Homes & Communities Agency

Land to the East of Hardingstone, Northampton

Rebuttal Witness Proof (Transport & Access)

Expert Witness – Jon Tricker

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Prepared for

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1. **Rebuttal to John Birch Proof of Evidence**

1.1.1 This rebuttal proof has been prepared in response to the Proof of Evidence (“PoE”) prepared by Mr Birch, dated 18th May 2015. This rebuttal is structured around the topics used by Mr Birch.

1.1.2 For clarity, I should note that by commenting on or responding to points raised in Mr Birch’s PoE, I am not conceding that the criticisms made are justified. In the most part I am instead providing new evidence or clarifying the position with reference to evidence, in response to the LPA’s case (now elucidated in Mr Birch’s proof). In some instances I have not responded to points made by Mr Birch, however this does not mean I agree with those points.

1.1.3 During the preparation of this rebuttal proof, I have obtained further input from Mr Stoneman, a Technical Director at WSP-PB, who is a technical expert in the field of transport modelling. His qualifications are set out in Appendix A. The Appellant reserves its position to call Mr Stoneman to give oral evidence if so advised.

1.1.4 A Location Plan of the local area showing all roads mentioned within this PoE is shown in Figure 1. This plan updates the TA Plan ref Figures 1 and 3, to include the principle areas raised within evidence and improve clarity.

1.2 **General**

1.2.1 In para 2.13 of his PoE, Mr Birch outlines the visual observations he and his colleagues have made. I don’t dispute that these traffic conditions were observed on a particular day and time. However, I would like to make a number of points. Firstly, there is no classification within the observations, for example there is no record of whether the observed queues were static or rolling. Secondly, one of the survey days was the Friday before the Easter holidays and I would consider this to be unrepresentative, as indicated in GOTA [CD139], which suggests avoiding Fridays. Thirdly, no real quantifiable or independently verifiable data was actually recorded or reported. Fourthly, within his own evidence the form of Google ‘typical drive data’ suggests far less intense congestion: see Mr Birch’s PoE, Appendix D.

1.2.2 I have undertaken further surveys to corroborate my view, which is that queuing can vary day by day and Mr Birch is describing an untypical case, which may have occurred, but can’t be described as average, as shown through his own Google data. This highlights the risk in putting reliance on queue data, which I discuss in Section 1.11 later.

1.3 **Scope of Assessment**

1.3.1 The Council’s case is set out at section 4 of Mr Birch’s PoE. In para 4.4 and 4.9 – 4.10, Mr Birch questions the adequacy of the TA scope to enable a proper assessment of the development impact.
1.3.2 In para 4.4, Mr Birch describes the agreed Transport Assessment (TA) as ‘relatively brief and rather simplistic’. I do not agree with this position as the scope and methodologies of the TA were agreed at and confirmed during pre-application discussion with Northamptonshire County Council (NCC) and the Highways Agency (now Highways England) in accordance with paragraph 4.2 of GOTA [CD139]. NCC in their capacity as Local Highway Authority has confirmed through the Statement of Common Ground (SoCG) [CD 16] made between the Appellant and NCC, that it accepts the TA as ‘fit for purpose’.

1.3.3 This was also directly communicated to Mr Birch when he contacted NCC about the TA scope in an email to NCC. The email response to his enquiry [CD 90] states:

“... Mr Birch asked - Was the scope of the Transport Assessment and key parameters such as traffic generation / distribution / assignment agreed with NCC? If so, can you provide copies of relevant correspondence and evidence of the agreement?

NCC Response – yes the initial TA and subsequent assessment was reviewed by N[orthamptonshire] H[ighways] and agreement was reached (please see attached)”.

1.3.4 The view of NCC, the competent authority with responsibility for the local highway network, clearly confirms that the TA scope was agreed and evidence has been provided in the form of communication between the Appellant and NCC. In addition to this response, NCC enclosed the various technical audits which they had undertaken, and these are enclosed with [CD90] and were also sent to Mr Birch as part of TN1 [CD 85] by the Appellant, in advance of the submission of proofs of evidence.

1.3.5 Additionally, Highways England (HE) was party to original TA scoping discussions in early 2012 and the Council was present at later scoping discussions in November 2013 where the study area was expanded and made no adverse comments on the agreed scope. Ms Toon was provided with all revised assessments in advance of formal submission and made no comments on what was issued. Indeed in para 1.1 of the Committee report [CD57], the planning officer concludes that:

“the site is located in a sustainable location on the edge of Northampton, which will be adequately served by the necessary infrastructure and it is considered that the environmental and highway impacts can be adequately mitigated or reduced to an acceptable degree.”

1.3.6 I can only conclude that the agreed TA scope is reasonable, as it is endorsed by all relevant Highway Authorities and the Council up until planning determination and there can be no reasonable case to say otherwise.
1.4 Existing Conditions

1.4.1 Within para 4.11, Mr Birch claims that no description of existing traffic conditions was provided in the TA.

1.4.2 I can confirm the TA provided an account of the existing highway conditions in and around the Hardingstone SUE site. Chapter 2 of the TA provides a detailed description of the existing conditions, including a detailed assessment of the highway conditions along Newport Pagnell Road.

1.4.3 Site observations were undertaken around the site, on all key junctions, as well as manual traffic count data surveys. Site visits were undertaken by the project team to understand the general traffic conditions with observations taken on the day of surveys.

Video Observation

1.4.4 Furthermore, extensive traffic counts were undertaken using video surveys across peak periods (07:00-10:00; 16:00-19:00) to understand the traffic conditions around the peak hours as well as during the periods before and after the peak period. These details are set out in para 5.2.2 of my PoE. Video footage of the traffic counts at Brackmills Interchange and Caswell Road/Rhosili Road has been used to validate the models as indicated in TN1 [CD85] and have been studied again more recently to consider the specific queuing conditions on the survey days.

1.4.5 I can confirm that video footage from the Brackmills interchange and Caswell Road roundabout, does not align with observations provided by Mr Birch in a number of significant aspects as indicated in paragraphs [2.15 – 2.20] of his PoE, suggesting the queuing conditions at the junctions are considerably variable and individual observations should not be considered as reliable on their own.

1.4.6 Key observations at Brackmills interchange from our video surveys are summarised below:

- Limited stopline queuing observed during the morning peak period on all arms;
- The signalised movements show all traffic clearing the stopline in each 60-second cycle with no obvious residual queuing;
- No or very limited exit blocking observed during the morning peak period at Brackmills;
- The evening peak period shows queuing along the southbound on-slip with some exit blocking. However this is sporadic and does not delay circulatory traffic except on a few isolated occasions;
- Queuing does not extend back from the Brackmills Interchange to the Caswell/Rhosili junction at any point throughout either peak hour;
- Some residual queuing observed on the circulatory carriageway at the northbound-off-slip carriageway, however all is cleared by the end of the peak hour.
1.4.7 As the Queen Eleanor interchange data was provided by NCC as highway authority, it has not been possible to study the video footage on the dates of these surveys. However, recent observation surveys have been carried out at the Queen Eleanor junction and the key observations are summarised below.

**Recent Observational Surveys**

1.4.8 As a response to Mr Birch’s criticisms, additional queue surveys and journey time observations have been carried out in order to further verify our approach to modelling the two A45 Interchange junctions and record the current conditions at these junctions. A full report into the findings is attached in [Appendix B](#).

