

Appendix 64

HTp/1107/TN/22 – Impact Summary

Highgate*Transportation*

**Land at Peel Hall, Warrington
Technical Note – Impact Summary**

(HTp/1107/TN/22)

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Appendices

Appendix 1	AECOM Technical Note 'SATURN Modelling Results' Appendix A
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1.0 Introduction

- 1.1 This Technical Note has been prepared by Highgate Transportation Limited to summarise the traffic impact results on the junctions in Warrington within the Peel Hall SATURN model, using the data arising from the AECOM SATURN modelling report.
- 1.2 The SATURN data is summarised in AECOM Technical Note 'SATURN Modelling Results' dated 22 September 2017; the Appendix of which is contained in **Appendix 1** to this report for ease of reference. The junction locations are illustrated on the summary sheets.
- 1.3 The scenarios that have been modelled are as follows:
 - i. Base 2015 – this is calibrated from existing traffic count and journey time data.
 - ii. 'Do Minimum' 2025 – this is the base traffic growthed to a future year of 2025, plus committed development traffic.
 - iii. 'Do Something' 2025 – this is the Do Minimum 2025 scenario plus the Peel Hall development flows for a part build-out scenario of 600 dwellings and no internal vehicular link for car traffic between the majority of the residential areas and the local centre.
 - iv. 'Do Minimum' 2030 – this is the base traffic growthed to a future year of 2030, plus committed development traffic.
 - v. 'Do Something' 2030 – this is the Do Minimum 2030 scenario plus full build-out of the Peel Hall development, with an internal link to the local centre, but no through-route for general traffic across the site.
 - vi. 'Through-Route' 2030 - this is the Do Minimum 2030 scenario plus full build-out of the Peel Hall development, with a fully open through-route for general traffic between the A49 (a new signalised junction is proposed) in the west and the proposed site access roundabout junction with Mill Lane to the east of the site.
- 1.4 The 2025 'Do Minimum' has been compared with the 2025 'Do Something' results to identify what mitigation, if any, on the local highway network may be required in the interim build-out years.
- 1.5 The 2030 'Do Minimum' scenario has been compared against the 2030 'Do Something' and the 2030 'Through-Route' scenarios; to again identify what mitigation may be required on the local highway network as a result of the Peel Hall development.
- 1.6 The following is a list of the junctions in the SATURN model:
 - Junction 1 – Winwick Link Road/Newton Road/A49
 - Junction 2 – A49/Delph Lane Retail Park
 - Junction 3 – M62 Junction 9
 - Junction 4 – Cromwell Avenue/Calver Road
 - Junction 5 – A49/Sandy Lane West
 - Junction 6 – A49/A50
 - Junction 7 – A50/Hallfields Road
 - Junction 8 – Blackbrook Avenue/Insall Road/Hilden Road
 - Junction 9 – A574 Birchwood Way/A50 Oreford Road

Junction 10 – A49/Birch Avenue
Junction 11 – Cotswold Road/Through-Route Alignment
Junction 12 – Cleveland Road/Poplars Avenue
Junction 13 – Howson Road/Poplars Avenue
Junction 14 – Statham Avenue/Poplars Avenue
Junction 15 – A50 Orford Green/Poplars Avenue
Junction 16 – Sandy Lane/Northway
Junction 17 – A50/Northway
Junction 18 – Sandy Lane West/Cotswold Road/Cleveland Road/Sandy Lane
Junction 19 – Cromwell Avenue/Europa Boulevard/Callands Road
Junction 20 – Capesthorpe Road/Poplars Avenue
Junction 21 – A50 Orford Green/Hilden Road/A50 Orford Road
Junction 22 – Ballater Drive/Mill Lane/Enfield Park Road/Blackbrook Avenue
Junction 23 – Capesthorpe Road/Blackbrook Avenue/Enfield Park Road
Junction 24 – Birchwood Way/Blackbrook Avenue
Junction 25 – Enfield Park Road/Crab Lane
Junction 26 – Birchwood Way/Crab Lane/Woolston Grange Avenue
Junction 27 – Birchwood Way/Oakwood Gate
Junction PH1 – Peel Hall employment site access priority junction with Cotswold Road and Poplars Avenue
Junction PH2 – Peel Hall site access ghost right turn priority junction with Poplars Avenue
Junction PH3 – Windermere Avenue priority junction with Poplars Avenue (sports club and community use site access off Grasmere Avenue)
Junction PH4 – Mill Lane priority junction with Delph Lane (residential site access off Mill Lane)
Junction PH5 – Peel Hall site access roundabout junction with Mill Lane
Junction PH6 – Peel Hall Through-Route A49/Poplars Avenue signalised junction

- 1.7 As set out in the AECOM Technical note, the results of the SATURN modelling are presented as Volume over Capacity (%) and Queues. Links with a VoC of below 85% are considered to be operating within capacity, with an additional 15% of reserve capacity to deal with any increases in traffic flows.
- 1.8 Usually, a significant impact is considered as an increase of 10% or more on a junction operating at 90% or above. The significance of impact on queue lengths is generally dependent on the available stacking capacity of that link.
- 1.9 A list of the junctions that show VoC of over 85% in the Base 2015 SATURN model are as follows:

Junction 1 - Winwick Link Road/Newton Road/A49
Junction 2 - A49/Delph Lane Retail Park
Junction 3 - M62 Junction 9
Junction 6 - A49/A50
Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road
Junction 27 - Birchwood Way/Oakwood Gate

- 1.10 A list of the junctions that show VoC of over 85% in the Do Minimum 2025 SATURN model are as follows (the highlighted junctions are in addition to those junctions operating at or over capacity in the base year of 2015):

Junction 1 - Winwick Link Road/Newton Road/A49

Junction 2 - A49/Delph Lane Retail Park

Junction 3 - M62 Junction 9

Junction 4 - Cromwell Avenue/Calver Road

Junction 5 - A49/Sandy Lane West

Junction 6 - A49/A50

Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road

Junction 15 - A50 Orford Green/Poplars Avenue

Junction 24 - Birchwood Way/Blackbrook Avenue

Junction 26 - Birchwood Way/Crab Lane/Woolston Grange Avenue

Junction 27 - Birchwood Way/Oakwood Gate

- 1.11 A list of the junctions that show VoC of over 85% in the Do Minimum 2030 SATURN Model are as follows:

Junction 1 - Winwick Link Road/Newton Road/A49

Junction 2 - A49/Delph Lane Retail Park

Junction 3 - M62 Junction 9

Junction 4 - Cromwell Avenue/Calver Road

Junction 5 - A49/Sandy Lane West

Junction 6 - A49/A50

Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road

Junction 24 - Birchwood Way/Blackbrook Avenue

Junction 26 - Birchwood Way/Crab Lane/Woolston Grange Avenue

Junction 27 - Birchwood Way/Oakwood Gate

- 1.12 It is noted that Junction 15 (A50 Orford Green/Poplars Avenue) has dropped out of this list shown in **paragraph 1.11**, this is due to the change in the proportion of traffic flows across the arms resulting in the junction working more efficiently.
- 1.13 Junctions 1, 2, 4 and 26 show very minor (or no) increase from the 'Do Minimum' scenarios in 2025 and 2030 and therefore, whilst these junctions may be approaching operational capacity, the development does not impact them significantly. It is not for this development to mitigate for existing deficiencies on the local highway network.
- 1.14 This report provides a summary of the SATURN results by providing a direct tabulated comparison of the 'Do Minimum' and 'Do Something' results, thereby highlighting the junctions to be modelled on an individual basis with PICADY, ARCADY (Junctions 9) and Linsig software.

