant impact on junction capacity. This should therefore have been identified by the appellant and taken into account within the junction models, but it has not been.

• Paragraph 12.2 suggests that the base models are representing existing conditions only “reasonably well”. This is not good enough, and contrary to my observations. It must be demonstrated through robust calibration and validation that the base models are a reliable representation of existing conditions.

4.58 The modelling work undertaken is simply inadequate for a scheme of this size and when the local road network is known to be congested. It is impossible to have any confidence that the mitigation measures proposed will avoid severe effects when there is no confidence that the baseline models against which the performance of “with mitigation” models are compared are accurate. A robust assessment could (and should) have been provided at the planning application stage and no satisfactory explanation has been given by the appellant as to why this was not done.

4.59 I also note that there is no evidence within the Transport Assessment that the LinSig modelling has been audited in detail and approved by Northamptonshire County Council. It is normal practice for junction modelling to be audited by the highway authority, and indeed it was my experience when undertaking transport planning work for developments within Northamptonshire that the junction modelling undertaken was audited thoroughly.

4.60 I understand from my discussions with Northamptonshire County Council that the LinSig models were reviewed and found to be acceptable, and this is confirmed in paragraph 2.9 of Parson Brinckerhoff’s Technical Note 1. However, I can only conclude that the review was not thorough given the number of deficiencies I have identified that I would expect to have been identified during the audit process.

Study Area Link Flows

4.61 Tables 7-17 and 7-18 in the Transport Assessment make an assessment of link capacities in the AM and PM peaks respectively with reference to Technical Advice note TA 79/99 Traffic Capacity of Urban Roads. TA 79/99 is from the Design Manual for Roads and Bridges published by the Highways Agency. It is not clear at what points on Newport Pagnell Road the capacity of that link has been assessed, but it would appear to be immediately to the east and west of the Landimore Road junction based on the traffic flows. However, the most heavily trafficked section of Newport Pagnell Road is the westernmost section between Queen Eleanor Interchange and Hermitage Way. No assessment of the demand flow against capacity of this link has been undertaken.

4.62 At this location, Newport Pagnell Road would be classified as Urban All-Purpose 2 (UAP2) standard in accordance with TA 79/99 based on the speed limit, number of side roads and access to facilities, including bus stops and pedestrian crossings. The carriageway varies in width between 6.75m and 7.3m. Therefore, the link capacity would be between 1260 and 1470 vehicles per hour in accordance with Table 2 of TA 79/99. This is for the busiest direction of flow and assumes a 60/40 directional split.
4.63 The link flows for 2026 with the development as extracted from the LinSig models are summarised below.

AM Peak:
Newport Pagnell Road (Westbound) – 1575 vehicles
Newport Pagnell Road (Eastbound) – 1103 vehicles

PM Peak:
Newport Pagnell Road (Westbound) – 1091 vehicles
Newport Pagnell Road (Eastbound) – 1490 vehicles

4.64 Therefore, during the morning peak period the westbound flow will exceed the link capacity of Newport Pagnell Road and during the evening peak the eastbound flow will exceed the capacity. The effect of additional traffic growth to 2029 would exacerbate the problem. No mitigation measures are proposed to increase the capacity of this section of Newport Pagnell Road either by the appellant or as part of the A45 Northampton Growth Management Strategy. Reference to this issue is made by the Hardingstone Village Action Group in section 3.4 of the evidence they have provided, which is included at Appendix E.

Mitigation Measures

4.65 In accordance with Northamptonshire County Council’s guidance *Northamptonshire Highway Development Management Strategy*, all proposed developments are required to demonstrate that the likely impacts of the development are fully mitigated, and that there is a ‘nil-detriment’ impact, i.e. there is to be no difference in the safety and capacity of the local highway network as a result of the development proposals compared to the existing situation. The introduction of the “severe” test in the NPPF does not remove the importance of ensuring that the likely impacts are mitigated appropriately.

4.66 Details of the highway mitigation measures proposed by Parsons Brinckerhoff are set out in Section 8 of the Transport Assessment, together with the associated capacity assessments for the modified junctions that purport to achieve at least nil-detriment. Plans of the improvements proposed at the Queen Eleanor and Brackmills Interchanges are included at Appendices 12 and 13 respectively of the Transport Assessment and are reproduced in Appendix G of this Proof of Evidence.

