Land North of St Albans (S4), Harpenden Road, St Albans

Technical Note on Capacity of A1081 Harpenden Road Corridor to Accommodate Local Plan Housing Growth

Prepared on behalf of Hunston Properties Limited

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Executive Summary

In the Strategic Local Plan 2011-2031, Publication Draft (2016), St Albans City & District Council (SACDC) have identified land to the North-West of Harpenden (S5) as one of four major green belt sites for housing growth. The identification of these four sites, and rejection of others, was based on the Council's own sustainability appraisal.

Based on the Council's ranking of major green belt sites (Broad Locations), the land North-West of Harpenden (S5) was 4th on the listing (hence its inclusion as Policy SLP13c on the Strategic Local Plan) and the land North of St Albans (S4) was 5th on the listing. The most significant contributory factor in ranking S5 higher was the score attributed to "vehicular access and traffic impact": with S5 awarded 8 out of 10 and S4 given 3 out of 10.

From MTP's own review of the submitted Transport Assessment which formed the evidence base of the Council's assessment of S5 it is evident that there are a number of critical junctions on the A1081 corridor (and beyond) that operate at or well over capacity without development. Mitigation has been identified by the promoters' transport consultant to address the additional traffic demand generated by the development with the desire to achieve 'nil detriment' in terms of impact.

MTP's review of the mitigation proposals is that the schemes put forward for the A1081 / The Common, the A1081 / Station Road, the A1081 / B487 and B487 / A1583 junctions do not comply with published design standards, do not accommodate the swept path of all types of vehicles, will reduce the level of service to pedestrians and will deliver no tangible improvement in capacity.

By contrast, this Technical Note demonstrates how opportunities to increase the capacity of the highway network in the vicinity of land North of St Albans (S4) means it can be made to accommodate all of the predicted traffic demand generated by the same scale of development currently promoted on land North-West of Harpenden (S5).

In this regard the Technical Note supports a change to the scores awarded for "vehicular access and traffic impact". Whatever the revised scores attributed to the two sites may be, the evidence demonstrates that S4 must be acknowledged to out-score S5 (i.e. if S5 remains at 8 out of 10, then S4 must be 9 or 10 out of 10). The consequential impact on the ranking of the two sites should therefore be conceded.

Comment [A1]:
Overall –
SADC needs more time to consider the document but initial thoughts are marked throughout.

'NPPF 2' will be a significant consideration moving forward eg SADC will need to consider 'official' OAN method, approach to GB etc.

The approach taken overall in the Technical Note does not follow the process in the DSSOE.

The initial thoughts raised at the meeting were in document order, not in order of significance.

Comment [A2]: (1) Incorrect. JS agreed.

Comment [A3]: (2) Incorrect. TA did not form part of evidence base in the assessment of S5 but it is referred to in the IDP. JS agreed.

Comment [A4]: (3) Have SADC seen this? JS – 'no'. JS 'didn't want to overload SADC' by submitting it to SADC. NB: Indicative info only originally requested from developers by SADC.

Comment [A5]: (4) SADC need to consider the scale of the issue, especially in relation to Plan-making – eg. making a minor problem the same or slightly worse or better versus a major problem the same or slightly worse or better - there is still a major problem ie. the significantly greater scale of the problem at Ancient Briton junction versus north west Harpenden. JS noted.

Comment [A6]: (5) SADC would have to look at 900 on the site, not 500 due to 1) as agreed by PPC - being consistent across 8 sites – SKM boundaries, 60/40 split, 40 dph 2) very unlikely to just secure only 500 - in practice all 900 would be built and 3) if a site is in the best location and is chosen for GB release then the best use of the land needs to be made. JS noted.

Assessment Methodology

To provide a direct comparison between the highway impact of both sites, the same methodology has been applied within this Technical Note to the assessment of capacity on the surrounding highway network. As outlined within subsequent sections of the Technical Note this methodology has comprised:

- 2017 traffic / queue length surveys at critical junctions;
- 2017 base models calibrated to reflect observed queuing
- Application of TEMPRO growth rates to 2031 (end of Plan Period);
- Identification of TRICS trip rates for land uses on the site - Residential (500 units) + 2FE Primary School (420 pupils);
- Modal split of development-related trips based on 2011 Census Method of Travel to Work data;
- Distribution of development-related traffic onto the network based on 2011 Census Origin / Destination data.

Comment [A7]: (6) Incorrect approach (though understandable) - SADC and HCC in COMET use TEMPRO only outside Hertfordshire and instead use Local Plan Growth inside Hertfordshire, including within St Albans District. JS noted

Study Area & Baseline Surveys

To determine the existing operation of the local highway network, baseline traffic data has been obtained in the form of Manual Classified Count (MCC) surveys at the following junctions (e.g. the study area):

- Sandridgebury Lane / A1081 give-way controlled priority junction;
- Green Lane / A1081 give-way controlled priority junction;
- A1081 / Beech Road / Batchwood Drive 'Ancient Briton' signalised crossroads.