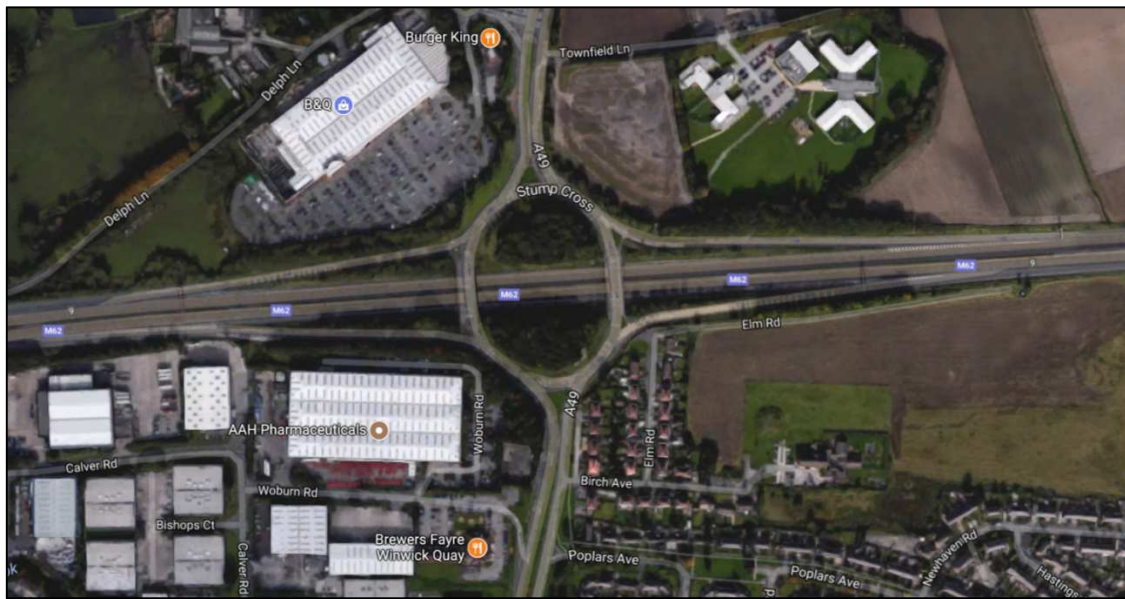
2.0 2025 Junction Summary Results

2.1 The following Section is a summary of the 2025 'Do Minimum' and 'Do Something' SATURN modelling results, where a VoC of above 85% is shown and exceeds that in the base and 'Do Minimum' scenarios.

Junction 3, M62 Junction 9

2.2 The M62 Junction 9 with the A49 Winwick Road is located to the north western corner of the Peel Hall site.

Figure 2.1 – M62 Junction 9 Google Map Extract



(Accessed 20/09/17)

Table 2.1 – M62 Junction 9 Saturn Results

Arm	2025			
	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. M62 Ebd Off Slip	97	21	98	21
B. A49 N	109	71	109	71
C. M62 Wbd Off Slip	71	4	72	4
D. A49 S	91	15	93	18
PM				
A. M62 Ebd Off Slip	135	78	117	89
B. A49 N	106	49	107	52
C. M62 Wbd Off Slip	50	2	51	2
D. A49 S	101	109	106	143

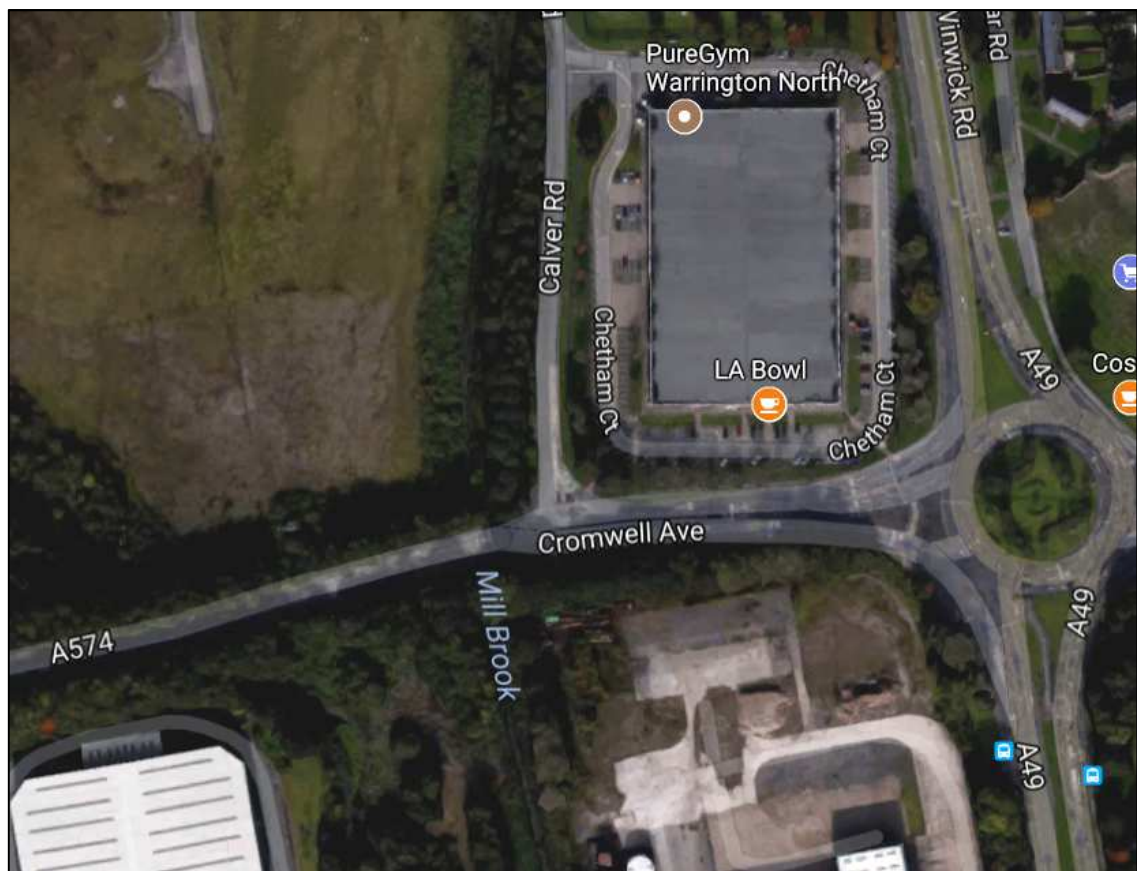
2.3 It can be seen from the above results that there is not a significant impact of the 'Do Something' above the 'Do Minimum' results.

- 2.4 Furthermore, it should be noted that when a junction starts to operate at or exceed its design capacity, longer delays and queues start to form. However, the model is unable to accurately reflect what may occur on site in practice and therefore once a capacity of 1.0 is exceed caution should be taken when reviewing the corresponding queue lengths.

Junction 4, Cromwell Avenue/Calver Road

- 2.5 The Cromwell Avenue junction with Calver Road is located to the south west of the Peel Hall site.

Figure 2.2 – Cromwell Avenue/Calver Road Google Map Extract



(Accessed 20/09/17)

Table 2.2 – Cromwell Avenue/Calver Road Saturn Results

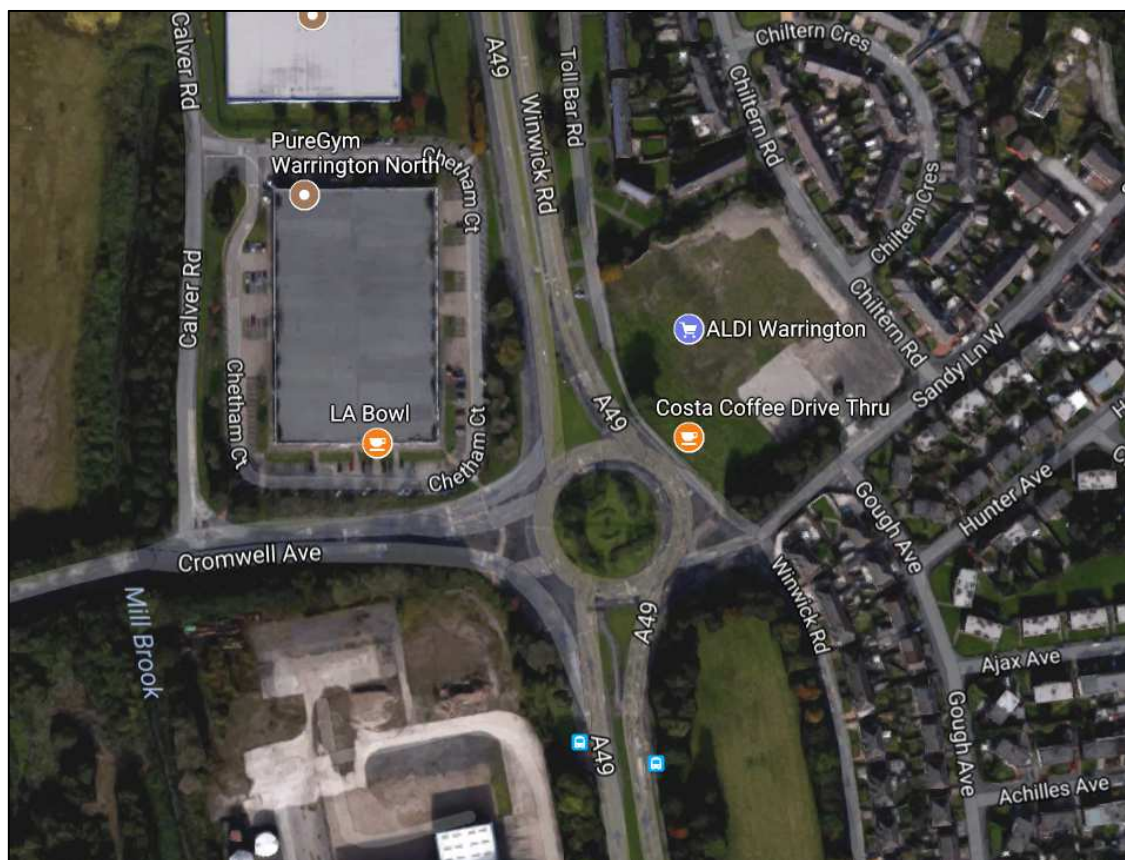
Arm	2025			
	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Cromwell Ave W	86	6	90	6
B. Calver Road	60	2	60	2
C. Cromwell Ave E	36	1	37	1
PM				
A. Cromwell Ave W	59	3	60	4
B. Calver Road	78	2	78	2
C. Cromwell Ave E	55	1	56	1