4.67 The improvements proposed at the Queen Eleanor Interchange are as follows:

- Lengthening of three lane flare on the Newport Pagnell Road approach;
- Lengthening of three lane flare on the Mere Way approach;
- Lengthening of three lane flare on the London Road approach;
- Widening of the Newport Pagnell Road exit from one to two lanes;
- Widening of the circulatory carriageway over the northern A45 overbridge from two to three lanes;
- Widening of the circulatory carriageway in the north-west quadrant of the roundabout from three to four lanes; and
- Widening of the circulatory carriageway in the south-east quadrant of the roundabout from four to five lanes.
4.68 The improvements proposed at the Brackmills Interchange are as follows:

- Signalisation of the Caswell Road approach, including signalisation of the circulatory carriageway (part-time during PM peak only);
- Widening of the Caswell Road approach from two to three lanes;
- Widening of the A45 exit slip road on approach to the roundabout from two to three lanes;
- Widening of the circulatory carriageway in the north-west quadrant of the roundabout from three to four lanes; and
- Widening of the circulatory carriageway over the northern A45 overbridge from two to three lanes.

4.69 As noted above, no mitigation measures are proposed to deal with the link capacity problems that will occur with the western section of Newport Pagnell Road.

Junction Capacity Analysis

4.70 Proposed / future models should be modified versions of validated and approved base models. Given the aforementioned concerns with the robustness of the base traffic data and junction models, there is inevitably significant doubt over the validity of the results from the proposed / future models.

4.71 My principal concern with the future “with mitigation” models is that the effect of exit-blocking has not been taken into account, and is therefore the same concern that I have with the other junction models. None of the mitigation measures deal with the cause of the exit-blocking. If it persists, exit-blocking will significantly reduce the effectiveness of the mitigation measures intended to improve the capacity of the junctions. Thus, in the absence of models that take proper account of exit-blocking it is impossible to verify whether the proposed development can be accommodated on the highway network without resulting in a severe impact.

Highway Improvement Works

4.72 The previous sub-section shows that adequate modelling has not been undertaken to demonstrate that the mitigation measures proposed will be sufficient for the traffic generated by the development to be accommodated on the local road network without severe impact. This section shows that it is not even possible to be sure that all the mitigation measures proposed can actually be implemented.

4.73 I accept that it is normal practice for the detailed design of highway mitigation measures to be developed after planning permission has been granted, and delivery will be subject to a Section 278 Agreement with the appropriate highway authority. However, at the planning application stage, designs should be developed to an appropriate “preliminary” standard to demonstrate deliverability and compliance with applicable design and safety standards. If this is not confirmed at the planning application stage, problems could be identified at a later stage that may prevent the delivery of the mitigation measures or reduce their effectiveness.

4.74 I have identified a number of deficiencies with the proposals for highway improvement works at the Queen Eleanor and Brackmills Interchanges that are intended to mitigate the development’s traffic impact at the junctions. My primary concerns relate to road safety (specifically lane widths) and compliance with design standards, and are further described below.
4.75 In addition to those primary concerns, the plans contained within the Transport Assessment showing the mitigation measures proposed for the A45 junctions are based on Ordnance Survey mapping at either 1:1250 scale (urban) or 1:2500 scale (rural). However, because Ordnance Survey mapping data is provided to an accuracy of around ±0.5m for urban locations and ±1.0m for rural locations, it is common practice to instead base proposals for significant highway works on an accurate topographical survey. The Transport Assessment thus initially gave rise to doubts over the reliability of the base mapping, and (as a result) over the deliverability of the mitigation measures proposed within the land available, particularly on the relatively narrow bridges over the A45 where additional traffic lanes are proposed. Having now considered Section 5 of Parsons Brinckerhoff’s Technical Note 2 (provided on 11th May 2015), which describes the sample topographical survey information that has been collected at both the Queen Eleanor and Brackmills Interchanges and includes (as Appendix E) drawings which provide a comparison between the topographical survey and Ordnance Survey mapping, I am satisfied that the Ordnance Survey mapping is sufficiently reliable for preliminary design purposes, notwithstanding that the drawings show that there are discrepancies between the two data sources.