1.4.9 Recent queue length surveys were undertaken on Tuesday 2nd June 2015 at Queen Eleanor Interchange for all arms, with particular focus on Mere Way, London Road and Newport Pagnell Road. Alongside the surveys, videos and photographs were also taken and are provided in [Appendix B](#).

1.4.10 Site observations from Queen Eleanor are summarised below:

**Newport Pagnell Road**

- Some queuing was observed throughout the peak hour, with a rolling queue often reaching back to Newport Pagnell Road West (Premier Inn access) – approximately 225m;
- Queuing traffic in outside lane wishing to turn right onto the A45 northbound often reached the end of the flare, blocking access for traffic to the nearside and middle lanes;
- Occasionally queuing on the circulatory carriageway blocked back to the Newport Pagnell Road exit, preventing those in the offside lane from entering the roundabout on a green cycle;
- Post 09:00 queuing and congestion reduced considerably and rapidly
- PM peak was noticeably quieter with queuing only once observed extending back to the end of the flare (approximately 100m)

**Hardingstone Lane**

- The majority of vehicles using the offside lane, towards Mere Way or London Road;
- Vehicles were able to enter roundabout during the intergreen period of the previous arm and circulatory with no residual queuing;
- Occasional blocking back from the circulatory preventing exit of traffic.

**A45 Offslip**

- Limited residual queuing after green cycle.
• Nearside lane generally underutilised – limited demand for Hardingstone Lane and Newport Pagnell Road

**A508 London Road**

• Offside lane is under-utilised – majority of traffic exiting onto A45 or London Road;
• During both peaks queuing reaches back to up 150m at some points but rolling queue as this arm is give way;
• Pinch-point observed at island refuge approximately 150 metres back from the junction, preventing traffic from splitting into two lanes until beyond this point;
• Traffic clears when circulatory carriageway is clear – during intergreen on other arms.

**A5076 Mere Way**

• Rolling queue during the morning peak stretches back to the Fire Station yellow box – approximately 350m;
• Fire Station yellow box and signal creates a temporary stopline;
• Some exit blocking observed in the evening peak, preventing traffic exiting in nearside lane;
• Static queue no longer than 150metres during both peak hours;
• Free flowing traffic observed after 09:00 and 18:10 beyond fire station with static queuing considerably shorter – less than 60m by 09:20 and 18:30.

1.4.11 Given the video footage at Brackmills already obtained by the Appellant, observations were limited to southbound on-slip onto the A45 and Caswell Road approach to interchange. At no point during the recent on-site observations did queuing from Pavilion Drive extend up the slip-road to the roundabout. This aligns with our observations from the 2013 video survey. The video footage from October 2013 showed queuing back up the slip-road during the evening peak. Although it was not possible to determine the reason for this from the camera angle, it is likely to have been due to congestion on the A45 mainline preventing traffic from the junction entering the southbound flow. This queuing was observed for two short periods over the peak hour.

**Journey Time Surveys – A45 / Brackmills**

1.4.12 Journey Time Surveys were undertaken on Thursday 4th June 2015 for a route as shown in Figure 2 below:
The survey involved a continuous drive from Caswell Road / Rhosili Road roundabout towards Brackmills interchange, then along the A45 and turning at Queen Eleanor interchange and back along the same route to Caswell / Rhosili roundabout. The route was surveyed throughout the morning peak period between 07:30 and 09:30. The total journey time varied from between 4m51s at 09:22 to 8m10s at 08:01. Delays were primarily experienced on the A45 off-slips and within the Queen Eleanor circulatory carriageway.

A total of twelve runs of the route were undertaken. The comparison of travel times shows that the journey time increases by approximately 11% during the peak period compared with off-peak. Full results are provided in Appendix B.

This evidence clearly shows that although some delay is experienced, it is not extreme or as described generally by Mr Birch or Mr Drake, who has provided a letter about traffic conditions, forming part of the Council’s PoE on planning matters.

Finally, I confirm the TA does describe congestion on the local network, with base models showing Degree of Saturation levels of up to 92% at Queen Eleanor and 90% at Brackmills [CD09 – Section 7.6-7.8]. Degree of Saturation is a key determinate of junction capacity and it is generally considered that signal junctions reach theoretical capacity at about 90%. This level of congestion aligns with the video footage and confirms the junctions are both operating ‘at capacity’. This conclusion is clearly outlined within the TA. I discuss how the Appellant has undertaken further sensitivity testing with Section 1.12 of this Rebuttal Proof.
1.5 Development Mode Share

1.5.1 In para 4.12 – 4.13, Mr Birch questions the level of mode shared derived from Census data.

1.5.2 I can confirm the data extracted from 2001 Census was supplied merely to inform the travel distribution behaviour of the residents of the Hardingstone SUE development. It was not used to forecast mode share, as Mr Birch correctly confirms in para 4.13 of his PoE.

1.5.3 An average of surrounding wards was proposed as it is considered to best represent the future mode share of the population, rather than the historic behaviour of the existing Hardingstone residents, as the new development will create a wider range of housing options. The mode share has been used to provide an indication of the likely public transport usage rather than to lower the level of car trips. The actual traffic forecasts for the development are based solely upon the TRICS database, as correctly indicated by Mr Birch at para 4.13 of his PoE and are therefore independently derived, making any case about use of mode share data irrelevant.

1.5.4 This approach was agreed with NCC and indicated in the SoCG [CD16] para 3.4.

1.6 Scope of the Traffic Assessment

1.6.1 In para 4.14 – 4.23, Mr Birch questions the extent of the study area and confirms the Appellant has tested 7 junctions, but suggests in his view that further junctions warrant detailed testing including Pavilion Drive / A45 slip lane, Barnes Meadow Interchange and Lilliput Road / A428.

1.6.2 I have provided further evidence in my main PoE Section 5.3, showing the development has no or nominal impact on Pavilion Drive and Lilliput junction and no further testing is warranted. These conclusions are based on there being less than 30 veh / hour which draws on advice given in GoTA [CD 139 Appendix B]. This position is shared with NCC and shown through the SoCG [CD16] and their email [CD 90] to Mr Birch in response to his questions on this subject. Specifically;

“...Mr Birch asked - Why was it not considered necessary to assess in detail the development’s traffic impact at the following junctions given the high proportion of traffic expected to route to and from the north via Brackmills / Gowerton Road (45.7% of arrivals and 36.8% of departures during the AM and PM peak periods)?

NCC response – you will note from the attached exchanges that NH picked up this very issue and expanded the study area to the North of the Site.

- A45 Southbound On-slip / Pavilion Drive to the south of Brackmills Interchange - The A45 on-slip is not a County Road, and you will need to discuss this with the HA.
- A45 / A428 Barnes Meadow Interchange to the north of Brackmills Interchange - A major improvement scheme has relatively recently been undertaken at this junction, which has provided capacity to accommodate the allocated sites, such as Hardingstone SUE.
- A428 / Liliput Road at the north-eastern end of the Brackmills Industrial Estate - It was considered that the A45 – A428 is a more appropriate and attractive route (particularly with the improvements proposed along the A45) for residents of the Hardingstone SUE, rather than a convoluted route through the middle of an industrial estate…”

1.6.3 Regarding Pavilion Drive, I can confirm that the NGMS will signalise this junction in order to better manage capacity as shown in the NGMS MoU [CD76 Annex AECOM Tech note]. Highways England (HE) did thus not consider it necessary or appropriate given the context of NGMS, to undertake a detailed test of that junction. Further details are provided in my PoE para 4.4.23.