- 2.6 It can be seen from the above that there is not a significant impact of the 'Do Something' above the 'Do Minimum' results, with a queue of only six vehicles on the Cromwell Avenue West arm. It is considered that this junction does not require further testing for this future year of 2025.
- 2.7 Furthermore it can be noted from the SATURN results in **Appendix A** that there are no capacity issues shown in the model for the future year of 2030.

Junction 5, A49/Sandy Lane West

- 2.8 The A49 signalised roundabout junction with Sandy Lane West is to the immediate southwest of the Peel Hall site.

Figure 2.3 – A49/Sandy Lane West Google Map Extract



(Accessed 20/09/17)

Table 2.3 – A49/Sandy Lane West Saturn Results

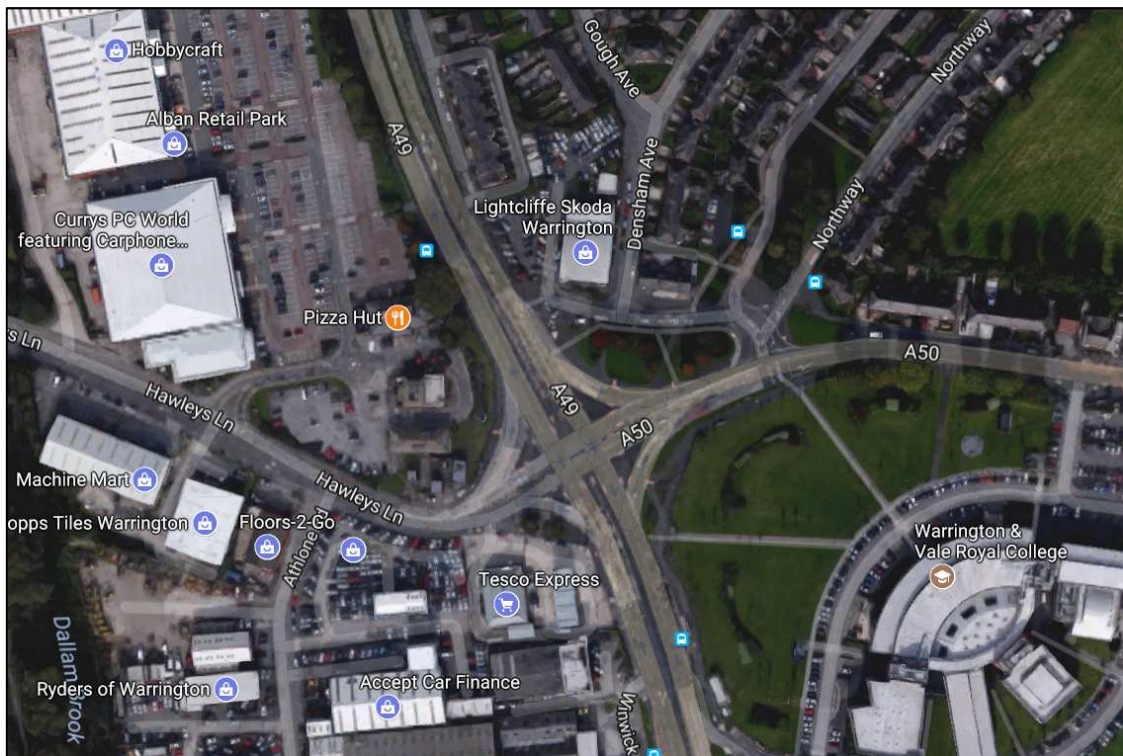
Arm	2025			
	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Cromwell Ave W	74	16	76	39
B. A49 N	92	96	94	93
C. Sandy Lane W	40	2	49	3
D. A49 S	30	0	31	0
PM				
A. Cromwell Ave W	43	5	44	5
B. A49 N	90	10	91	10
C. Sandy Lane W	80	4	97	6
D. A49 S	45	0	45	0

- 2.9 It can be seen from the above results that there is generally not a significant impact of the 'Do Something' above the 'Do Minimum' results. However, the Sandy Lane West arm is shown to be experiencing an increase in VoC of 17% in the PM peak hour and therefore it is considered that this junction should be modelled.

Junction 6 – A49/A50

- 2.10 The A49 signalised four-arm junction with the A50 is located to the southwest of the site, towards the city centre.

Figure 2.4 – A49/A50 Google Map Extract



(Accessed 20/09/17)

Table 2.4 – A49/A50 Saturn Results

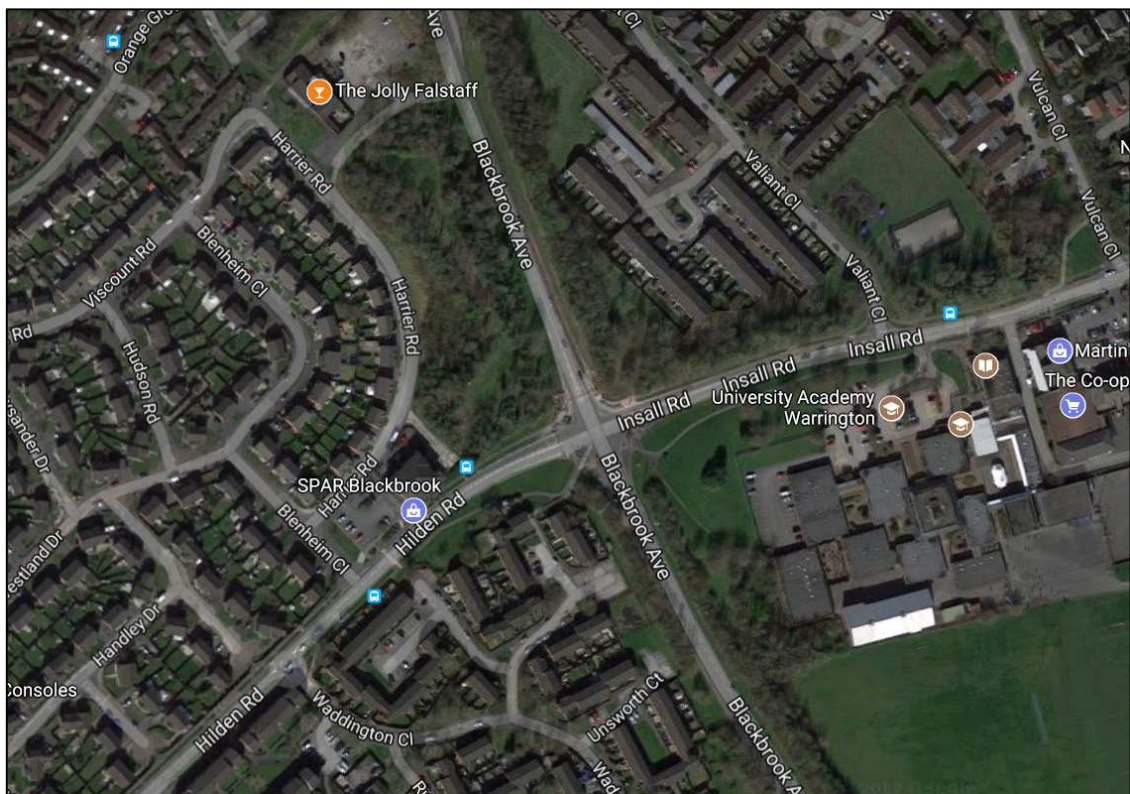
2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Hawleys Lane	20	2	20	2
B. A49 N	100	84	100	90
C. A50	82	8	83	9
D. A49 S	78	21	81	22
PM				
A. Hawleys Lane	36	4	36	4
B. A49 N	67	13	69	14
C. A50	50	5	51	5
D. A49 S	105	65	106	80

- 2.11 It can be seen from the above results that there is not a significant impact of the 'Do Something' above the 'Do Minimum' results. Therefore no detailed modelling is required.