Comment [A8]: (7) Should include impacts on the King William IV junction. JS noted

The MCC surveys were conducted on 26th January 2017 during the AM peak periods (07:00-10:00) and the PM peak periods (15:00-19:00) and associated flows are illustrated in Appendix 1.

It should be noted that the levels of traffic travelling through each junction were significantly less (c. 7% reduction in the AM peak and 10% in the PM peak) in comparison to MCC surveys which were undertaken on 5th October 2010 in conjunction with the previous promotion of development of the Sewell Park site.

Comment [A9]: (8) Interesting – but could be a one-off due to natural variability. HCC/AECOM work was carried out over a period of time. JS noted.

Development Trip Generation

The TRICS database has been interrogated to establish the likely trip generational characteristics of the residential and primary school elements of the proposals.

Residential – 500 units

To provide a robust assessment, the TRICS sub-category 'Houses Privately Owned' has been adopted and comparable sites have been identified. It is likely that should the proposed development come forward, a mix of tenure will be delivered. Table 1 provides a summary of the AM and PM peak periods trip rates and associated movements for the proposed 500 units. The full TRICS output is included as Appendix 2.

Table 1 Total Person Trip Rates

Time Period	Arrivals		Departures		Total	
	Trip Rate	No. Trips	Trip Rate	No. Trips	Trip Rate	No. Trips
AM Peak	0.242	121	0.749	375	0.991	496
PM Peak	0.554	277	0.291	146	0.845	423

To derive robust mode share data, localised data from the 2011 Census dataset 'Method of Travel to Work' for the St. Albans 007A area has been obtained and applied to the total person trip rates from TRICS output for the AM and PM peak periods. Table 2 provides a summary of the weekday AM and PM peak hourly trip rates by mode of travel and the resultant person movements.

Table 2 AM & PM Peak Person Trip Rates by Mode of Travel – Residential

Mode	AM Peak				PM Peak			
	Arrivals		Departures		Arrivals		Departures	
	Trip Rate	No. Trips	Trip Rate	No. Trips	Trip Rate	No. Trips	Trip Rate	No. Trips
Vehicle Driver	0.151	76	0.469	234	0.347	173	0.182	91
Vehicle Passenger	0.008	4	0.026	13	0.019	10	0.010	5
Public Transport	0.047	23	0.145	73	0.107	54	0.056	28
Walk	0.027	13	0.082	41	0.061	30	0.032	16
Cycle	0.005	3	0.016	8	0.012	6	0.006	3
Other	0.003	2	0.010	5	0.007	4	0.004	2
Total	0.242	121	0.749	375	0.554	277	0.291	146

Table 2 shows that a 500-unit residential development has the potential to generate approximately 496 total two-way person movements during the AM peak, of which 310 trips would be vehicular. During the PM peak the development could generate in the order of 423 total two-way person movements, of which 264 trips would be vehicular.

2FE Primary School – 420 Pupils

As part of the assessment, it has been assumed that all primary school aged children residing within the proposed development will attend the on-site primary school. To establish this, 2011 Census datasets for the local area have been applied which indicates approximately 156 primary school aged children from the development would attend the primary school.

Comment: (9) Approach appears ok - JS noted.

As such, Table 3 provides a summary of the AM and PM peak period trip rates and associated movements for the proposed 2FE Primary School with the number of primary school aged children from the development discounted. It has been assumed that these children will travel to and from the school by sustainable modes. The full TRICS output is included as Appendix 3.

Mode	AM Peak		AM Peak	
	Two-Way Trip Rate	No. Trips	Two-Way Trip Rate	No. Trips
Vehicle Driver	0.650	172	0.374	99

Table 3 AM & PM Peak Person Trip Rates by Mode of Travel – 2FE Primary School (264 pupils)

Vehicle Passenger	0.056	15	0.071	19
Public Transport	0.032	8	0.047	12
Walk	1.068	282	1.244	328
Cycle	0.007	2	0.003	1
Total	**1.813**	**479**	**1.739**	**459**

Table 3 shows that a 2FE Primary School has the potential to generate 479 two-way total person movements during the AM peak, of which 172 two-way trips would be vehicular. During the PM peak the primary school could generate in the order of 459 two-way total person movements, of which 99 trips would be vehicular. The remaining 307-360 movements would be undertaken by sustainable modes of travel, primarily on foot.

It should be noted that the peak period for the school (1500-1600) has been superimposed upon the standards network peak hour 1700-1800 thereby providing a robust analysis of development-related impact.

The total number of vehicular arrives and departures to and from the site during the AM and PM peak is outlined in Table 4 illustrating a comparative analysis of vehicular trip generation between each assessment scenario.

