

DRAFT Technical Note: 04
Additional Junction Capacity Assessments

1.0 Introduction

1.1 This Technical Note (TN04) has been prepared by BSP Consulting in response to planning consultation comments received from Nottinghamshire County Council (NCC). It also takes account of a subsequent meeting and correspondence with NCC and the Highways Agency (HA).

1.2 All of the traffic impact assessment work in the original Transport Assessment (and in subsequent work to date) considers a residential development of up to 500 dwellings at Field Farm. However, the outline planning application is for up to 450 dwellings, and therefore all of the trip generation figures and traffic impact assessment results are very robust.

1.3 The following junctions are considered further below:

- A6007 Ilkeston Road/Trowell Road/B6003 Pasture Road (Mini Roundabout)
- A6007 Ilkeston Road/Coventry Lane/Hickings Lane (Double Mini Roundabout)
- B5010 Derby Rd/Nottingham Rd/B6003 Toton Lane/Church St (Stapleford)
- A6002 Coventry Lane/A609 Nottingham Rd/Wollaton Vale (Balloon Woods)
- A52/A6007 Ilkeston Rd/Derby Rd/Town St (Bramcote Island)

2.0 A6007 Ilkeston Road / Trowell Road / B6003 Pasture Road (Mini Roundabout)

2.1 NCC requested that mitigation measures to widen the Trowell Road approach should be investigated, as the development appears to have a detrimental effect on the Trowell Road approach to the junction.

2.2 We have designed junction improvements with widening on the Trowell Road approach and modelled the ‘with development’ scenario with these improvements in place. The proposed amendments are illustrated on Drawing 10172/011 in Appendix A. The results are provided below, with the results for the existing junction layout also provided for comparison. The full ARCADY results are also in Appendix A.

Table 1: ARCADY Results – Trowell Road/Ilkeston Road/Pasture Road Junction

Arm	2026 Ref Case				2026 With Development				2026 With Development & Junction Improvements			
	AM		PM		AM		PM		AM		PM	
	Max RFC	Max Q	Max RFC	Max Q	Max RFC	Max Q	Max RFC	Max Q	Max RFC	Max Q	Max RFC	Max Q
Trowell Rd	1.27	110	0.91	9	1.28	115	0.99	17	0.96	14	0.74	3
Ilkeston Rd	0.63	2	1.33	118	0.74	3	1.16	55	0.78	4	1.17	58
Pasture Rd	0.64	2	0.69	2	0.64	2	0.78	4	0.64	2	0.78	4

- 2.3 The junction is shown to already be over capacity in the 2026 ‘reference case’ scenario. Trowell Road is over capacity in both the AM and PM peak hours, and Ilkeston Road is over capacity in the PM peak hour only. Where the RFC values are over 1, the queue length becomes unreliable. The worst queues occur on the arms which the model was shown to overestimate in the validation exercise, e.g. Trowell Road in the AM peak hour and Ilkeston Road in the PM peak hour
- 2.4 The results show that with the proposed junction improvements, the RFC values and max queue lengths for Trowell Road reduce to below the ‘reference case’ with the existing layout. This is most dramatically evident in the critical AM peak hour, and the arm is shown to have spare capacity in the PM peak hour. There are slight increases in RFC values in the AM peak hour on Ilkeston Road and the PM peak hour on Pasture Road, but these are still below the capacity threshold with increases in queues of just 2 PCUs. There is no change to Pasture Road during the AM peak hour, and there is still a significant improvement from the ‘reference case’ on Ilkeston Road during the PM peak hour.
- 2.5 Therefore, the proposed junction improvements are considered to mitigate the impact of the development traffic on Trowell Road and make general improvements to the operation of the junction as a whole.

3.0 A6007 Ilkeston Road/Coventry Lane/Hickings Lane (Double Mini Roundabout)

- 3.1 BSP Consulting has proposed a set of mitigation measures which was adjusted following comments from NCC, and has been adjusted further following additional comments from NCC on the layout and modelling settings. The ‘reference case’ and ‘with development’ scenario results using the existing layout, and two potential improvement schemes are provided below. The proposed amendments are illustrated on Drawings 10172/006 Revision C and D, in Appendix B. The full ARCADY results are also in Appendix B.

Table 2: ARCADY Results – Ilkeston Rd/Coventry Ln/Hickings Ln + Improvements

2026 – Ref Case		AM		PM	
		RFC	Queue (PCU)	RFC	Queue (PCU)
Coventry Lane	Ilkeston Road W	1.00	17	0.78	3.54
	Coventry Lane	0.74	2.72	1.26	206.58
	Ilkeston Road E	0.66	1.91	0.76	3.11
Hickings Lane	Ilkeston Road W	1.52	237.98	0.45	0.81
	Ilkeston Road E	0.61	1.58	0.9	7.85
	Hickings Lane	1.31	108.63	0.8	3.79

Table 2: ARCADY Results – Ilkeston Rd/Coventry Ln/Hickings Ln + Improvements (continued)