Junction 8, Blackbrook Avenue/Insall Road/Hilden Road

- 2.12 The Blackbrook Avenue signalised junction with Insall and Hilden Road is located to the southeast of the Peel Hall site.

Figure 2.5 – Blackbrook Avenue/Insall Road/Hilden Road Google Map Extract



(Accessed 20/09/17)

Table 2.5 – Blackbrook Avenue/Insall Road/Hilden Road Saturn Results

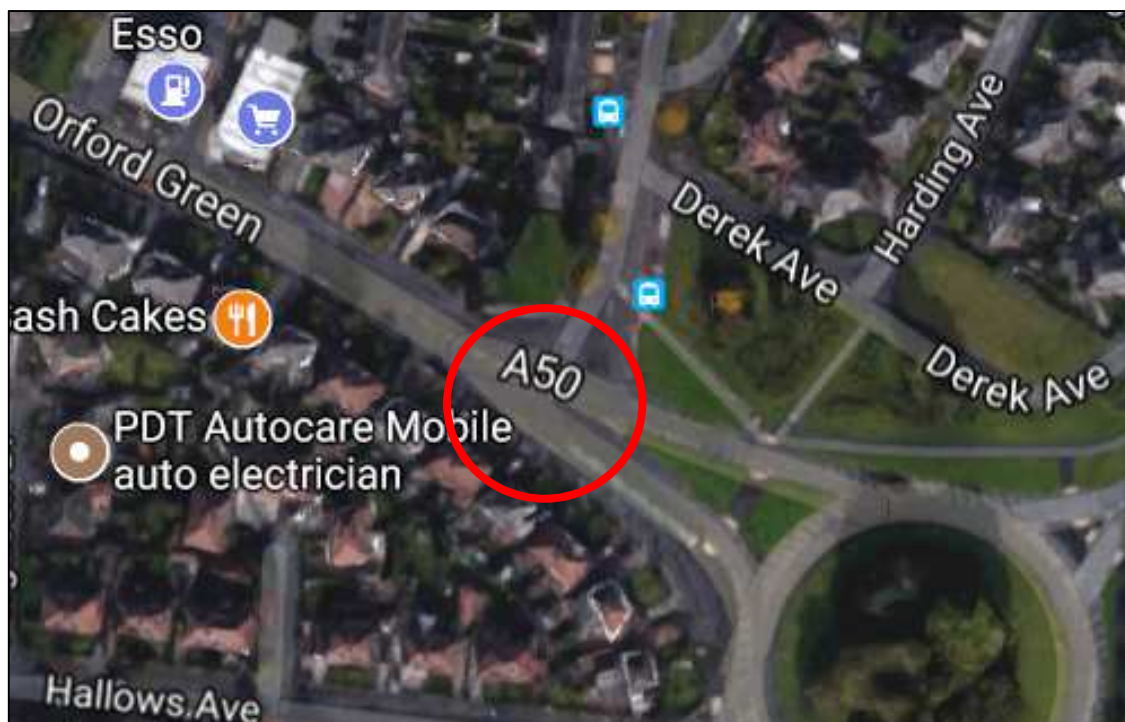
2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Hilden Road	46	3	52	0
B. Blackbrook Ave N	86	6	99	1
C. Insall Road	73	5	80	0
D. Blackbrook Ave S	92	5	93	0
PM				
A. Hilden Road	83	5	91	5
B. Blackbrook Ave N	72	5	85	6
C. Insall Road	100	4	103	8
D. Blackbrook Ave S	72	5	82	5

- 2.13 In the AM peak hour both arms B and D are operating at capacity; albeit that arm D is not a significant increase over the 'Do Minimum' scenario with the Peel Hall development traffic added on.
- 2.14 Arm A and arm C are shown to be operating at or above capacity in the PM peak hour. Therefore further detailed modelling will be carried out for this junction.

Junction 15, A50 Orford Green/Poplars Avenue

- 2.15 The A50 Orford Green junction with Poplars Avenue is located to the south of the site, as shown in **Figure 2.5** below (depicted by red circle).

Figure 2.6 – A50 Orford Green/Poplars Avenue Google Map Extract



(Accessed 20/09/17)

Table 2.6 – A50 Orford Green/Poplars Avenue Saturn Results

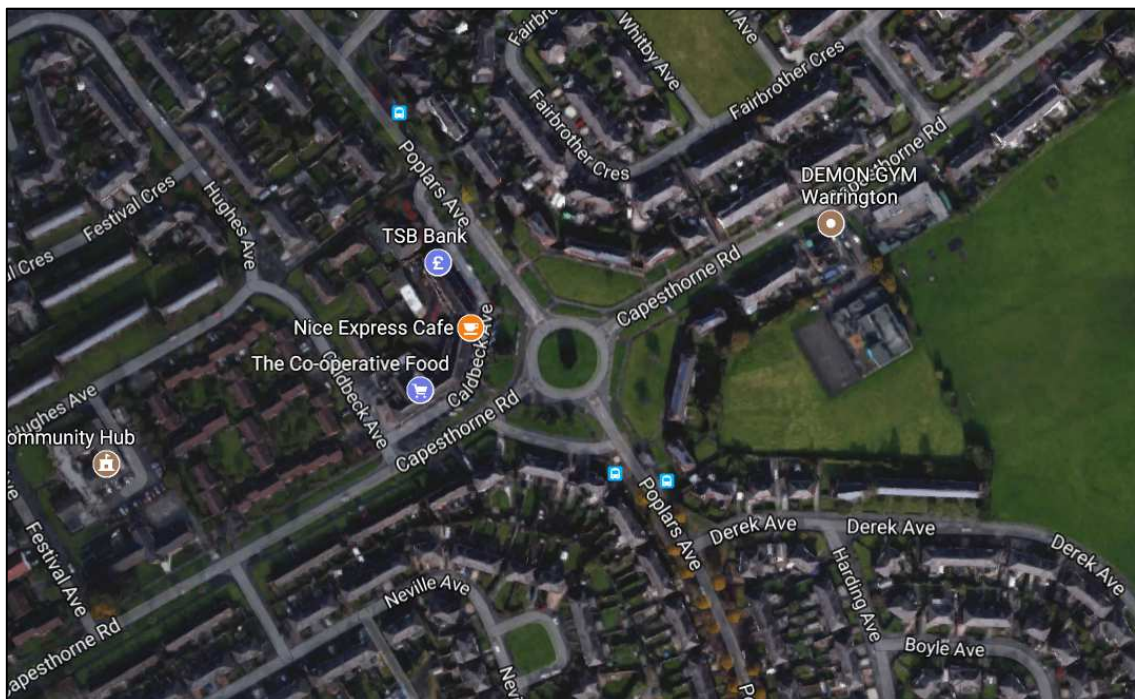
2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. A50 W	22	0	23	0
B. Poplars Avenue	97	3	103	15
C. A50 E	70	1	84	1
PM				
A. A50 W	42	0	41	0
B. Poplars Avenue	47	0	67	1
C. A50 E	73	0	101	5

- 2.16 Arm B is shown to be operating at a slight increase in capacity in the AM peak hour, with arm C operating just over capacity in the PM peak hour. Therefore it is considered that more detailed modelling of this junction should be carried out.

Junction 20, Capesthorne Road/Poplars Avenue

- 2.17 The Capesthorne Road roundabout junction with poplars Avenue is located to the immediate south of the Peel Hall site.