1.6.4 The position at Barnes Meadow is different in that the appeal scheme’s impacts are greater than 30 veh/hr and testing to the County network part of Barnes Meadow may have been warranted. However, as confirmed in my PoE para 5.3.8 – 5.3.10, Barnes Meadow recently underwent a major capacity upgrade as part of a £5.3m investment in the A45 / A4500 corridor to deal with development growth (including that of Hardingstone SUE). This was delivered via the HCA based Community Infrastructure Fund (CIF) which support transport costs in growth areas. NCC therefore expressly confirmed it should not be tested. This position was communicated to Mr Birch by NCC in response to his email [CD 90].

1.6.5 Furthermore, the trunk road element of the Barnes Meadow interchange (i.e. slip lanes) are covered by the NGMS, which seeks to avoid individual developer mitigation as outlined in Section 4.4 of my PoE, and will form part of NGMS improvements, highlight in the NGMS MoU [CD76 Annex AECOM Tech note].

1.7 Traffic Data Collection

1.7.1 In para 4.24 – 4.30, Mr Birch questions the reliability of the submitted traffic survey data. Specifically, in para 4.25 – 4.26, he says that surveys where undertaken over several dates and up to 11 months apart. He also says that;

...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 Automatic Traffic Counts over a 7-day period...

1.7.2 I would like to make a number of points about the survey data in response. Firstly, within my main PoE Section 5.2, I have confirmed the survey dates and made clear that, although surveys were undertaken on different days, each junction was surveyed on a single day to correctly represent the interaction of flows and turning movements within each interchange. Secondly, within my main PoE section 5.2, I have provided further evidence in the form of Automatic Traffic Counts, to demonstrate the reliability of that survey data. Thirdly, queue surveys were not undertaken as they were not requested – on the basis that the data was likely to be unreliable (as discussed above).
1.7.3 Further, I also note that independent data obtained by the Hardingstone Action Group show similar levels of traffic to that used by the Appellant, as illustrated in my PoE Section 6.3.6, where I have compared the data obtained from various years in Table 10.

1.7.4 I therefore conclude the survey data used by the Appellant is reasonable and this view is shared and agreed by NCC.

1.8 Development Traffic Generation

1.8.1 In para 4.31 – 4.32, Mr Birch questions if the trip generation for the primary school was included in the TA analysis.

1.8.2 I can confirm the trip generation does include provision for trips generated by the school, however Tables 6-3 and 6-4 within the submitted TA were truncated in error. I can confirm that the primary school traffic has been included within the traffic analysis, so the TA conclusions remain. As shown in the original TA distribution diagrams and the revised diagrams in my PoE (Appendix B) show the total flow of traffic from the development as 386 inbound and 602 outbound in the morning peak and 532 inbound and 381 outbound in the evening peak.

1.8.3 By way of confirmation, the following non-residential trips have been included within the total development trips (Table 1) and are agreed with NCC.

<table>
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<tr>
<th>Land Use</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Inbound</td>
<td>Outbound</td>
</tr>
<tr>
<td>Medical Centre</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Pharmacy/Other Retail</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>Community Centre</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Food Retail</td>
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<td>50</td>
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<tr>
<td>Public House</td>
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<td>0</td>
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<tr>
<td>Primary School</td>
<td>121</td>
<td>90</td>
</tr>
<tr>
<td>Total Non-Resi</td>
<td>227</td>
<td>188</td>
</tr>
<tr>
<td>Residential Trips</td>
<td>159</td>
<td>414</td>
</tr>
<tr>
<td>Total Trips</td>
<td>386</td>
<td>602</td>
</tr>
</tbody>
</table>

Table 1 – Breakdown of trips by use

1.8.4 It should also be noted that there has been no adjustment made for internalisation of trips – the term applied to trips which both start and finish within the development site as a whole. In reality, the primary school, as with the other land uses, is being provided to service the local residents of the SUE. Likewise, there has been no adjustment for linked trips, i.e. those trips which are escorting primary school children to school with the driver then continuing on for work. Therefore there are likely to be significantly fewer vehicular trips generated in practice. I therefore conclude the assumptions remain robust.
1.9  Development Trip Distribution

1.9.1  In para 4.33 - 4.34, Mr Birch questions the assignment methodology undertaken for the assignment of residential and non-residential uses. To be clear on the agreed method, I have set out below the methodology used for traffic distribution as used within the Transport Assessment.

1.9.2  The distribution of traffic has been applied differently for outbound and inbound trips during the peak hours. Morning outbound and evening inbound trips have been assumed to be existing Hardingstone residential trips to employment and have been distributed based on Journey to Work data for Nene Valley residents. Morning inbound and evening outbound trips have been assumed to be Hardingstone employment trips from external residences and have therefore been distributed based on Journey to Work data for Nene Valley employees.

1.9.3  Due to the relatively low levels of employment trips compared with residential trips, the alternative distribution proposed by Mr Birch is unlikely to make a significant difference. However, for completeness, I set out below (Table 2) the effect of distributing the non-residential and residential trips differently, as indicated by Mr Birch.

<table>
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<th>TA Distribution (Updated to 2011 census)</th>
<th>Alternative Distribution</th>
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<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
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<tr>
<td><strong>Newport Pagnell RD W</strong></td>
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<td>170</td>
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<tr>
<td></td>
<td>Inbound</td>
<td>Outbound</td>
</tr>
<tr>
<td><strong>Newport Pagnell RD E</strong></td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Inbound</td>
<td>Outbound</td>
</tr>
<tr>
<td><strong>Gowerton RD</strong></td>
<td>130</td>
<td>177</td>
</tr>
<tr>
<td></td>
<td>Inbound</td>
<td>Outbound</td>
</tr>
<tr>
<td><strong>Wooldale RD</strong></td>
<td>34</td>
<td>155</td>
</tr>
</tbody>
</table>

Table 2 Comparison of distribution methods

1.9.4  Table 2 above shows that there is only a difference of a few vehicles depending on the approach to trip distribution. I can therefore conclude that changing the assumptions makes no difference to the overall trip distribution and assignments used for the purpose of model testing.

1.9.5  There are number of further points to make about the forecast flows. To ensure a robust assessment, the TA did not discount the non-residential trips which could have been warranted for the following reasons:
• Internalisation – as the main purpose of the local centre is to serve the development, the resulting catchment does not generally stretch beyond the development boundary, meaning these trips will have no impact upon the wider network.

• Retail ‘pass by’ – a proportion, typically up to 30% of retail trip are already on the network and simply pass into the development as part of the existing trip.

• Linked trips – a proportion of trips will be linked to other purpose trips already accounted for.

I can therefore conclude that the actual amount of non-residential trips on the network beyond the development will be far less than forecast, I would estimate 50%. This further highlights the robustness of the assumptions and assessment undertaken.

### 1.10 Assessment Years and Growth

1.10.1 Within para 4.35 – 4.39, Mr Birch discusses the assignment year and corresponding traffic growth. I reaffirm how I have used TEMPro, which should be read in conjunction with my PoE Section 5.4.

1.10.2 TEMPro software (Trip End Model Presentation PROgram) is used to provide summaries of traffic growth using data from the National Trip End Model (NTEM) and the National Transport Model (NTM). It presents projections of growth in planning data and car ownership, and resultant growth in trip making by different modes of transport.