2026 – With Dev		AM		PM	
		RFC	Queue (PCU)	RFC	Queue (PCU)
Coventry Lane	Ilkeston Road W	1	17	0.78	3.41
	Coventry Lane	0.76	3.01	1.33	229.58
	Ilkeston Road E	0.66	1.91	1.04	36.31
Hickings Lane	Ilkeston Road W	1.87	421.37	0.46	0.85
	Ilkeston Road E	0.63	1.67	0.92	8
	Hickings Lane	1.35	111.28	0.78	3.45
2026 – With Dev Improvements at Hickings Lane Roundabout Only		AM		PM	
		RFC	Queue (PCU)	RFC	Queue (PCU)
Coventry Lane	Ilkeston Road W	1	17	0.77	3.57
	Coventry Lane	0.76	3.28	1.49	303.89
	Ilkeston Road E	0.66	2.1	1.12	90.45
Hickings Lane	Ilkeston Road W	1.71	383.84	0.28	0.39
	Ilkeston Road E	0.68	2.11	0.92	8
	Hickings Lane	1.53	154.13	0.63	1.66
2026 – With Dev Improvements at Hickings Lane & Coventry Lane Roundabouts		AM		PM	
		RFC	Queue (PCU)	RFC	Queue (PCU)
Coventry Lane	Ilkeston Road W	1	17	0.76	3.5
	Coventry Lane	0.58	1.5	1.27	205.37
	Ilkeston Road E	0.75	3.27	1.26	178.1
Hickings Lane	Ilkeston Road W	1.77	403.37	0.28	0.39
	Ilkeston Road E	0.68	2.1	0.92	8
	Hickings Lane	1.59	163.29	0.63	1.66

3.2 The proposed improvements at the Hickings Lane roundabout only, reduce potential queuing towards the site on Ilkeston Road W in the AM peak hour, and reduces the PM peak hour to below the ‘reference case’. There are no other negative effects in the AM peak hour, except for Hickings Lane. In the PM peak hour the RFC and max queue length increases on Coventry Lane and Ilkeston Road E at the Coventry Lane roundabout, however there is a positive effect on the Ilkeston Road W and Hickings Lane arms of the Hickings Lane roundabout.

3.3 The original improvements to both junctions, following the tweaks to the layout following the latest comments from NCC, have also been tested. The amendments to the layout show less of an improvement at the Hickings Lane roundabout (although still a considerable improvement), and an improvement at the Coventry Lane junction, with the exception of Ilkeston Road E arm.

4.0 B5010 Derby Rd/Nottingham Rd/B6003 Toton Lane/Church St (Stapleford)

- 4.1 The LinSig models use the ‘ref case’ and ‘with development’ scenarios traffic flows provided by MVA from the GNMMTM for these scenarios. The provided flows had zero values for movements between Church Street and Nottingham Road. It is acknowledged that the 2012 count shows some (minor) traffic movements. (Please see the GNMMTM traffic flows and the 2012 traffic count for this junction in Appendix C).
- 4.2 BSP queried the values for the movements identified with MVA, who confirmed that there is no error in the turning flows on the plans they have provided. They have stated that “the model does not fully replicate actual turning movements and where flows are low zero figures can occur due to the assumed routing of traffic or the locations of zone connectors onto the network. This is unfortunately the nature of a strategic modelling package.” The method of using the GNMMTM traffic flows has been previously agreed.
- 4.3 NCC commented that the saturation flow of Church Street approach is affected by right turners blocking in the AM peak, and that this should be reflected in the model. However, the right-turn has been modelled as blocking the unopposed traffic in the model. Reducing the saturation flow from the value used would not significantly increase the queue predicted by LinSig. For example, a significant reduction from 1923 pcu/hr to say, 1600 pcu/hr only increases the queue from 7.5 to 8.2 pcus. The reason being that this approach is predicted to be well within capacity. However, the predicted queue of 7.5 pcus by LinSig and average of 11.7 in the queue survey is not considered unreasonable. It should be noted that one queue length was noted in the survey for each 5 minute interval. It is likely that the surveyor recorded the longest queue within the 5 minute period. As LinSig takes an average for every cycle, one would expect the queue length in Linsig to be lower than observed in most cases.
- 4.4 Therefore, the overall conclusion from Technical Note 03 is maintained, in that mitigation measures are not considered necessary at this junction as a result of the proposed development.

5.0 A6002 Coventry Lane/A609 Nottingham Rd/Wollaton Vale (Balloon Woods)

- 5.1 The LinSig models use the ‘ref case’ and ‘with development’ scenarios traffic flows provided by MVA from the GNMMTM for these scenarios. The provided flows had zero values for movements between Trowell Road and Bilborough Road in the ‘reference case’ and ‘with development’ scenarios. It is acknowledged that the 2012 count shows some (minor) traffic movements. (Please see the GNMMTM traffic flows and the 2012 traffic count for this junction in Appendix D).
- 5.2 BSP queried the values for the movements identified with MVA, who confirmed that there is no error in the turning flows on the plans they have provided. They have

stated that “the model does not fully replicate actual turning movements and where flows are low zero figures can occur due to the assumed routing of traffic or the locations of zone connectors onto the network. This is unfortunately the nature of a strategic modelling package.” The method of using the GNMMTM traffic flows has been previously agreed.