Figure 2.7 – Capesthorne Road/Poplars Avenue Google Map Extract



(Accessed 20/09/17)

Table 2.7 – Capesthorpe Road/Poplars Avenue Saturn Results

2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Poplars Ave N	52	0	66	0
B. Capesthorpe Road E	59	0	69	0
C. Poplars Ave S	28	0	38	0
D. Capesthorpe Road W	28	0	31	0
PM				
A. Poplars Ave N	35	0	47	0
B. Capesthorpe Road E	73	0	60	0
C. Poplars Ave S	58	0	100	6
D. Capesthorpe Road W	35	0	87	2

- 2.18 The junction is generally shown to be operating within capacity apart from in the PM peak hour in the 'Do Something' scenario on arms C and D. Therefore it is considered that further detailed modelling should be carried out.

Junction 24, Birchwood Way/Blackbrook Avenue

- 2.19 The Birchwood Way roundabout junction with Blackbrook Avenue is located to the southeast of the Peel Hall site.

Figure 2.8 – Birchwood Way/Blackbrook Avenue Google Map Extract



(Accessed 20/09/17)

Table 2.8 – Birchwood Way/Blackbrook Avenue Saturn Results

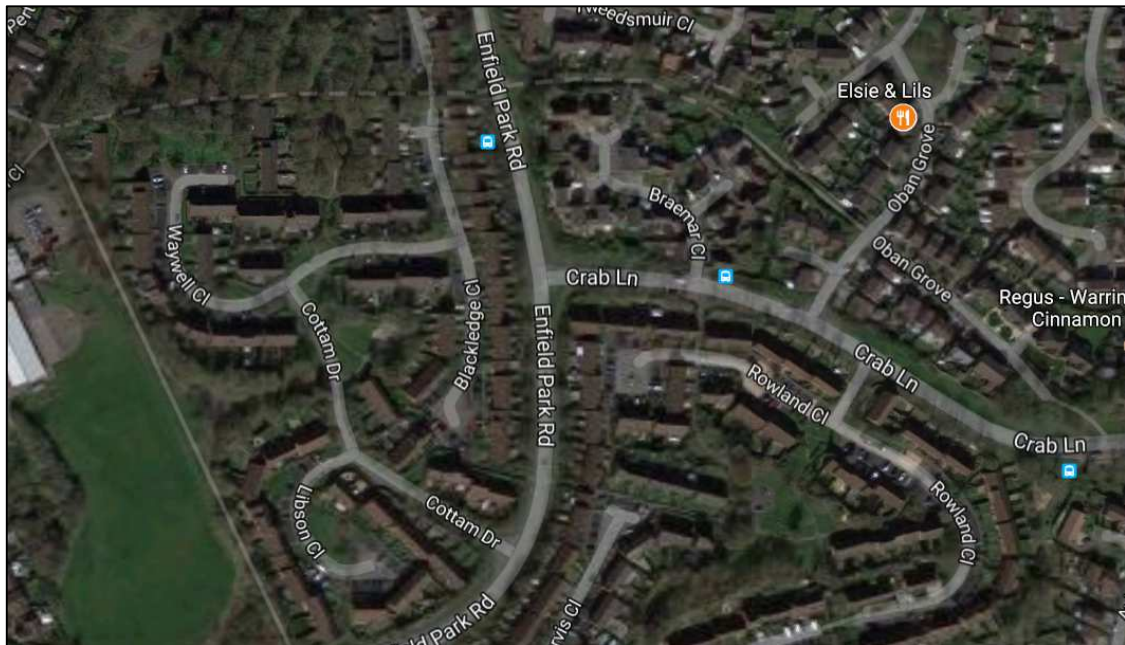
Arm	2025			
	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Birchwood Way W	77	1	76	1
B. Blackbrook Ave N	90	3	97	5
C. Birchwood Way E	58	2	92	3
D. Blackbrook Ave S	69	1	72	1
PM				
A. Birchwood Way W	79	1	89	2
B. Blackbrook Ave N	73	1	92	4
C. Birchwood Way E	109	18	106	33
D. Blackbrook Ave S	78	1	83	1

- 2.20 This junction is shown to operate at capacity in both the 'Do Minimum' and 'Do Something' scenarios, with arm B and C in the AM peak hour and arms A, B and C in the PM peak hour. Therefore it is considered that further detailed modelling should be carried out for this junction.

Junction 25, Enfield Park Road/Crab Lane

- 2.21 The Enfield Park Road priority junction with Crab Lane is located to the east of the Peel Hall site.

Figure 2.9 – Enfield Park Road/Crab Lane Google Map Extract



(Accessed 20/09/17)

Table 2.9 – Enfield Park Road/Crab Lane Saturn Results

Arm	2025			
	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Enfield Park Road N	0	0	0	0
B. Crab Lane	29	0	32	0
C. Enfield Park Lane S	50	0	64	0
PM				
A. Enfield Park Road N	43	0	0	0
B. Crab Lane	0	0	91	0
C. Enfield Park Lane S	64	0	51	0

- 2.22 The Peel Hall traffic is shown to impact this junction in the PM peak hour on arm B, Crab Lane. Therefore it is considered that further detailed modelling should be carried out for this junction.

Junction 26, Birchwood Way/Crab Lane/Woolston Grange Avenue

- 2.23 The Birchwood Way roundabout junction with Crab Lane and Woolston Grange Avenue is located to the southeast of the Peel Hall site.

Figure 2.10 – Birchwood Way/Crab Lane/Woolston Grange Avenue Google Map Extract



(Accessed 20/09/17)

Table 2.10 – Birchwood Way/Crab Lane/Woolston Grange Avenue Saturn Results

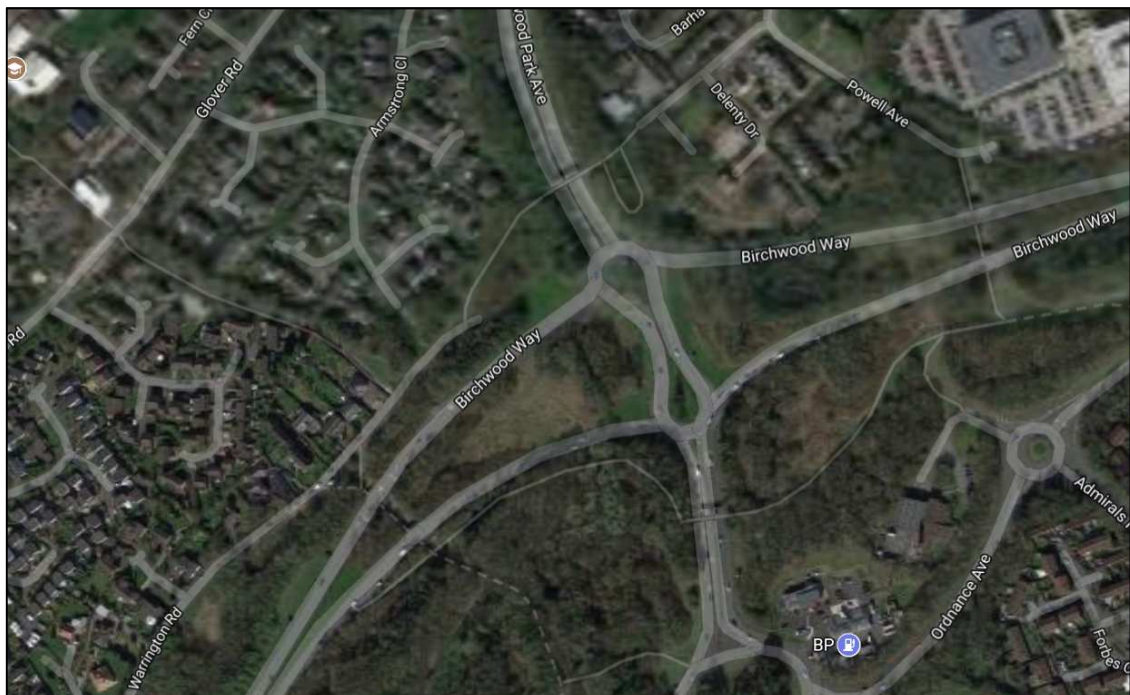
2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Birchwood Way W	39	0	38	0
B. Crab Lane	85	3	96	6
C. Birchwood Way E	59	0	48	0
D. Woolston Grange	90	0	60	0
PM				
A. Birchwood Way W	37	0	38	0
B. Crab Lane	74	2	74	2
C. Birchwood Way E	57	2	57	0
D. Woolston Grange	42	0	45	0

2.24 The above results show that there is not a significant impact of the Peel Hall traffic on the 'Do Minimum' scenario; with a benefit to arm D in the AM and an increase in VoC to arm B. Therefore it is considered that further detailed modelling should be carried out for this junction.