1.10.3 The latest data sets NTEM 6.2 and NTM AF09 have been approved by the Department for Transport in July 2011. The basic input data to NTEM is planning data for population and employment and this combined with person trip rates to forecast the total ‘trip ends’ in that particular zone over the period selected. The underlying planning data used to forecast the growth is based upon local authority planning guidance as available along with broader national demographic forecasts for population and the economy.

1.10.4 In response to Mr Birch’s points. Firstly, the selection of the assessment year of 2026 was agreed at an early stage in the scoping process. The year was chosen as it aligns with the future year modelling of the NGMS and also the planning horizon for the Northamptonshire Transportation Plan as published in March 2012 a coincidence which is considered good practice as identified in paragraph 4.45 of GOTA which states:

> “The assessment year(s) in respect of capacity analysis for the transport network should be consistent with the size, scale and completion schedule of the proposed development, and that of other major developments in the vicinity of the site, as well as planned improvements to the transport system.”
The decision was also informed by paragraphs 4.47 and 4.48 of the Guidance on Transport Assessments which suggest for the local highway network “a period of no less than 5 years after the registration of a planning application” and for the Strategic Road Network, “the future assessment year will normally be ten years after the registration of a planning application.”

1.10.5 DfT Circular 02/2013 which was published after the GTA indicates in paragraph 25 “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.” There is a provision for the review period to be varied as described in footnote 8 “The length of the review period, at the discretion of the Secretary of State for Transport, can be amended for individual cases, where there is a wider political and economic imperative or, for example, where proposals will take a long time to develop fully. This would only be in exceptional circumstance.”

1.10.6 I consider extending the future year modelling to 2029 would be inconsistent with the requirements of policy and good practice as it extends the future scenario to 16 years after submission. The additional years impose an excessive length of time on the analysis and do not even have the benefit of aligning with transport strategies, like NGMS. All of these factors were taken into consideration and had influence in determining the design year of 2026 for the TA.

1.10.7 Secondly, the growth represented in TEMPro is growth in demand over the periods of the day and does not imply uniform growth in any one hour. For robustness the growth factor has been applied in full to the peak hour – i.e. a flat 25% applied to each hour within the 3 hour morning peak period as opposed to 25% increase over the sum of all traffic in the period. In reality, the growth will be spread across the three hour period and is likely to result in peak hour spreading rather than all growth occurring within the peak hour.

1.10.8 Transport Analysis Guidance published by the DfT on Variable Demand Modelling provides guidance on the assumptions of Peak Hour Spreading (TAG Unit M2 Variable Demand Modelling, DfT, Jan 2014), extract in Appendix C:

“It is common experience that when demand grows in a congested network the peak in demand tends to occupy a longer time. The peak is unable to grow higher for lack of capacity, so additional demand is accommodated in the shoulders of the peak… If modelling predicts unrealistically severe congestion in the peak hour, micro time period choice modelling to reallocate trips between the peak hour and the shoulders may be used to achieve a more realistic estimate.”

1.10.9 Thirdly, the analysis did not reduce TEMPro outputs to make allowances for the growth from the actual application site (i.e. Hardingstone SUE). So by not discounting TEMPro outputs, the Appellant has created been robust.
Lastly, the forecast growth applied using TEMPRO, is based on the Wootton/Hardingham geographical area as stated within my PoE Section 5.4. It should be noted that this geographical area has been separately forecast from the wider Northampton town area in order to more accurately reflect the forecast growth in houses and jobs related to Hardingstone and the Brackmills Industrial Estate. The TEMPro forecast equates to an additional 796 households and 1,196 jobs and is therefore considered to include all planned growth (i.e. committed / allocated development) at the Brackmills Estate, a point disputed by Mr Birch in his PoE para 4.39.

There is a specific zone within TEMPRO for Wootton/Hardingham due to the forecast growth in homes and jobs within that area as part of local plan policy. This forecast is based on local policy growth in that area in terms of labour force and housing projections as provided by Northampton Borough Council. The fact that there is a specific zone for Wootton/Hardingham reflects the fact that future growth is likely to be different proportionally to the wider Northampton town zone. This is reflected by Table 3 below:

<table>
<thead>
<tr>
<th>2012-2026 Growth</th>
<th>34UF2 Wootton/Hardingstone (main) Used in TA</th>
<th>34UF1 Northampton (main) Shown for comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Average</td>
<td>AM 1.2524</td>
<td>PM 1.2557</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AM 1.2214</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM 1.22261</td>
</tr>
</tbody>
</table>

Table 3 – Comparison of TEMPro datasets

As can be seen from the data, proportional growth in traffic, based on housing and employment projections, is higher in Wootton/Hardingham than across the rest of the Northampton Town area.

It should be noted that the NTEM dataset forecasts growth between 2003 and 2035, with continued growth applied to all zones beyond the 2026 period that the Hardingstone assessment has assessed. Growth is based on long term policy aspirations for the Wootton/Hardingstone zone, including the SUE and expansion of Brackmills, rather than specific planning consents within the zone. All growth with policy support (i.e. committed / planned development) can be assumed to be included within the growth factors. It can therefore be accepted that all intensification and growth of Brackmills proposed beyond current operation is included within the growth factors used.

In para 4.39, Mr Birch also says that vacant floor space may come back into operation and this has not been included. I consider that vacant floorspace to be a very normal part of land use, as tenants come and go and is accounted for in normal fluctuations in traffic levels and cannot be reasonably build into TA assumptions.

I would also like to point out that any new development at Brackmills which creates a net impact of over 30 veh / hour on the A45, may be considered material by HE, who will therefore require a contribution towards the NGMS. This may include the intensification of sites at Brackmills, which
would require planning permission. This position was confirmed during a recent meeting with Brackmills Business Improvement District (BID) on Monday 1st June. A follow up letter in relation to the meeting, which I prepared and sent to Brackmills Industrial Estate BID is enclosed in Appendix D.

1.10.16 I therefore conclude that the amount of background growth factored into the TA is appropriate given the nature of the surrounding area, the 2026 design year being compatible with NGMS and the congested nature of local highways and this position is shared with NCC. Moreover, it has been shown that the assumptions are robust, as opposed to one which underestimates the resultant flow as indicated by Mr Birch.

1.11 Junction Capacity Analysis

1.11.1 In para 4.40 onwards, Mr Birch discusses the LinSig modelling undertaken to assess the development impact at QE and Brackmills. I believe Mr Birch has misunderstood the context in which the modelling was undertaken, which is surprising as the position of Highways England and NCC is very clear.

Model Suitability

1.11.2 In para 4.41 – 4.45, Mr Birch discusses his views about modal suitability. I have prepared an ‘Information Graphic’ to illustrate the modelling context and help describe the technical points. This should be read in conjunction with para 5.7.22 – 5.7.28 within my main PoE.

![Diagram showing traffic delay under differing scenarios](image)

1.11.3 The vertical axis represents notional junction delay to the County network element of the junction, whilst the horizontal axis represents time.
1.11.4 Point A1 is the base traffic 2012 assessment based upon the traffic survey data undertaken using video recording.

1.11.5 Point A2 is the future 2026 base model which includes TEMPro growth at about 25% to 2026. As this scenario will not occur without NGMS mitigation, point A2 is not considered further.