Road Safety

4.76 There is no evidence within the Transport Assessment that the preliminary designs of the mitigation measures were subject to independent Stage 1 Road Safety Audits, as is mandatory for schemes on trunk roads and motorways in accordance with HD 19/15 Road Safety Audit, and as is also normal practice in relation to other roads. HD 19/15 is from the Design Manual for Roads and Bridges published by the Highways Agency. It is my experience working on similar projects in Northamptonshire and elsewhere that the highway authority would usually require developer-led proposals to be subject to an independent Stage 1 Road Safety Audit at the pre-planning approval stage. It is surprising that this was not the case here given the significance of the mitigation measures proposed and the traffic-sensitive nature of the A45 and associated junctions.

4.77 The planning application therefore failed to demonstrate either that the proposals are safe for all road users, in accordance with paragraphs 4.89 and 4.93 of the Department for Transport’s Guidance on Transport Assessment, or that the mitigation measures achieve nil-detriment in safety terms, as required by the County Council’s guidance. The safety audit process could raise concerns with aspects of the proposals that could require changes to the layouts and in turn mean the theoretical capacity benefits cannot be realised.

4.78 One such concern is lane widths. The proposed mitigation measures will result in narrower lane widths, particularly within the circulatory carriageway of the interchanges. Both junctions are subject to a relatively high proportion of HGV traffic and no evidence is provided within the Transport Assessment to demonstrate that large vehicles will able to negotiate the proposed junction arrangements without encroaching into adjacent traffic lanes or overrunning adjacent verges, as occurs currently at both interchanges. It may therefore be necessary to widen some lanes to accommodate HGVs, and this may mean that the widening cannot be achieved within the land available, which may prevent the delivery of the mitigation measures or reduce their effectiveness.
4.79 Stage 1 Road Safety Audits for the mitigation measures proposed at the Queen Eleanor and Brackmills Interchanges have now been carried out by an independent consultant, TMS Consultancy, and are included at Appendix D of Parson Brinckerhoff’s Technical Note 2. Also included at Appendix D are designer’s responses prepared by Parson Brinckerhoff in response to the problems raised by the audits. Safety audits have not been carried out for the other highway works proposed by the appellant.

4.80 Swept path assessments for selected movements at the Queen Eleanor and Brackmills Interchanges have also now been carried out by the appellant and are included at Appendix B of Parson Brinckerhoff’s Technical Note 2. These show an articulated vehicle and a large car (long wheelbase 4x4) travelling side-by-side. It is unclear why this has been done only for selected movements. Swept paths should be provided for all movements and for all situations where articulated vehicles could travel side-by-side.

4.81 I do have some further specific concerns with the swept path drawings, which are described below.

- **Sketch 10a** shows vehicles travelling from the A45 northbound off-slip to Caswell Road via the Brackmills Interchange. Paragraph 2.13 of Technical Note 2 acknowledges “it will be a challenge for a large vehicle (on the nearside) to fully keep the trailer within the lane markings”. It is likely that two articulated vehicle would travel side-by-side from the A45 northbound off-slip to Caswell Road, so swept paths for this situation should have been provided. It appears that the proposed lanes would not be sufficiently wide to accommodate two articulated vehicle travelling side-by-side.

- **Sketch 10b** shows vehicles travelling from the A45 southbound off-slip to Caswell Road via the Brackmills Interchange. Swept paths are provided for an articulated vehicle and a large car travelling side-by-side. However, it is likely that two articulated vehicle would travel side-by-side at this point, so swept paths for this situation should have been provided. It appears that the proposed lanes would not be sufficiently wide to accommodate two articulated vehicle travelling side-by-side.

- **Sketch 10c** shows there is very little margin for error between the three vehicles travelling side-by-side from Caswell Road to the Brackmills Interchange. Also, although it is likely that articulated vehicles could use both the middle and off-side lanes on Caswell Road when travelling towards the A45 northbound on-slip via the roundabout, swept paths for this situation have not been provided but should have been. It appears that the proposed lanes would not be sufficiently wide to accommodate two articulated vehicle travelling side-by-side.