Junction 27, Birchwood Way/Oakwood Gate

2.25 The Birchwood Way part-signalised gyratory system with Oakwood Gate is located around 4.5km to the east of the Peel Hall development.

Figure 2.11 – Birchwood Way/Oakwood Gate Google Map Extract



(Accessed 20/09/17)

Table 2.11 – Birchwood Way/Oakwood Gate Saturn Results

2025				
Arm	Do Minimum		Do Something	
	VoC	Queue	VoC	Queue
AM				
A. Birchwood Way W	92	5	95	5
B. Birchwood Park Ave	68	1	96	1
C. Birchwood Way E	86	3	86	3
D. Oakwood Gate	134	101	135	104
PM				
A. Birchwood Way W	70	3	71	3
B. Birchwood Park Ave	52	1	56	1
C. Birchwood Way E	122	119	133	161
D. Oakwood Gate	294	273	321	296

2.26 It can be seen that this junction will operate significantly over capacity in the future year of 2025 in the without development traffic scenario. In any event it is considered that further detailed modelling should be carried out for this junction.

Summary

2.27 Therefore the following junctions will need to be modelled in more detail for a 2025 scenario:

- Junction 5 - A49/Sandy Lane West
- Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road
- Junction 15 - A50 Orford Green/Poplars Avenue
- Junction 20 - Capesthorpe Road/Poplars Avenue
- Junction 24 - Birchwood Way/Blackbrook Avenue
- Junction 25 - Enfield Park Road/Crab Lane
- Junction 26 - Birchwood Way/Crab Lane/Woolston Grange Avenue
- Junction 27 - Birchwood Way/Oakwood Gate

3.0 2030 Junction Summary Results

- 3.1 The following Section is a summary of the 2030 'Do Minimum' and 'Do Something' SATURN modelling results, where a VoC of above 85% is shown and exceeds that in the base and 'Do Minimum' scenarios. A comparison of the 2030 'Through-Route' scenario is also provided.
- 3.2 Map extracts are provided in **Section 2.0** where already referenced.

Junction 3, M62 Junction 9

- 3.3 The M62 Junction 9 modelling results are summarised below.

Table 3.1 – M62 Junction 9 Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. M62 Ebd Off Slip	101	22	102	21	102	20
B. A49 N	109	71	109	71	109	71
C. M62 Wbd Off Slip	74	4	75	4	75	4
D. A49 S	94	36	96	38	98	41
PM						
A. M62 Ebd Off Slip	119	100	123	119	123	119
B. A49 N	105	45	106	48	107	55
C. M62 Wbd Off Slip	52	2	53	2	53	2
D. A49 S	104	121	107	143	101	96

- 3.4 It can be seen that this junction operates over capacity in the future year of 2030, but that the development traffic has little impact.
- 3.5 It should be noted that when a junction starts to operate at or exceed its design capacity, longer delays and queues start to form. However, the model is unable to accurately reflect what may occur on site in practice and therefore once a capacity of 1.0 is exceed caution should be taken when reviewing the corresponding queue lengths.
- 3.6 It can be seen from the values in **Table 3.1** that the 'Through-Route' has a beneficial difference in impact in the PM peak hour overall and a minor negative impact in the AM peak hour.

Junction 5, A49/Sandy Lane West

- 3.7 The results for the A49 roundabout junction with Sandy Lane West are summarised below.

Table 3.2 – A49/Sandy Lane West Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Cromwell Ave W	76	34	79	60	79	32
B. A49 N	95	103	97	98	96	106
C. Sandy Lane W	42	2	53	3	40	2
D. A49 S	32	0	33	0	33	0
PM						
A. Cromwell Ave W	45	5	45	5	46	5
B. A49 N	92	10	95	10	91	10
C. Sandy Lane W	86	5	99	6	74	4
D. A49 S	45	0	46	0	46	0

- 3.8 It can be seen that this junction operates over capacity in the future year of 2030. Therefore it is considered that further detailed modelling should be carried out for this junction. It can be seen that the 'Through-Route' access option has a clear beneficial difference in impact in the PM peak hour.

Junction 8, Blackbrook Avenue/Insall Road/Hilden Road

- 3.9 The results of the Blackbrook Avenue junction with Insall Road and Hilden Road are summarised below.

Table 3.3 – Blackbrook Avenue/Insall Road/Hilden Road Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Hilden Road	63	4	44	3	42	3
B. Blackbrook Ave N	89	6	103	13	103	14
C. Insall Road	77	6	81	6	81	6
D. Blackbrook Ave S	93	5	97	6	97	6
PM						
A. Hilden Road	86	5	92	1	78	4
B. Blackbrook Ave N	76	5	93	0	92	6
C. Insall Road	101	6	104	2	102	7
D. Blackbrook Ave S	75	5	82	1	84	6

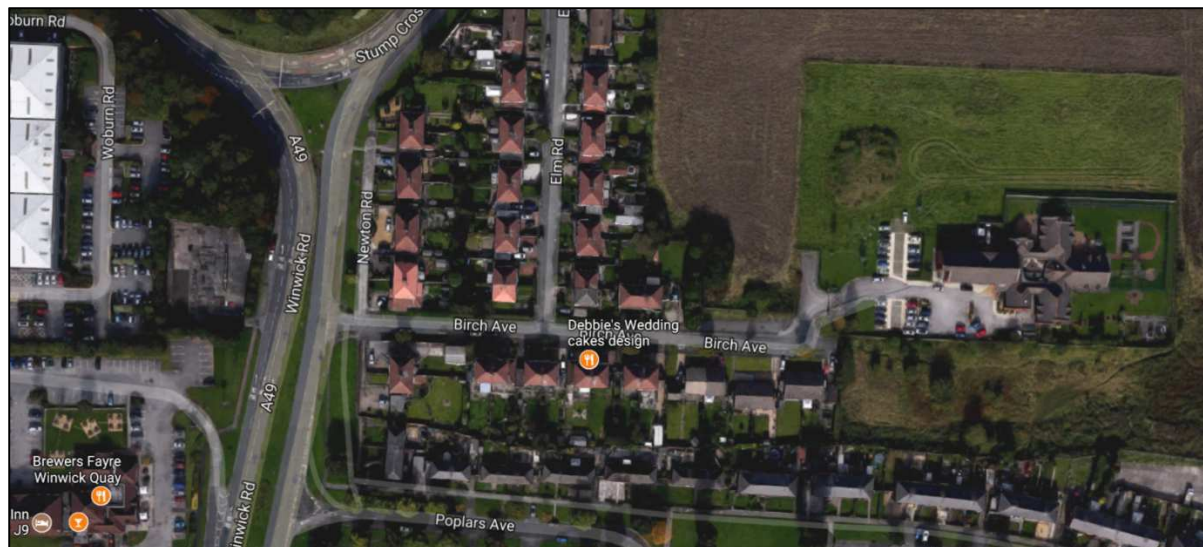
- 3.10 It can be seen that this junction operates over capacity in the future year of 2030. Therefore it is considered that further detailed modelling should be carried out for this

junction. It can be seen from **Table 3.3** that there is a slight increase in forecast queue levels in the PM peak hour with the 'Through-Route' access option, but that VoC's reduce, compared to the 'Do Something' scenario.

Junction 10, A49/Birch Avenue

3.11 The A49 priority junction with Birch Avenue is located to the immediate west of the Peel Hall site.

Figure 3.1 – A49/Birch Avenue Google Maps Extract



(Accessed 25/09/17)

Table 3.4 – A49/Birch Avenue Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. A49 S/bd N	42	0	55	0	101	7
B. Birch Avenue	54	0	27	0	51	1
C. A49 S/bd S	19	0	43	0	43	0
PM						
A. A49 S/bd N	40	0	41	0	42	0
B. Birch Avenue	7	0	9	0	10	0
C. A49 S/bd S	55	0	57	0	54	0

3.12 It can be seen that this junction generally operated well within capacity. However, due to blocking back from the proposed new signalised junction onto A49 in the 'Through-Route' scenario, VoC in the AM peak hour has increased to 101.

3.13 It is not considered that the geometry of this junction needs to be remodelled, but that consideration should be given to mitigation measures such as Keep Clear or yellow box markings to assist with drivers exiting Birch Avenue.

- 3.14 Furthermore it should be noted that the SATURN model did not include for a 3-arm entry for southbound A49 traffic at the new proposed signalised junction to the south of Birch Avenue at Poplars Avenue for the 'Through-Route'. This should reduce the length of queues on the A49.