1.11.6 Point B1 represents the delivery of the NGMS upon the A45 and associated junctions at QE and Brackmills. Point B1 is significant, as the junction operation and that of the A45 will be radically changed through the strategic NGMS improvements, meaning that the junctions will have an entirely different operation. As outlined in my PoE para 4.4.20 – 4.4.25, the NGMS will assist in managing flows to maintain current junction performance, thus over time the network is managed to a point B3. In summary NGMS benefits include;

- MOVA (Microprocessor Optimised Vehicle Actuation), meaning the current signal controller will be removed and replaced with a system which dynamically monitors queues and adjusts green times to maintain the efficient operation of the junction
- further signalisation, converting nearly all roundabout give way to signal control
- Ramp metering to slip lane entries to A45 – to maintain improved journey reliability on the A45 and associated queue management.

1.11.7 Collectively the above measures will radically alter the junction operation, and thus the future model needs to adopt very different assumptions to the base model.

1.11.8 Point B2 represents the future base model established by the Appellant, for the purpose of impact testing. The LinSig models assumed that exit blocking issues would be managed by NGMS and by making no allowance for exit blocking, the Appellant has partially modelled the positive effects of NGMS. LinSig is unable to model MOVA, so point B2 shows more delay than B3, which represents the more likely junction delay. I set out below brief descriptions of MOVA and Ramp metering. The combined effects of these two measures will have a significant positive impact on the future baseline operation of the two A45 junctions, hence HE pursuing them.

1.11.9 Vehicle Actuation (VA) is a simple method of allocating times to different traffic movements, between present minimum and maximum limits. Vehicles detected during the green phase extend the green period until a gap exceeding a critical value is found or the maximum is reached. MOVA is a more efficient form of control able to deliver substantially reduced delays without the need for regular re-setting of the signal timings.

1.11.10 MOVA is most suited to junctions with high flows, large complex junctions and those suffering from prolonged periods of congestion. “TRL/DfT trials have shown that MOVA reduces delays by an average of 13% compared to the earlier, vehicle actuated system.” (DfT Traffic Advisory Leaflet 3/97, 1997- Extract contained in Appendix E). This delay reduction will vary across the network,
but it can be safely assumed that the introduction of MOVA at the two A45 interchanges will improve their operation relative to the current conditions.

1.11.11 Similarly, according to the Highways Agency, “Ramp Metering is a traffic management technique, which manages the number of vehicles joining a motorway [or trunk road] at peak periods. The purpose of Ramp Metering is to prevent or delay the onset of flows breakdown on the main carriageway by a combination of:

- Managing the flow on the entry slip road to avoid large platoons of vehicles entering the main carriageway and causing flows breakdown; and

- Restricting the flow onto the motorway of additional traffic that, if unrestricted, would trigger flow breakdown.

By preventing or delaying flow breakdown, the system provides the following benefits:

- 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.”


1.11.12 Point C1 shows the impact of development traffic and ‘nil detriment’ is measured between point B2 and C1. Point C2 shows the effect of the Appellants Section 278 mitigation works.

1.11.13 Set within this context, there are a number of points I would like to make about Mr Birch’s evidence.

1.11.14 In para 4.42, he cites the TfL Modelling Guidance as a relevant document. Given the nature of London and its particular funding and assessment criteria, I would question the relevance of this document in a smaller settlement.

1.11.15 In para 4.4.4, Mr Birch says the Appellant could have made use of the HE microsimulation model. Firstly, the current modelling method was agreed with NCC, as HE have already undertaken the higher order assessment of NGMS using the microsimulation (VISSIM) and this included major growth like Hardingstone SUE.

1.11.16 Secondly, as both of the highway authorities were satisfied that the proposed LinSig modelling would be sufficient for their purposes it was considered unnecessary to spend additional time on more complex tools.

1.11.17 Thirdly, the primary source of information for junctions for any micro-simulation model is a calibrated static junction model such as LinSig, thus the LinSig modelling would still have been required and the VISSIM model would have been a duplication of effort in this instance.
1.11.18 I therefore conclude that if viewed in the context of NGMS, the agreed LinSig method was and is an appropriate tool for the assessment of traffic impact of the County network and there can be no reasonable case to say otherwise.

1.12 Model Calibration / Validation

1.12.1 This section responds to points made in para 4.46 to 4.57 by Mr Birch about the model validation.

1.12.2 Mr Birch states at Para 4.51 that TN1 [CD 85] confirms that validation did not take place. Rather TN1 confirms in para 4.3 that the TA models were calibrated by inputting direct observations of geometric parameters and saturation flows based on traffic observations and validated by confirming that the output degree of saturation was as observed – i.e. queues were forming – but not validated against queue surveys.

1.12.3 In para 4.46, Mr Birch outlines what he describes as ‘numerous deficiencies’. I do not share this view and consider these to be differences of professional opinion. Moreover, traffic signalled gyratory are considered to be the hardest form of junction to model, given the complex interaction of signal nodes and traffic streams, meaning there are often different ‘schools of thought’ about input data and optimisation.

1.12.4 I can confirm the LinSig models were calibrated based on the turning counts as observed in the traffic surveys, providing observed saturation flows on each link. This approach to calibration is reasonable and robust and clearly based on advice given in the LinSig Manual (Appendix G). This states in Para 3.1.1.5;

“...The queue lengths calculated by cyclic flow profile models are often misunderstood and it is important to understand the different queue components and how they are used to predict queue lengths. Queues are inherently difficult to model accurately regardless of the quality or level of detail used in the model. Predicted queue lengths are extremely sensitive to small changes in input data. For example looking at a typical Lane in a LinSig model with a flow of 600 PCU, its predicted queue at a degree of saturation of 90% is 19 PCU. Increasing the flow by 10% gives a degree of saturation of 100% and a queue of 29 PCU an increase of over 50% in the queue length. Due to the variability of queues and sensitivity to small changes in conditions both in models and in reality we recommend avoiding directly calibrating models to measured queues as unless done with extreme care and highly detailed data it has the potential for introducing significant inaccuracy into the model. It is recommended that a greater emphasis is placed on ensuring capacities are modelled correctly whilst still checking that modelled queues are acceptable...”

1.12.5 In accordance with this advice, and given the inherent difficulties in recording queues that are truly representative, the Appellant’s approach to model calibration was therefore to focus on entry capacities ‘saturation flow’ and has modelled the full saturation of the junction. However, some
queuing is predicted by the model, but extensive queues are not, as they were not recorded by the survey to travel through the junction within the 1 hour test period.

1.12.6 Any additional queue evident at the end of the test period can be termed ‘excess demand’ and will travel through the network in the minutes after the 1-hour test period. This excess demand, which falls outside of the LinSig modelling will exist in all test periods studied, but importantly, the TA models have still assessed the saturation of the junctions and are thus accurate in forecasting measures required to achieve ‘nil detriment’ and have therefore been accurate in the analysis and determination of mitigation solutions.

1.12.7 The initial base model results were issued to NCC during the process of compiling the revised TA who confirmed, with the knowledge of these results, that a ‘nil detriment’ result was what was required for the 2026 future scenario only.

1.12.8 The LinSig models have been refined to match the junction capacity to the traffic volumes observed entering the junction. The process of refining and modifying the junction coding to match the observed ability of the junction to process vehicles is calibration. As Mr Birch states, in paragraph 4.50 the degree of saturation should not exceed 100% at the stop line. Table 7-13 of the Transport Assessment [CD 9] shows the degree of saturation for all the entries are at or about 90% for Queen Eleanor and Brackmills. Therefore, we can agree that the junction entries are coded to allow the correct number of vehicles to enter the junction in the modelled hour, meaning the models will accurately model further increases in traffic demand.