- **Sketch 11a** shows vehicles travelling from the A45 northbound off-slip via the Queen Eleanor Interchange. Paragraph 3.13 of Technical Note 2 acknowledges “it will be challenging for a large vehicle right turning towards Newport Pagnell Road to fully keep the trailer within the lane marking”.

- **Sketch 11b** shows vehicles travelling from the A5076 approach via the Queen Eleanor Interchange. Paragraph 3.14 of Technical Note 2 acknowledges “the large vehicle right turning towards A45 southbound will have difficulties in fully keeping the trailer within the lane marking across the north bridge section of the circulatory carriageway”.

• No swept paths are provided for the inside lane on the circulatory carriageway at the Queen Eleanor Interchange, and this is the tightest lane in terms of turning radii and therefore there is a greater likelihood of large vehicles overrunning the adjacent lane or central island.

• The swept path drawings did not form part of the information reviewed by the safety audit team and therefore the audit does not consider the safety implications of large vehicles not remaining wholly within their dedicated lane when negotiating certain turning movements at the junctions.

4.82 The carriageway widening works proposed to increase the number of lanes on the roundabout entries and the circulatory carriageway have resulted in narrower lanes at key locations. As demonstrated by the swept path assessments, large vehicles cannot remain wholly within their dedicated lane when negotiating certain turning movements at the junctions and this has been exacerbated by the narrower lane widths. This will increase the risk of side-swipe type collisions between vehicles travelling side-by-side. As such, the proposals fail to demonstrate that the impact of the development on the local highway network will be acceptable in terms of road safety.

4.83 Furthermore, paragraph 2.12 of Technical Note 2 acknowledges that in practice large vehicles often disregard lanes markings when negotiating the circulatory carriageway and a car travelling alongside such a vehicle often feels vulnerable and exercises some courtesy to avoid the blind spot of the large vehicle. These issues mean that narrow lanes will be underused which will result in reduced traffic capacity making it harder to avoid a severe effect.

Compliance with Design Standards

4.84 There is no evidence within the Transport Assessment that the mitigation measures have been subject to a technical approval process by the highway authority to confirm, or otherwise, compliance with relevant design standards. Again, it is my experience working on similar projects in Northamptonshire and elsewhere that the highway authority would usually carry out a relatively in-depth technical review of the proposed highway works and it is surprising that this was not the case here.

4.85 There is no indication within the Transport Assessment as to whether the design of the mitigation measures requires any Departures from Standards and, if so, whether they have been approved by the highway authority, or are likely to be approved. Failure to obtain any necessary Departures from Standards may prevent the delivery of the mitigation measures or reduce their effectiveness, again making it harder to avoid a severe effect.

Wider Network Impacts

4.86 The Highways Agency (now Highways England), in collaboration with partners including Northamptonshire County Council and Northampton Borough Council, has developed the Northampton Growth Management Scheme (NGMS) for the M1 and A45 to enable forecast development to 2026 in and around Northampton to be accommodated on the Strategic Road Network (SRN). The purpose is to enable the highway measures required to mitigate the cumulative impact of the forecast development on the M1 and A45 to be provided in a timely and equitable way, thus safeguarding the operation of the SRN.
4.87 A Memorandum of Understanding (MoU) exists between the parties to the NGMS that confirms a shared commitment to facilitate development planned for Northampton with improvements to the A45 trunk road and M1 Junction 15 in the form of the NGMS delivered by way of developer contributions.

4.88 A Delivery Process for the NGMS has been devised, and is described in Annex 3 of the MoU, which establishes the impacts of individual developments and calculates the relative financial contribution required as mitigation. The appellant has agreed to pay a contribution to the NGMS in line with the quantum of development proposed.

4.89 As a preliminary point in relation to the NGMS I note that the principal developments planned in the Northampton area are illustrated in Annex 2 to the MoU, and this includes the SUE south of Brackmills. The model testing assumed a development of 1,250 dwellings but no employment. This differs to the planning application for the proposed SUE that includes up to 1,000 dwellings, a Local Centre, public house, two-form entry primary school and community uses (to include medical centre, pharmacy and community centre). The traffic generation suggested within Parson Brinckerhoff’s Transport Assessment for the mix of uses proposed is higher than for 1,250 dwellings.