- 5.3 NCC requested that the reason for adjusting the limit structure of Trowell Road between the Reference case and the Mitigation case should be developed. The proposed mitigation measures lengthen the left turn from Trowell Road, but this flow is reduced (from 353 to 345) in the Development scenario. The lane structure was changed on Trowell Road due to the proposed changes to the layout. Originally, we modelled the existing layout with a similar layout to the mitigation layout. However, when running the model, the results did not tie up with the queue survey. On closer inspection, the reason for this is that due to the flow volumes / distributions on Trowell Road, it is likely that the nearside and middle lanes act as long lanes, despite the road markings. This is also probably likely due to the gradual taper on the nearside from 2 to 3 lanes. Once modelled to how we felt traffic would use the approach, the Surveyed Flow scenario results tied up well with the provided queue survey. In the mitigation layout, it was no longer reasonable to make the same assumption. Not only has the flare length been increased, but more importantly there is a short distance where the approach becomes 3 lanes from 2 (unlike the gradual taper), and so the nearside lane should act as the short lane.
- 5.4 Therefore it is still proposed to amend the junction layout as set out in Technical Note 03. These improvements have a slight benefit to the total delay in the AM peak hour, and are shown to have operational benefits beyond the reference case scenario in the PM peak hour. In the PM peak hour, the PRC, total delay, maximum degree of saturation and queue length are all improved with the mitigation measures in place, to give better results than the reference case scenario with no amendments. Therefore, the proposals are considered to go slightly beyond mitigating the impact of the development.

6.0 A52 / A6007 Ilkeston Rd /Derby Rd /Town St (Bramcote Island)

- 6.1 At our meeting on the 20th July 2012, we discussed that the proposed development traffic has an insignificant impact on the A52/A6007 Ilkeston Rd/Derby Rd/Town St (Bramcote Island), and that no physical improvements would be required as a result of the development proposals. It is anticipated that the operation of the junction may benefit from a review of the MOVA settings prior to the 2026 ‘reference case’ scenario. This will be completed as part of the ongoing programme of maintenance and hence we do not feel that any further modelling work is required at this junction.

7.0 Conclusions

- 7.1 The proposed junction improvements at the Ilkeston Road/Trowell Road/Pasture Road mini roundabout are considered to mitigate the impact of the development traffic on Trowell Road and make general improvements to the operation of the junction.
- 7.2 The two options for junction improvements at the Ilkeston Road/Coventry Lane/Hickings Lane double mini roundabout have varying effects on the arms of the junction. Neither of these options completely mitigates the impact of the development traffic back to the reference case scenario, however, as improvements at the Ilkeston Road/Trowell Road/Pasture Road mini roundabout and the A6002 Coventry Lane/A609 Nottingham Rd/Wollaton Vale (Balloon Woods) signal junction generally provide mitigation beyond the reference case, it is considered that the overall mitigation strategy is acceptable.
- 7.3 It is maintained that no improvements are considered necessary at the B5010 Derby Rd/Nottingham Rd/B6003 Toton Lane/Church St junction in Stapleford as a result of the proposed development.
- 7.4 It is still proposed to amend the layout of the A6002 Coventry Lane/A609 Nottingham Rd/Wollaton Vale (Balloon Woods) junction as set out in Technical Note 03. These improvements have a slight benefit to the total delay in the AM peak hour, and are shown to have operational benefits beyond the reference case scenario in the PM peak hour. Therefore, the proposals are considered to go slightly beyond mitigating the impact of the development.
- 7.5 At our meeting on the 20th July 2012, we discussed that the proposed development traffic has an insignificant impact on the A52/A6007 Ilkeston Rd/Derby Rd/Town St (Bramcote Island), and that no physical improvements would be required as a result of the development proposals. It is anticipated that the operation of the junction may benefit from a review of the MOVA settings prior to the 2026 ‘reference case’ scenario. This will be completed as part of the ongoing programme of maintenance and hence we do not feel that any further modelling work is required at this junction.
- 7.6 All of the traffic impact assessment work considers a residential development of up to 500 dwellings at Field Farm. However, the outline planning application is for up to 450 dwellings, and therefore all of the trip generation figures and traffic impact assessment results are very robust.
- 7.7 In conclusion, the overall package of mitigation measures at the junctions set out above is considered to be acceptable.

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Enc.

Appendix A Drawing 10172/011 & ARCADY Results – Ilkeston Rd / Trowell Rd / Pasture Rd

Appendix B Drawings 10172/006 Rev C + D & ARCADY Results – Hickings Ln / Cov Ln

Appendix C GNMMTM Traffic Flows & 2012 Traffic Count – Stapleford

Appendix D GNMMTM Traffic Flows & 2012 Traffic Count – Balloon Woods