1.12.9 Finally, the queues which are identified by Mr Birch and reported in paragraphs 4.52 and 4.53 of his PoE are a function of the traffic not being able to cross the stop line and enter the junction within the 60 minute survey and test period. So in conclusion, as these vehicles would not form part of the junction coding adjustment process and have not affected the accuracy of the junction testing for the purpose of determining ‘nil detriment’, as they are unrelated to the saturation flow of the junction. It is for this reasons, the models are considered ‘fit for purpose’.

**Further Sensitivity Testing**

1.12.10 Notwithstanding the Appellant’s position on the agreed TA models, and in order to consider the implications of the evidence put forward by Mr Birch within his PoE, further sensitivity testing has been undertaken to simulate the infrequent levels of queuing quoted by Mr Birch.

1.12.11 The results of this sensitivity testing should be treated as an extreme sensitivity test as it is not considered that such high levels of queuing are a normal baseline situation. I consider these do not correlate with the assumptions that I have used up to this point based on video surveys and recent on-site observations (June 2015). Furthermore, as described in section 1.11 above, it should also be noted that the future scenarios will be quite different with the full implementation of the NGMS and the benefits described.
1.12.12 In order to derive the extreme additional queues, information has been used from the manual turning counts, live traffic conditions observed from www.roadworks.org, video survey data from our manual survey days, limited queue descriptions within Mr Birch’s PoE and our own observed queue information from more recent surveys. The LinSig models have been rerun with demand traffic flow increased over and above the normal traffic flow surveyed to simulate the queuing. Table 4 below provides a summary of the modelled queues (i.e. those simulated within the model) included within our base model compared with our observed queue lengths (from the method derived above and based on Mr Birch’s observations).

**Queen Eleanor – Queue Lengths**

<table>
<thead>
<tr>
<th>Arm</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modelled Queue (PCUs)</td>
<td>Observed Queue (max PCUs)</td>
</tr>
<tr>
<td>Southbound Off-slip</td>
<td>120</td>
<td>20</td>
</tr>
<tr>
<td>Hardingstone Lane</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Newport Pagnell Road</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Northbound Off-slip</td>
<td>60</td>
<td>Not observed</td>
</tr>
<tr>
<td>A5076 Mere Way</td>
<td>400</td>
<td>50</td>
</tr>
<tr>
<td>A508 London Road</td>
<td>120</td>
<td>30</td>
</tr>
</tbody>
</table>

**Brackmills – Queue Lengths**

<table>
<thead>
<tr>
<th>Arm</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modelled Queue (PCUs)</td>
<td>Observed Queue (max PCUs)*</td>
</tr>
<tr>
<td>Southbound Off-slip</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Caswell Road</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Northbound Off-slip</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>Eagle Drive</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4 - * Estimates based on video surveys from 2013.

1.12.13 The additional demand that creates the queues refers to the traffic that wishes to pass through the junction but is unable to pass through the stopline by the end of the peak hour – the unsatisfied demand or ‘excess demand’. Full details of the approach taken to simulate queuing is provided in Appendix H.

1.12.14 The scenarios tested are in line with those included within the Transport Assessment in order to provide a direct comparison. Additional alterations to parameters as included within the sensitivity testing detailed in para 5.7.30 to 5.7.39 and Appendix G of my PoE have not been used here as they were shown to have minimal effect on the operation of the junction.
1.12.15 The scenarios tested were:

- 2013 Baseline (added queues)
- 2026 Future Baseline (added queues)
- 2026 Future with Hardingstone SUE Development (added queues)
- 2026 Future with Hardingstone SUE Development and proposed Junction Mitigation (added queues)

1.12.16 Each of these scenarios were tested for the weekday morning and evening peak hours at both junctions. Tables 5 and 6 below provides a summary of the results of this sensitivity testing.

<table>
<thead>
<tr>
<th></th>
<th>2013 Base (with Q)</th>
<th>2026 Base (with Q)</th>
<th>2026 Development (with Q)</th>
<th>2026 Mitigation (with Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRC</td>
<td>Delay (pcu/Hr)</td>
<td>PRC</td>
<td>Delay (pcu/Hr)</td>
</tr>
<tr>
<td>AM Peak</td>
<td>-26.7%</td>
<td>326.67</td>
<td>-153.6%</td>
<td>1252.42</td>
</tr>
<tr>
<td>PM Peak</td>
<td>-8.8%</td>
<td>98.60</td>
<td>-91.4%</td>
<td>840.81</td>
</tr>
</tbody>
</table>

Table 5 Extreme Sensitivity Test Results – Queen Eleanor Interchange

1.12.17 It should be noted that, during the PM peak at Queen Eleanor, LinSig has automatically optimised the operation of the junction compared with the base situation. This results in a slightly improved situation with the development traffic than without in the future baseline – the software seeks to share the overcapacity burden across other arms, thereby reducing the overall delay.

<table>
<thead>
<tr>
<th></th>
<th>2013 Base (with Q)</th>
<th>2026 Base (with Q)</th>
<th>2026 Development (with Q)</th>
<th>2026 Mitigation (with Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRC</td>
<td>Delay (pcu/Hr)</td>
<td>PRC</td>
<td>Delay (pcu/Hr)</td>
</tr>
<tr>
<td>AM Peak</td>
<td>-3.0%</td>
<td>40.35</td>
<td>-36.3%</td>
<td>369.92</td>
</tr>
<tr>
<td>PM Peak</td>
<td>-3.6%</td>
<td>38.71</td>
<td>-35.4%</td>
<td>310.94</td>
</tr>
</tbody>
</table>

Table 6 Sensitivity Test Results – Brackmills Interchange

1.12.18 As can be seen from both tables, nil detriment is demonstrated by the total delay being less in the “with development and mitigation” test than in the “no development” test and is achieved in both peak hours for both junctions. In fact in some scenarios, the resultant position is far better than ‘nil detriment’. It should be noted that this level of congestion is not considered a realistic situation (see the discussion about peak spreading) and as such this sensitivity test is intended to demonstrate that my ultimate conclusions remain sound, rather than representing a revised version of our future traffic forecasts.
1.12.19 I therefore conclude that I have demonstrated that the original and agreed TA LinSig models are suitable for the purpose of ‘nil detriment’ testing and this conclusion is based upon new evidence which explores the implication of modelling longer queues.

1.13 Scope of the Transport Assessment Issues

1.13.1 There are a number of points to make in response to Mr Birch evidence in para 4.57.

1.13.2 In Bullet 1, he says TN1 acknowledges the model were set up with ‘relatively limited information’. This extract was taken out of context and the Appellant stated in para 4.2 ...The base models were prepared with relatively limited information, however it was endeavoured to prepare a model suitable to represent the existing conditions on the ground, based on observed flows and signal control information...

1.13.3 In Bullet 2, he say TN1 confirms ‘limited time and resource’ prevented proper observation. Again, Mr Birch chooses to ignore much of the actual statement. The Appellant actually stated; ...It is acknowledged that saturation flow should ideally be observed to reflect the existing conditions. However, observation also comes with their uncertainties. For example, No guarantee that the junction is operating “typically” on the day of observation, Observation can only take place during the peak periods, Traffic struggle to exit roundabout downstream will affect the observations, Traffic demand fluctuate would reduce the number of valid observation, Time and resources...