4.90 A summary of the schemes comprising the NGMS are set out in Annex 1 of the MoU to the NGMS. Of most relevance to the proposed SUE south of Brackmills are the following schemes (refer to the drawings included at Appendix H of this Proof of Evidence):

A45 Queen Eleanor Interchange (drawing 60153917/6157/QUEL/TN1 Rev. A):

- All traffic signals are proposed to be upgraded to MOVA;
- Widening of the B526 Newport Pagnell Road;
- Signalisation of the London Road approach, including signalisation of the circulatory carriageway;
- Ramp metering at the southbound on-slip; and
- Ramp metering at the northbound on-slip along with removal of the short merge so all traffic accesses the A45 mainline through the lane gain facility.

A45 Brackmills Interchange (drawing 60153917/6157/BRA/TN1):

- All traffic signals are proposed to be upgraded to MOVA;
- Traffic signals are proposed at the exit from Pavilion Drive to the A45 southbound on-slip; and
- Traffic signals are proposed to be introduced on the Caswell Road approach.

A45 Barnes Meadow Interchange (drawing 60153917/6157/BARN/TN1):

- All traffic signals are proposed to be upgraded to MOVA;
- Ramp metering proposed on the northbound on-slip; and
- Removal of short merge and traffic can only access A45 mainline through the northbound lane gain facility.
4.91 The majority of the measures at the above junctions proposed to be delivered via the NGMS are different to the mitigation proposed by the appellant at the same junctions. The only areas of overlap are the widening proposed on the Newport Pagnell Road approach to the Queen Eleanor Interchange and the signalisation of the Caswell Road approach to the Brackmills Interchange. Ramp metering forms part of the NGMS but not part of the mitigation proposed by the appellant. With the exception of ramp metering (discussed below) none of the NGMS measures will address the current problems with exit-blocking.

4.92 Ramp metering is a traffic management technique that controls the flow of vehicles joining the main carriageway of a dual carriageway or motorway during peak periods through the use of traffic signals at the downstream end of the entry slip road. The purpose is to prevent or delay the onset of flow breakdown on the main carriageway to achieve: less congestion and improved traffic flows on the main carriageway; higher throughput during peak periods on the main carriageway; and smoother and more reliable journey times on the main carriageway.

4.93 The Highways Agency’s Interim Advice Note 103/08 Advice Regarding the Assessment of Sites for Ramp Metering states that ramp metering is particularly effective to manage traffic at sites with the following characteristics:

- Merging traffic interfering with mainline traffic;
- Traffic joining from the on-slip conflicting with traffic leaving the main carriageway at a major downstream junction;
- Temporary peaks in joining traffic resulting in congestion;
- On-slips fed by signalised junctions causing large platoons of merging traffic;
- High on-slip flows overloading merge capacity;
- On-slips affected by shockwaves and flow breakdown from downstream; or,
- Queuing traffic is already a feature of the on-slip during peak periods.

4.94 On this basis, both the Queen Eleanor and Brackmills Interchanges are considered to be suitable sites for ramp metering as many of the above characteristics are evident.

4.95 Improvements to the flow of traffic on the dual carriageway A45 achieved through ramp metering should also lead to reduced queuing on the entry slips roads to the A45. The traffic signals that would be provided on the slip roads as part of the ramp metering would cause queues to form when the signals are on red. However, detection measures would be put in place on the slip road to mitigate against queues forming back up the slip road and affecting the performance of the roundabout through exit-blocking. Therefore, although not perhaps its main objective, I consider that ramp metering would be beneficial in terms of addressing the issues with exit-blocking that occur on the A45 slip roads leading away from the Queen Eleanor and Brackmills Interchanges.

4.96 However, ramp metering would not assist with resolving the blocking that occurs on other exits to the local road network, such as that which occurs on the Caswell Road and Pavilion Drive exits from the Brackmills Interchange during the AM peak. No NGMS measures are proposed to address these particular problems.