Table 4 Total Number of Vehicular Movements – Comparison between Assessment Scenarios

Time Period		Residential Only	Residential + School
AM Peak	Arrivals	76	174
	Departures	234	307
	Total	**310**	**482**
PM Peak	Arrivals	173	214
	Departures	91	149
	Total	**264**	**363**

Development Trip Distribution

To determine the impact of development-related traffic within the study area, the distribution of residential-related vehicular trips has been based on the 2011 Census Origin-Destination Dataset 'Location of Usual Residence and Place of Work by Method of Travel' for the St. Albans 007 area.

Appendix 4 provides spreadsheet analysis of the resultant distribution of residential-related vehicular trips, the results of which are summarised below:

- A1081 towards Harpenden (north) - 11%
- Sandridgebury Lane (north-east) - 6%
- Beech Road (east) - 30%
- A1081 towards St Albans City Centre (south) - 22%
- Batchwood Drive (west) - 31%

The vehicular trips associated with the proposed 2FE Primary School have been distributed across the local network based on turning movements obtained from the 2017 MCC surveys.

The arrivals and departures to and from the development for both the residential element and the primary school have been derived from the TRICS analysis detailed above.

Future Forecast Year

In order to provide a robust assessment and to assess the future operation of development-related traffic a 'future year' of 2031 has been adopted which reflects the end of the plan period.

The 2017 MCC surveys have been factored up to the year 2031 using growth factors obtained from the TEMPRO database (v.7.0) for the AM and PM peak periods. It should be noted that the TEMPRO growth rates have been adjusted using the 'alternative assumptions' option based on the proposed number of dwellings associated with the subject development to avoid 'double-counting' vehicular traffic growth on the highway network.

Junction Analysis

To understand the development-related impact on the highway, each junction within the study area has been modelled using specialist junction modelling software (e.g. PICADY and LinSig). The purpose of this analysis is to establish the potential impact of traffic flows associated with the proposed development on the operation of the surrounding highway network during the AM and PM peak periods when the combination of peak traffic generated from the proposed development coincides with the peak period demand on the network itself.

Sandridgebury Lane / A1081

The operation of the Sandridgebury Lane / A1081 priority junction has been modelled using PICADY based on the weekday AM and PM peak hourly periods under '2031 base' and '2031 base + development' conditions for both Residential Only (500 units) and Residential (500 units) + 2FE Primary School scenarios. This is summarised in Table 5.

It should be noted that the operational capacity is determined by the RFC value (Ratio of Flow to Capacity) whereby a threshold of 1.00 for existing junctions is widely accepted in identifying a junction operating within capacity.

Arm	AM Peak						PM Peak					
	2031 Base		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)		2031 Base		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue

Table 5 Sandridgebury Lane / A1081

B-C	0.22	0.3	0.26	0.4	0.27	0.4	0.17	0.2	0.18	0.2	0.19	0.2
B-A	0.15	0.2	0.24	0.3	0.29	0.4	0.27	0.4	0.43	0.7	0.47	0.8
C-A	0.50	1.5	0.58	2.1	0.62	2.4	0.55	2.0	0.66	3.4	0.68	3.7
C-B	0.58	0.7	0.64	0.9	0.67	1.0	0.56	0.3	0.65	0.4	0.66	0.4

A= A1081 (N), B= Sandridgebury Lane, C= A1081 (S)

Table 5 shows that the priority junction will continue to operate well within capacity under both 2031 base + development scenarios with minimal queuing on all arms. Therefore, the junction would be able to accommodate the level of traffic associated with the development proposals.

Green Lane / A1081

The operation of the Green Lane / A1081 priority junction has been modelled using PICADY based on the weekday AM and PM peak hourly periods under '2031 base' and '2031 base + development' conditions for both Residential Only (500 units) and Residential (500 units) + 2FE Primary School scenarios. This is

Arm	AM Peak						PM Peak					
	2031 Base		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)		2031 Base		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue

summarised in Table 6.

Table 6 Green Lane / A1081

B-C	0.34	0.5	0.38	0.6	0.46	0.8	0.28	0.4	0.33	0.5	0.40	0.6
B-A	0.21	0.3	0.27	0.4	0.33	0.5	0.26	0.3	0.33	0.5	0.35	0.5
C-A	0.48	1.5	0.65	2.9	0.68	3.3	0.38	1.1	0.49	1.6	0.47	1.5
C-B	0.51	0.3	0.65	0.7	0.67	0.7	0.44	0.3	0.54	0.4	0.53	0.4

A= A1081 (S), B= Green Lane, C= A1081 (N)

Table 6 shows that the priority junction will continue to operate well within capacity under both 2031 base + development scenarios with minimal queuing on all arms. Therefore, the junction would be able to accommodate the level of traffic associated with the development proposals.