1.13.4 In responding to the assertions made in paragraph 4.57 and 4.60, I would like to highlight that the purpose of the junction modelling within any TA is to provide the highway authorities with sufficient information for a decision to be made about the development traffic impact and scale, type and location of the mitigation required. Whilst Mr Birch may be of the view that what was undertaken is insufficient, both highway authorities have evidently satisfied themselves that appropriate analysis has been completed and acceptable mitigation measures have been identified. Had either of the highway authorities or the planning authority expressed a concern that the information being prepared and submitted was inadequate for the purpose of identifying appropriate mitigation this should have been identified at the appropriate time during the Scoping and the review of the TA, or during the preparation of the revised TA.

1.13.5 In para 4.60, Mr Birch concludes that the NCC review of the LinSig models was not thorough. NCC have already send Mr Birch details of their technical audit. [CD90]
1.14  **Study Area Link Flow**

1.14.1  In para 4.61 – 4.64, Mr Birch discusses the link capacity of Newport Pagnell Road. The TA included a link capacity assessment for the roads immediately around the development site based on TA/99 of DMRB. I note that the issue of link capacity was never raised in the Councils RfR or SoC.

1.14.2  This document provides guidance for the relevant capacities on urban roads. Para 2.1 states that “the guidance in this document should be used flexibly”. In some circumstances, the use of a reduced width of carriageway will result in significant savings or environmental benefits, which outweigh the disbenefits of congestion during peak periods.” This is key to considering the relative capacity of Newport Pagnell Road and the fact that the peak demand occurs over a short period of time. In addition, the document states that “capacity flows may be up to 10% more or less than the values given in this document.” The classification of the links based on the criteria in the guidance document is subjective and can vary along the length of a particular road.

1.14.3  The sections of Newport Pagnell Road assessed were immediately to the west of The Warren junction and immediately to the east of the Landimore Road/Wooldale Road junction. The assessment identified Newport Pagnell Road as type UAP3 in these locations.

1.14.4  I believe Newport Pagnell Road is a higher classification route than being suggested by Mr Birch, as it connects to a main trunk road at its western end. In addition, the speed limit is 40 mph between Wooldale Road and Queen Eleanor Interchange with parking restrictions along its length. A classification of UAP2 would be considered more appropriate along the western section of the route.

1.14.5  The relative capacity of a link is also determined by the width of the link in question. Newport Pagnell Road increases in width at its western end to between 8 and 9m. When the UAP2 classification and a width of up to 9.0m is considered then a capacity of up to 1,550 vehicles per hour can be accommodated. Given the 10% variation as quoted above, then it is considered that the link provides sufficient capacity for peak hour demand.

1.14.6  I would also like to highlight the forecast growth is based on TEMPro applied to traffic flows along Newport Pagnell Road. As stated within my PoE, analysis has been undertaken related to the forecast level of traffic on Newport Pagnell Road as generated by the recently consented schemes. Table 6 within my PoE provided details of this analysis and demonstrated that the forecast growth as used within the Hardingstone SUE modelling more than accounts for all cumulative development growth. It is therefore considered that the forecast flows along Newport Pagnell Road are considered to be a worst case and in practice lower. A further consideration is the length of peak periods being limited to no more than 1 hour in the AM and PM on typical weekdays.
1.14.7 I therefore conclude that as the capacity of Newport Pagnell Road is likely to be higher than that outlined by Mr Birch and there is clear robustness within the demand flow, the situation is acceptable, particularly when this highest demand only occurs for very short periods.

1.15 **Mitigation Measures & Junction Capacity Analysis**

1.15.1 In para 4.65, Mr Birch discusses the ‘severity’ test in the NPPF and its application. My views on the ‘severity’ test are outlined in para 3.3.2 – 3.3.19 of my PoE.

1.15.2 Mr Birch’s main concern, as expressed in paragraph 4.71, is that none of the junction models reported in the Transport Assessment allows for exit blocking.

1.15.3 The context of the modelling undertaken by the Appellant is described within Section 1.11 of this Rebuttal Proof. As described the future baseline 2026 position, must be viewed in the context of the full delivery of NGMS and the various benefits are outlined in Sec 1.11. The mitigation measures put forward by the Appellant are agreed with NCC and have been assessed in conjunction with the 2026 base (with NGMS) in order to demonstrate ‘nil detriment’.

1.15.4 I would like to make the following points about how the various improvements will manage exit blocking. These points should be read in conjunction with Figure 3 and 4 which illustrate the NGMS elements superimposed upon the agreed Section 278 works. These diagrams are schematic and intended to provide information about the combined effects and not the engineering detail, which is shown within the TA [CD08] and NGMS MoU [CD76].

1.15.5 Firstly, ramp metering will assist in managing access onto the A45 and associated exit blocking issues will be managed. Mr Birch accepts this benefit in para 4.95 of his PoE. We can therefore agree that exit blocking onto the A45 will be managed by NGMS.

1.15.6 Secondly, MOVA signal control and queue management will reduce the potential that entries, exits or internal roundabout circulation will become blocked. MOVA will also enhance overall capacity. To capitalise on the removal of the exit blocking, some entry widths are also being increased to allow more traffic into the junction.

1.15.7 Thirdly, further signalisation of junction nodes, such as London Road at QE and Pavilion Drive at Brackmills, will help manage queuing and enhance capacity at these locations, thus assisting with exit blocking.

1.15.8 Fourthly, the agreed section 278 works will provide enhanced junction capacity through additional lanes, and longer flares (increased lane storage). Hence the combination of NGMS scheme and physical works on the entry arms is the appropriate mitigation package for the development.

1.15.9 Lastly, the agreed Section 278 works within Brackmills, proposed by the Appellant at Caswell Road / Rhosili Road junction will create a new and ‘segregated left turn lane’ into Rhosili Road from
Caswell Road (n) and also provide higher capacity entries to Pavilion Drive and Caswell Road(s). The benefits of these improvements are significant and create far more than a ‘nil detriment’ position. As shown in Table 8.3 (Page 41) from the TA [CD08], the introduction of the ‘segregated left turn lane’ improves the future baseline from a queue of 244 veh (2026 Base + Dev) to just 4 veh (2026 Base + Dev + Mit). This improvement will therefore significantly help manage exit blocking issues into Brackmills especially during the morning peak, at a time when traffic is heading into the estate off the A45, and shown to be delayed by the Caswell Rd / Rhosili roundabout.

1.15.10 I therefore conclude that the combination of NGMS and Section 278 works will be successful in managing exit blocking issues, cited by Mr Birch.

1.16 Highway Improvement Works

1.16.1 Within para 4.72 – 4.83, Mr Birch discusses the highway improvements works, which he says have a number of deficiencies.

1.16.2 Firstly, I would point out the NCC position on this which was confirmed to Mr Birch when he enquired [CD 90]. Specifically;

*Mr Birch asked* - *Was a vehicle tracking exercise carried out for the mitigation measures proposed the Queen Eleanor and Brackmills Interchanges? If so, can NCC provide details? If not, can you confirm why this was not required given the narrowness of some lanes and the high HGV content?*

*NCC Reply* - *As the mitigation proposals are indicative at this stage this level of detail is not required, and will be provided as part of any detailed design and S278 Audit process, should the Appeal be allowed.*

*Mr Birch asked* - *Have the mitigation measures proposed the Queen Eleanor and Brackmills Interchanges been subject to formal road safety audit (Stage 1). If so, can NCC provide evidence of the audit process and outcome? If not, can you confirm why this was not required?*

*NCC Reply* - *As the mitigation proposals are indicative at this stage this level of detail is not required, and will be provided as part of any detailed design and S278 Audit process, should the Appeal be allowed.*

1.16.3 I must therefore conclude that as NCC as the ultimate adopting authority are satisfied with the approach, then there is no case to suggest otherwise.