4.97 Furthermore, the Joint Position Statement prepared by the Highways Agency and Northamptonshire County Council in relation to the NGMS and dated March 2015 confirms that it is the intention to commence the identified highway improvements at the Queen Eleanor and Brackmills junctions except for ramp metering in summer 2015.
I do not therefore consider that the mitigation measures that are to be delivered via the NGMS will effectively mitigate the impact of the proposed development on the road network. None of those measures except for ramp metering will assist in addressing the problems with exit-blocking. Ramp metering, however, will not be brought forward in the first phase of NGMS measures and in any event offers only a partial solution to the problem of exit-blocking. In the absence of an effective solution to the exit-blocking issue I have particular concerns over the effectiveness of the mitigation measures proposed by the appellant to increase the capacity of the A45 junctions.
5.0 Summary & Conclusion

Summary

5.1 This Proof of Evidence sets out the Council’s case on highway matters in defence of its refusal of planning permission for the residential led mixed use development of land east of Hardingstone, north of Newport Pagnell Road, Northampton. It focuses specifically on reason for refusal (1), and therefore considers the proposed development's potential off-site traffic impact and associated proposed mitigation measures.

5.2 The main issues for consideration are:

- Whether the highway mitigation measures proposed by the appellant fail to sufficiently demonstrate that the development would not have a residual cumulative impact on the A45 trunk road and associated junctions such that the cumulative impacts of the development would not be severe; and
- Whether the adverse highway impacts of the proposed development would lead to a detrimental impact on the highway network which would affect all users, including occupiers of the Brackmills Industrial Estate thus acting as an impediment to the operation of the business park and its future sustainable economic growth.

5.3 The appellant proposes to mitigate the traffic impact of the development on the local highway network through a combination of physical junction improvements and a financial contribution towards improvements to the A45 corridor via the Northampton Growth Management Strategy.

5.4 I have reviewed relevant documentation submitted with the planning application, principally the Transport Assessment prepared by consultants Parsons Brinckerhoff on behalf of the Homes and Communities Agency (Revision A dated December 2013). I have also reviewed further information provided by the appellant in response to deficiencies I highlighted with the planning application documents.

5.5 I have discussed the assessment work with Northamptonshire County Council as highway authority for the local road network and the Highways Agency (now Highways England) as highway authority for the trunk road and motorway network.

5.6 My colleagues and I have carried out a thorough study of the operational characteristics of the local road network through observations carried out at peak times and throughout the day on a number of separate days. The Transport Assessment acknowledges that the wider highway network is already congested, and our observations support this statement. This study focussed on the Queen Eleanor and Brackmills Interchanges, which are large grade-separated junctions on the A45. Both junctions are congested at peak times and exit-blocking occurs which restricts the ability of vehicles to leave the junctions.

5.7 In my opinion, based on experience with similar schemes elsewhere, the Transport Assessment submitted with the planning application is a brief and rather simplistic document. This is very surprising given the scale of development proposed and its proximity to traffic sensitive infrastructure, the A45 trunk road in particular. There is a lack of verifiable evidence to support the conclusions reached within the Transport Assessment.
5.8 Furthermore, I have identified numerous deficiencies with the Transport Assessment prepared by Parsons Brinckerhoff for the proposed development that call into question the robustness of the assessment and the conclusions drawn.

5.9 My concerns with the assessment are summarised below.

1. The Transport Assessment shows a lack of understanding of existing traffic conditions on the local road network, including a failure to identify exit-blocking and its implications. There is no reference to observations being carried out on-site to establish accurately the baseline conditions.

2. The forecast mode share is based on 2001 Census Travel to Work data for the ward of Nene Valley (within which the site is situated) and three neighbouring wards. The average mode share across all four wards of 74:26 (car driver to other modes) has been assumed. However, the Nene Valley ward has the highest level of car use, with a modal split of 81:19, and I consider that this is more likely to apply to the proposed development than the average.

3. The assessment fails to consider the traffic impact of the development at key junctions to the north of the application site despite the significant proportion of development traffic that is expected to route to and from the north – 45.7% of arrivals and 36.8% of departures during the AM and PM peak periods. This equates to 176 vehicle arrivals and 222 vehicle departures in the AM peak hour and 196 vehicle arrivals and 174 vehicle departures in the PM peak hour, which are significant figures. Those key junctions should have been assessed but were not.