Junction 15, A50 Orford Green/Poplars Avenue

- 3.15 The results of the A50 Orford Green junction with Poplars Avenue are summarised below.

Table 3.5 – A50 Orford Green/Poplars Avenue Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. A50 W	22	0	25	0	25	0
B. Poplars Avenue	31	0	107	25	107	26
C. A50 E	76	0	84	1	81	0
PM						
A. A50 W	42	0	42	0	41	0
B. Poplars Avenue	54	0	57	0	68	1
C. A50 E	74	1	100	0	97	4

- 3.16 It can be seen that the Peel Hall development has an impact on the operation of this junction, and that there is no significant difference between the 'Through-Route' and the 'Do Something' scenarios. Therefore it is considered that further detailed modelling should be carried out for this junction. It can also be noted from **Table 3.5** above that the impact of the development traffic is similar between access strategies.

Junction 20, Capesthorpe Road/Poplars Avenue

- 3.17 The results of the Capesthorpe Road roundabout junction with Poplars Avenue are summarised below.

Table 3.6 – Capesthorpe Road/Poplars Avenue Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Poplars Ave N	29	0	36	0	35	0
B. Capesthorpe Road E	56	0	79	1	62	0
C. Poplars Ave S	61	0	85	1	82	1
D. Capesthorpe Road W	31	0	32	0	43	0
PM						
A. Poplars Ave N	38	0	50	0	40	0
B. Capesthorpe Road E	83	0	66	0	36	0
C. Poplars Ave S	61	1	102	12	83	1
D. Capesthorpe Road W	38	1	90	3	77	1

- 3.18 It can be seen that the 'Through-Route' scenario does not have an impact on the operation of this junction. However, in the PM peak hour the 'Do Something' scenario has an impact on the operation of arms C and D. In any event it is considered that further detailed modelling should be carried out for this junction.
- 3.19 It can be seen that there is a clear difference in impact between the 'Do Something' and 'Through-Route' access strategy options at this junction.

Junction 23, Capesthorpe Road/Blackbrook Avenue/Enfield Park Road

- 3.20 The Capesthorpe Road roundabout junction with Blackbrook Avenue and Enfield Park Road is located to the immediate east of the Peel Hall site.

Figure 3.2 - Capesthorpe Road/Blackbrook Avenue/Enfield Park Road Google Maps Extract



(Accessed 25/09/17)

Table 3.7 – Capesthorpe Road/Blackbrook Avenue/Enfield Park Road Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Capesthorpe Road	38	0	50	0	45	0
B. Blackbrook Avenue	53	0	86	1	87	1
C. Enfield Park Road	34	0	50	0	50	0
D. Blackbrook Avenue	24	0	36	0	38	0
PM						
A. Capesthorpe Road	42	0	65	1	56	0
B. Blackbrook Avenue	39	0	59	0	53	0
C. Enfield Park Road	55	0	87	2	78	1
D. Blackbrook Avenue	41	0	70	1	63	1

3.21 It can be seen that there is not a significant impact of the Peel Hall development traffic on this junction and that it will continue to operate reasonably within capacity in the future year of 2030. It is the Blackbrook Avenue North arm in the AM peak hour and the Enfield Park Road arm in PM peak hour that are slightly effected.

3.22 It is not considered that this junction needs to be remodelled.

3.23 It can be seen that there is no significant difference between either of the Peel Hall access strategies at this junction.

Junction 24, Birchwood Way/Blackbrook Avenue

3.24 The Birchwood Way junction with Blackbrook Avenue results are summarised below.

Table 3.8 – Birchwood Way/Blackbrook Avenue Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Birchwood Way W	74	1	84	1	84	1
B. Blackbrook Ave N	90	3	101	9	101	11
C. Birchwood Way E	88	2	94	4	90	3
D. Blackbrook Ave S	72	1	74	1	73	1
PM						
A. Birchwood Way W	83	1	89	2	86	2
B. Blackbrook Ave N	80	2	97	5	85	2
C. Birchwood Way E	103	23	108	40	105	31
D. Blackbrook Ave S	79	1	84	1	84	1

- 3.25 It can be seen that the Peel Hall development traffic is shown to have an impact on the operation of this junction in the future year of 2030. Therefore it is considered that further detailed modelling should be carried out for this junction. Furthermore, it can also be seen that the impact of development traffic on this junction is slightly less with the 'Through-Route' access option.

Junction 25, Enfield Park Road/Crab Lane

- 3.26 The results of the Enfield Park Road junction with Crab Lane are summarised below.

Table 3.9 – Enfield Park Road/Crab Lane Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Enfield Park Road N	53	0	0	0	0	0
B. Crab Lane	0	0	37	0	38	0
C. Enfield Park Lane S	30	0	77	0	80	0
PM						
A. Enfield Park Road N	0	0	0	0	0	0
B. Crab Lane	18	0	97	0	97	0
C. Enfield Park Lane S	44	0	57	0	57	0

- 3.27 It can again be seen that the Peel Hall development is likely to have an impact on the operation of this junction in the PM peak hour. Therefore it is considered that further detailed modelling should be carried out for this junction and mitigation measures considered further. It can be seen that there is no significant difference between the access option strategies.

Junction 26 – Birchwood Way/Crab Lane/Woolston Grange Avenue

- 3.28 The Birchwood Way junction with Crab Lane and Woolston Grange Avenue are summarised below.

Table 3.10 – Birchwood Way/Crab Lane/Woolston Grange Avenue Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Birchwood Way W	38	0	38	0	3	0
B. Crab Lane	95	5	103	15	103	15
C. Birchwood Way E	59	0	48	0	49	0
D. Woolston Grange Ave	64	0	63	0	63	0
PM						
A. Birchwood Way W	38	0	38	0	38	0
B. Crab Lane	78	2	82	2	88	0
C. Birchwood Way E	57	0	58	0	57	0
D. Woolston Grange Ave	44	0	46	0	46	2

3.29 It can be seen that this junction is already operating at capacity in the AM peak hour on arm B, Crab Lane, but that the Peel Hall development traffic may have a further impact on capacity. Therefore it is considered that further detailed modelling should be carried out for this junction.

3.30 It is considered that there is no significant difference in the access option scenarios.

Junction 27, Birchwood Way/Oakwood Gate

3.31 The results of the Birchwood Way junction with Oakwood Gate are summarised below.

Table 3.11 – Birchwood Way/Oakwood Gate Saturn Results

2030						
Arm	Do Minimum		Do Something		Through-Route	
	VoC	Queue	VoC	Queue	VoC	Queue
AM						
A. Birchwood Way W	95	5	96	5	75	4
B. Birchwood Park Ave	2	2	73	2	69	1
C. Birchwood Way E	92	4	91	4	89	3
D. Oakwood Gate	154	142	153	141	148	132
PM						
A. Birchwood Way W	72	3	74	3	74	3
B. Birchwood Park Ave	55	1	62	1	62	1
C. Birchwood Way E	131	162	86	221	149	221
D. Oakwood Gate	305	287	346	326	347	326

3.32 It can be seen that this junction will operate over capacity in the future year of 2030 without development traffic. In any event it is considered that further detailed modelling should be carried out for this junction.