1.16.4 However, as stated in my PoE, given the concerns of the Council and to further demonstrate the deliverability of the mitigation solution, the Appellant has undertaken the various technical audits, including Stage 1 Road Safety Audits, swept path testing and work on design compliance. As is normal practice, these technical audits would normally trigger changes to the design proposals, as part of a normal process of design evolution.
1.16.5 Following the submission of the Proofs, the Appellant has considered the points raised by the audits and those specific points highlighted by Mr Birch. It is the view of the Appellant that all these matters can be resolved at Detailed Design Stage, as part of a normal process of design evolution. This is also clearly the view of NCC, who have confirmed they have no objection to the current designs and further technical audits and consider all matters can be resolved at detail design stage, as confirmed in the Supplementary SoCG [CD19]. It remains the case that the mitigation proposals are effective as a solution but may evolve through the section 278 process in conjunction with the highway authority.

1.16.6 Nonetheless, in para 4.78, Mr Birch expresses concern at lane widths and in para 4.80 – 4.83 comments on the submitted swept path testing. I have studied his points carefully, and I fully accept that the designs include lanes of typically 3.25m wide and 3.00m on the northern overbridges at both QE and Brackmills. I can confirm these are fully acceptable lane widths, based on advice given in TD16/07 - 7.24, which confirms a minimum lane width of 3.00m. In addition 3.00m lanes are currently observed on the southern overbridge to QE. I have inserted lane dimensions on the design drawings and these are contained in Appendix I. Furthermore, there is scope to create wider lanes if deemed necessary at ‘detained design stage’ through the full removal of the verge on the overbridges. This is not uncommon on local roads but would require traffic management to undertake bridge inspection and maintenance. In addition other lanes on the roundabouts can be widened if deemed necessary.

1.16.7 I therefore conclude there is nothing to suggest that the full delivery of the schemes cannot be achieved at detailed design stage and this view is shared by NCC. Furthermore, the Appellant has agreed a Planning Condition, which thus protects the Council from detail design not being accepted.

1.17 Compliance with Design Standard

1.17.1 In para 4.84 – 4.85, Mr Birch questions the level of technical sign off during the TA process and compliance with Design Standards.

1.17.2 Within my main PoE I have clearly outlined the detailed sign off process which the Appellant conducted with NCC and this is reflected in the SoCS [16] and the Supplementary SoCG [19] which covers the design work which comprised Technical Note 2 [86]. Additionally, NCC have confirmed their position directly to Mr Birch in their response to his email [CD 90]. Specifically, this states;

Mr Birch asked - Was the preliminary design of the mitigation measures proposed the Queen Eleanor and Brackmills Interchanges subject to a formal technical audit by NCC. If so, can NCC provide evidence of the audit process and outcome? If not, can you confirm why this was not required?
NCC Reply - NH only usually undertake formal technical audits as part of a S278 process, and do not enter into S278 agreements until such time that planning consent is granted, and detailed designs have been produced.

Mr Birch asked - Does the preliminary design of the mitigation measures proposed the Queen Eleanor and Brackmills Interchanges require any Departures from Standard? If so, can you confirm whether they have been approved, or are likely to be approved?

NCC Reply - This will be picked up at the technical approval stage, and if there are any, a formal process is in place to deal with this.

1.18 Wider Network Impact

1.18.1 Within 4.86 onwards, Mr Birch discusses the wider network impact. There are a number of observations I would like to make.

1.18.2 In para 4.89, Mr Birch questions the data used by HE to determine the Appellant’s contribution towards NGMS. I can confirm this was original based on 1200 units, but was updated by HE following the submission of the planning application and this is confirmed in their last letter to the Appellant dated 8th May 2013 [CD78].

1.18.3 In para 4.91, Mr Birch says only ramp metering will assist in managing exit blocking. The Appellant considers that the agreed Section 278 works at Caswell Road / Rhosili Road roundabout and the NGMS traffic signals at Pavilion Drive will also help manage exit blocking as both these measures will enhance the capacity of these junctions, as shown in Section 1.15 above.

1.18.4 Furthermore, there are a number of further solutions to resolving exit blocking on Pavilion Drive like implementing ‘registration plate parking control’ at Barclaycard instead of the current form of ‘entry barrier control’ which is observed to create congestion on Pavilion Drive. The Appellant raised this with Brackmills BID, who confirmed Barclaycard did not form part of the BID, but accepted the point and confirmed there are likely to be a number of operational solutions which could help traffic flow within Brackmills estate, though are not necessary in the context of the appeal scheme.

1.18.5 In para 4.95, Mr Birch confirms the benefits of ramp metering and the successful removal of exit blocking issues onto the A45. This view is shared by the Appellant and agreed.

1.18.6 In para 4.95, Mr Birch says ramp metering will not resolve exit blocking issues at Caswell Road or Pavilion Drive. However, the Appellant considers the agreed Section 278 works at Caswell Road /
Rhosili Road roundabout and the NGMS traffic signals at Pavilion Drive will resolve and manage exit blocking, as described in Section 1.15.

1.18.7 In para 4.97 – 4.98 discusses the deliverability of the NGMS, highlighting that ramp metering will not be brought forward in the immediate first phase. This point is accepted but ramp metering clearly forms part of the NGMS and QE and Brackmills are the highest priority for HE, as confirmed in their Position Statement [CD 80, 82]. However, the Appellant has presented evidence, which highlight ‘interim benefit’ arising from the Section 278 as outlined in the PoE para 5.9.8 – 5.9.11. These measures in conjunction with MOVA will still have a significant benefit to the network in the opening year and complemented by ramp metering soon after.

1.18.8 I therefore conclude that the wider impacts are mitigated through the agreed combination of measures.
2 Conclusions

2.1.1 I am firmly of the opinion that the transport impacts of the development have been demonstrated not to be severe. They identified impacts will be mitigated by the extensive package of transport improvements and the TA is based on reasonable and robust assumptions and is thus fit for purpose. The mitigation works are phased to ensure that impacts are managed from first occupation and the early delivery of Section 278 will actually have a significant capacity benefit to the network, known as ‘interim benefit’. This conclusion is shared by NCC, who have fully agreed the TA.

2.1.2 Consequently, there is in my view no reason within the scope of my evidence why planning permission should be refused on transport grounds.

Statement of Truth

It is my professional duty to assist in this Appeal on matters within my expertise, and that duty overrides any obligations to the Appellant on whose behalf I have been retained. I confirm that I have discharged this duty, and that I believe that the facts I have stated in this Statement are true, and the opinions I have expressed are correct.

Signed

[Signature]

Dated

9th June 2015

END
Figures
Figure 3 - Schematic showing NGMS / Section 278 Works at QE Interchange

KEY

- NGMS Ramp Metering
- NGMS MOVA signal
- Sec 278 New traffic lane
- Sec 278 Flare extension to existing land
Figure 4 - Schematic showing NGMS / Section 278 Works at Brackmills Interchange

KEY

- NGMS Ramp Metering
- NGMS MOVA signal
- Sec 278 New traffic lane
- Sec 278 Flare extension to existing lane