4. There are issues with the reliability of the base traffic data which was obtained from surveys on different days of the week some 11 months apart. The Transport Assessment provides no indication as to whether the data collected is representative of flows on different days of the week or at different times of the year. There is also no evidence that queue lengths surveys were undertaken at the key junctions assessed within the Transport Assessment in order to validate the results of junction modelling. Thus, the data that forms the basis of the traffic assessment for the base and future years cannot be considered reliable and neither therefore can the subsequent modelling work that relies upon the base data.

5. Although a two-form entry primary school is included within the proposed development, no trip rates or trip generation is suggested for this element, and there is no explanation for this within the Transport Assessment. The impact of the development on the local road network will have been under-estimated as a result, particularly during the AM peak when traffic flows to the school will be highest.

6. The same trip assignment methodology has been applied to the proposed residential and non-residential uses. This approach is too simplistic and has not been justified. Travel patterns are likely to be different for each land use, and therefore different assignment models should be used. As a result, the development’s traffic impact on the A45 trunk road and associated junctions may have been under-estimated.
7. No explanation of the expected assignment of development traffic to the north of Gowerton Road (i.e. to / from the A45 and A428) is provided. Without that explanation it is not possible to properly understand the assignment of traffic through the Brackmills Industrial Estate or to verify whether the impact of the development on junctions to the north of the site is either acceptable or has been mitigated appropriately.

8. An assessment year of 2026 has been assumed within the Transport Assessment. I consider it necessary to carry out further assessments that include traffic growth up to 2029, the end of the Local Plan period. Allowing for additional growth to 2029 would increase background flows by around 5% compared with an assessment year of 2026. Given the very high volume of traffic on the local road network, these increases equate to a significant number of vehicles. The performance of junctions operating overcapacity (as the A45 junctions are) is sensitive to relatively small increases in traffic, and therefore the addition of further growth will mean that it will be harder to avoid a severe effect.

9. The development’s impact on the Queen Eleanor and Brackmills Interchanges on the A45 has been assessed using the software package LinSig. The effect of exit-blocking can be accounted for to some degree in LinSig but because the cause of exit blocking cannot be inputted into the model, this method is relatively crude and unreliable. Where endemic exit-blocking exists (as is the case here), microsimulation modelling (for example using the software packages VISSIM or Paramics) would provide more reliable results, and therefore should have been undertaken.

10. Irrespective of the appropriateness or otherwise of using LinSig to model the performance of the Queen Eleanor and Brackmills Interchanges, I have identified numerous deficiencies with the LinSig models for both junctions that cast serious doubt over whether the models are fit for purpose, and therefore question the validity of the conclusion reached within the Transport Assessment. My chief concerns are summarised below.

- The base traffic models have not been calibrated or validated. Failure to do so is a fundamental flaw in the assessment.
- No account has been taken of exit-blocking within the LinSig models. Exit-blocking reduces the capacity of the road network upstream of where the blockage occurs. The results of the junction modelling are therefore more favourable in all scenarios than would be the case if exit-blocking were accounted for.
- A comparison between site observations and the results of the base models highlight significant anomalies between the predicted and observed queue lengths, with the predicted queue lengths being significantly shorter than observed. As such, the base models are unreliable and are not suitable for analysing current network performance or as a benchmark against which the results of other modelling scenarios can be compared.
11. Thus, the modelling work undertaken is simply inadequate for a scheme of this size and when the local road network is known to be congested. The junctions are already operating overcapacity and, as such, their performance is very sensitive to small increases in traffic flow such that the relationship between traffic flow and congestion is not linear. It is impossible to have any confidence that the mitigation measures proposed will avoid severe effects. A robust assessment could (and should) have been undertaken.

12. No assessment of demand flow against link capacity has been undertaken for the most heavily trafficked section of Newport Pagnell Road. My assessment has shown that during the morning peak hour the westbound flow will exceed the link capacity and during the evening peak hour the eastbound flow will exceed the link capacity. The effect of additional traffic growth to 2029 would exacerbate this problem. No mitigation measures are proposed to increase the link capacity of this section of road.

13. None of the mitigation measures proposed deal with the cause of the exit-blocking at the A45 junctions, which will significantly reduce the effectiveness of the mitigation measures and make it much harder to avoid a severe effect.