PH5, Peel Hall site access roundabout junction with Mill Lane

3.27 The proposed Peel Hall site access roundabout junction with Mill Lane is illustrated below.

Figure 3.3 – Peel Hall site access roundabout junction with Mill Lane

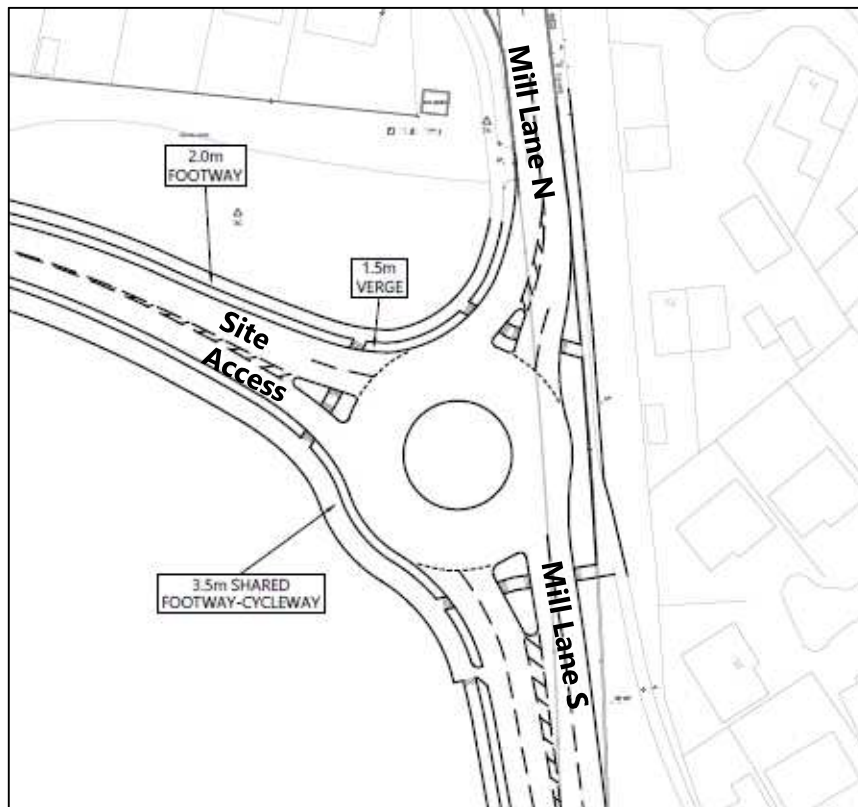


Table 3.12 – Peel Hall site access roundabout junction with Mill Lane Saturn Results

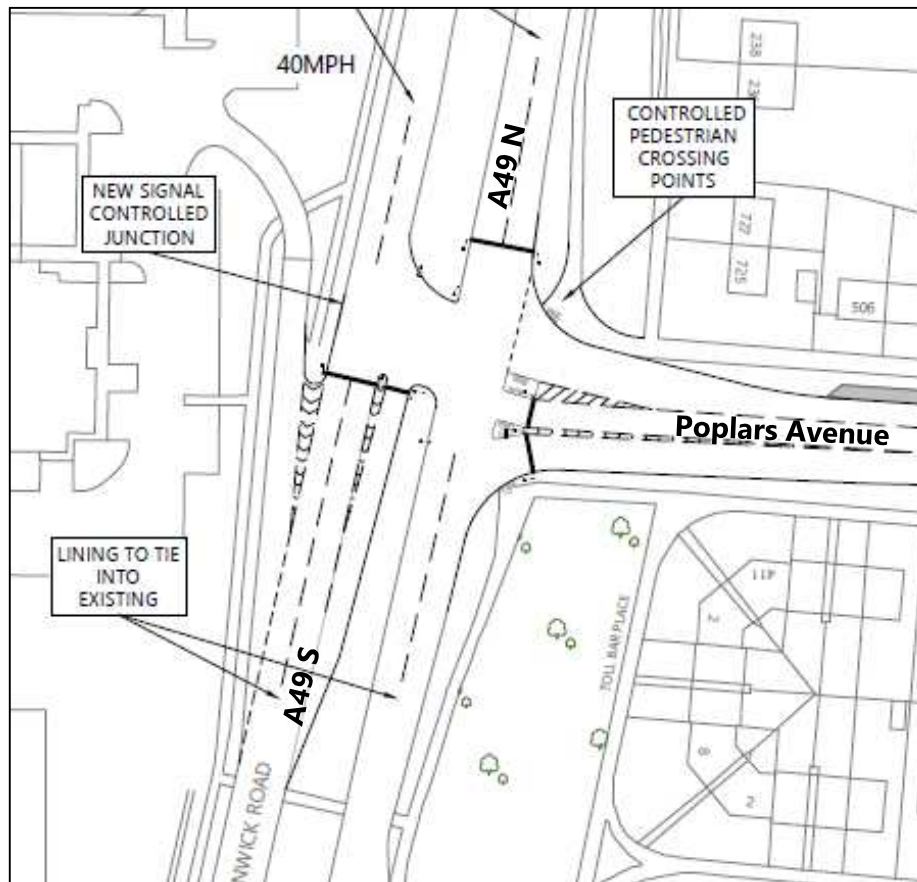
2030				
Arm	Do Something		Through-Route	
	VoC	Queue	VoC	Queue
AM				
A. Site Access	12	0	41	0
B. Mill Lane N	62	0	77	1
C. Mill Lane S	32	0	44	0
PM				
A. Site Access	24	0	42	0
B. Mill Lane N	56	0	62	0
C. Mill Lane S	76	0	87	1

3.28 It can be seen that there may be an increase in VoC slightly above desirable in the Pm peak hour on arm C (Mill lane South), with only 13% capacity remaining. This junction will be remodelled in more detail in any event as part of the access junction modelling.

PH6 - Peel Hall Through-Route A49/Poplars Avenue signalised junction

3.29 The proposed new signalised junction with the A49 at Poplars Avenue as part of the Through-Route is located to the immediate west of the Peel Hall site.

Figure 3.4 – Peel Hall Through-Route A49/Poplars Avenue signalised junction



**Table 3.13 – Peel Hall Through-Route A49/Poplars Avenue signalised junction
Saturn Results**

2030		
Arm	Through-Route	
	VoC	Queue
AM		
A. A49 North	101	15
B. Poplars Avenue	59	2
C. A49 South	73	5
PM		
A. A49 North	76	4
B. Poplars Avenue	82	13
C. A49 South	97	71

3.30 It can be seen that the proposed junction arrangement is operating at capacity in the future year of 2030. It is considered that a third lane for A49 southbound traffic on the northern arm could be provided. Therefore further detailed modelling should be carried out for this junction.

Summary

- 3.31 Therefore the following junctions will need to be modelled in more detail for the 2030 scenarios:

- Junction 5 - A49/Sandy Lane West
- Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road
- Junction 15 - A50 Orford Green/Poplars Avenue
- Junction 20 - Capesthorne Road/Poplars Avenue
- Junction 24 - Birchwood Way/Blackbrook Avenue
- Junction 25 - Enfield Park Road/Crab Lane
- Junction 26 - Birchwood Way/Crab Lane/Woolston Grange Avenue
- Junction 27 - Birchwood Way/Oakwood Gate
- PH6 – Peel Hall Through-Route A49/Poplars Avenue

- 3.32 The five Peel Hall access junctions will all be modelled as part of the Transport Assessment work in any event.

- 3.33 Measures will be considered further for Junction 10, the Birch Avenue access onto the A49 southbound to prevent stacking traffic on the A49 blocking the junction.

4.0 Conclusions

- 4.1 This report has been prepared by Highgate Transportation Limited to summarise the traffic impact results on the junctions in Warrington surrounding the Peel Hall site using the data arising from the AECOM SATURN modelling.
- 4.2 The junctions shown to be operating at or above capacity in the SATURN modelling results are indicated in **Table 4.1** below for ease of reference.

Junction Ref.	Base 2015	Do Minimum 2025	Do Something 2025	Do Minimum 2030	Do Something 2030	Through Route 2030
1	*	*	-	*	-	-
2	*	*	-	*	-	-
3	*	*	*	*	*	*
4		*	-	*	-	-
5		*	*	*	*	*
6	*	*	-	*	-	-
7						
8	*	*	*	*	*	*
9						
10						*
11						
12						
13						
14						
15		*	*		*	*
16						
17						
18						
19						
20			*		*	
21						
22						
23					-	-
24		*	*	*	*	*
25			*		*	*
26		*	*	*	*	*
27	*	*	*	*	*	*
PH1						
PH2						
PH3						
PH4						
PH5						*
PH6						*

- 4.3 Therefore, it can be concluded that the following junctions will need to be looked at in more detail and likely modelled in a junction modelling package such as Linsig or Junctions 9:
- i. Junction 5 - A49/Sandy Lane West
 - ii. Junction 8 - Blackbrook Avenue/Insall Road/Hilden Road
 - iii. Junction 15 - A50 Orford Green/Poplars Avenue
 - iv. Junction 20 - Capesthorne Road/Poplars Avenue
 - v. Junction 24 - Birchwood Way/Blackbrook Avenue
 - vi. Junction 25 - Enfield Park Road/Crab Lane
 - vii. Junction 26 - Birchwood Way/Crab Lane/Woolston Grange Avenue
 - viii. Junction 27 - Birchwood Way/Oakwood Gate
 - ix. Junction PH6 - Peel Hall Through Route A49/Poplars Avenue signalised junction
- 4.4 All the site access junctions are to be modelled as part of the Transport Assessment work in any event.