14. The carriageway widening works proposed to increase the number of lanes on the roundabout entries and the circulatory carriageway at the Queen Eleanor and Brackmills Interchanges have resulted in narrower lanes at key locations. Swept path assessments have been carried out by the appellant, but only for selected movements, and show an articulated vehicle and a large car travelling side-by-side. It is unclear why this has been done only for selected movements. Swept paths should be provided for all movements where articulated vehicles could travel side-by-side. As demonstrated by the swept path assessments, large vehicles cannot remain wholly within their own lane when negotiating certain parts of the junctions. This will increase the risk of side-swipe type collisions between vehicles travelling side-by-side. As such, the proposals fail to demonstrate that the impact of the development on the local highway network in terms of road safety will be acceptable. Furthermore, the narrow lanes will be underused and this will result in reduced traffic capacity, again making it harder to avoid a severe effect.

15. There is no evidence within the Transport Assessment that the mitigation measures have been subject to a technical approval process by the highway authority to confirm, or otherwise, compliance with relevant design standards or identify a requirement for any Departures from Standards. Failure to obtain technical approval and any necessary Departures from Standards may prevent the delivery of the mitigation measures or reduce their effectiveness, making it harder to avoid a severe effect.

5.10 The Highways Agency (now Highways England), in collaboration with partners including Northamptonshire County Council and Northampton Borough Council, has developed the Northampton Growth Management Scheme (NGMS) to enable forecast development to 2026 in and around Northampton to be accommodated on the Strategic Road Network (SRN). The purpose is to enable the highway measures required to be provided in a timely and equitable way, thus safeguarding the operation of the SRN.
5.11 A Delivery Process for the NGMS has been devised which establishes the impacts of individual developments and calculates the relative financial contribution required as mitigation. The appellant has agreed to pay a contribution to the NGMS in line with the quantum of development proposed.

5.12 Ramp metering forms part of the NGMS measures proposed at both the Queen Eleanor and Brackmills Interchanges. Ramp metering is a technique that manages traffic joining the main carriageway of a dual carriageway or motorway during peak periods and reduces congestion by maintaining a maximum throughput at the point traffic on the slip road merges with traffic on the main road. Improvements to the flow of traffic on the dual carriageway A45 through ramp metering should also lead to reduced queuing on the entry slip roads to the A45, and thus would be beneficial in terms of addressing some of the issues with exit-blocking that occur at the Queen Eleanor and Brackmills Interchanges. However, the Highways Agency and Northamptonshire County Council have confirmed that ramp metering will not be brought forward in summer 2015 as part of the first phase of the NGMS measures.

5.13 In any event, ramp metering would not assist with resolving the blocking that occurs on other exits to the local road network, such as that which occurs on the Caswell Road and Pavilion Drive exits from the Brackmills Interchange during the AM peak. No measures are proposed to address these particular problems.

5.14 I do not therefore consider that the mitigation measures that are to be delivered via the NGMS will effectively mitigate the impact of the proposed development on the road network. None of those measures except for ramp metering will assist in addressing the problems with exit-blocking. Ramp metering, however, will not be brought forward in the first phase of NGMS measures and in any event offers only a partial solution to the problem of exit-blocking. In the absence of an effective solution to the exit-blocking issue I have particular concerns over the effectiveness of the mitigation measures proposed by the appellant to increase the capacity of the A45 junctions.

Conclusion

5.15 I consider that the appellant has failed to sufficiently demonstrate that the highway mitigation measures would not lead to a residual cumulative impact on the A45 trunk road and associated junctions that would be severe and which would adversely affect all users, including occupiers of the Brackmills Industrial Estate.

5.16 In the absence of any evidence demonstrating what the real effects of the development and mitigation measures will be I can only conclude that it is likely that the increase in traffic on the road network local to the site will result in a severe impact.

5.17 In my view it is plain that in order to make the proposed development acceptable in highway terms, much more substantial changes would need to be made to the local highway network. The appellant has not even identified what those changes might be, let alone incorporated them into its proposals.

5.18 It is therefore my professional opinion that the appeal should be dismissed.
− Structural Engineering
− Civil Engineering
− Transport & Highways
− Geomatics (Land Surveying)
− Building Surveying
− CDM Co-ordinators