Site Access / A1081

The operation of the Site Access / A1081 priority junction has been modelled using PICADY based on the weekday AM and PM peak hourly periods under '2031 base + development' conditions for both Residential Only (500 units) and Residential (500 units) + 2FE Primary School scenarios. This is summarised in Table 7.

Arm	AM Peak				PM Peak			
	2031 + Dev (Residential Only)		2031 + Dev (Resi + School)		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
B-C	0.47	0.9	0.62	1.6	0.17	0.2	0.25	0.3
B-A	0.13	0.1	0.40	0.6	0.05	0.1	0.19	0.2
C-AB	0.13	0.2	0.23	0.3	0.29	0.4	0.34	0.5

Table 7 Site Access / A1081 – 2031 Base + Development

A= A1081 (N), B= Site Access, C= A1081 (S)

Table 7 shows that the site access junction will operate well within capacity under both 2031 + development scenarios within minimal queueing on all arms and therefore the junction can accommodate the level of traffic associated with the development proposals.

Ancient Briton (A1081 / Batchwood Drive / Beech Road)

The operation of the Ancient Briton junction has been modelled using LinSig based on the weekday AM and PM peak hourly periods for the existing 2017 surveyed conditions. This is summarised in Table 8 and identifies the baseline operation of the junction. To identify operational capacity, the PRC (Practical Reserve Capacity) value is given in a percentage whereby when the PRC value falls below 0% it is considered that the junction is operating above capacity. Additionally, capacity is also identified through the Degree of Saturation (DoS) value for each arm of the junction whereby 100.0 indicates peak capacity.

Arm	AM Peak		PM Peak	
	DoS	Queue	DoS	Queue
Harpenden Road (A1081)	99.2	34.4	102.6	40.6
Beech Road	99.0	36.6	101.9	42.8
Harpenden Road	71.3	14.6	98.1	28.4
Batchwood Drive	99.2	31.3	100.8	32.3
PRC%	-10.2		-14.0	

Table 8 shows that the signalised crossroad junction is operating above capacity during existing 2017 conditions.

As part of previous applications, a 'mitigation option' was designed to improve the operation of the junction. The mitigation proposals are illustrated in Appendix 5.

The mitigation option has been modelled under 2031 base + development conditions for both assessment scenarios. The results are summarised in Tables 9.

Comment [A10]: (10) Junction improvements (5 phases to 4) may be delivered anyway – identified by SADC/HCC/AECOM as a major priority junction even without any development at land north of St Albans - a priority for improvement from S106/ CIL/ other funding. JS noted.

Arm	AM Peak				PM Peak			
	2031 + Dev (Residential Only)		2031 + Dev (Resi + School)		2031 + Dev (Residential Only)		2031 + Dev (Resi + School)	
	DoS	Queue	DoS	Queue	DoS	Queue	DoS	Queue

Table 9 Ancient Briton – 2031 Base + Development

A	98.3	42.6	101.4	50.7	91.5	30.5	93.9	33.4
B	97.2	35.3	101.2	43.9	91.0	23.5	94.0	32.2
C	45.1	12.2	46.9	12.8	69.0	20.1	69.3	20.5
D	69.0	19.9	70.5	20.4	66.5	19.0	68.8	19.5
PRC%	-9.2		-12.7		-1.7		-4.4	

A= A1081 Harpenden Road, B= Beech Road, C= Harpenden Road, D=Batchwood Drive

Table 9 shows that through the implementation of the mitigation design works, the junction would operate with an improved capacity during the 2031 + development (residential only) scenario with a significant improvement during the PM peak in comparison to existing 2017 conditions.

During the 2031 + development (residential + school) scenario, the junction would operate with a marked improvement during the PM peak period compared with 2017 existing conditions and during the AM peak the operational capacity of the junction would marginally increase. It is considered that this development scenario would not have a severe impact on the operation of this junction in reflection of para. 32 of the NPPF.

Comment [A11]: (11) Data in Tables appears to show major issue will be made 20% worse (-10.2 to - 12.7 from Table 8 and Table 9). JS to check.

Table 10 Average Delay per PCU per second

Arm	AM Peak			PM Peak		
	2017 Existing	2031 Base+Dev	Change	2017 Existing	2031 Base+Dev	Change
A1081 (N)	136.7	140.5	+ 3.8	174.8	89.3	- 85.5
Beech Road	121.4	135.8	+1 4.4	152.4	80.3	- 71.6
A1081 (S)	79.3	47.8	- 31.5	138.6	56.5	- 82.1
Batchwood Drive	146.5	58.6	- 87.9	162.7	54.5	- 108.2

Additional comparative analysis on the operation of the junction has been undertaken regarding delay. Table 10 summarises the average delay per second per vehicle for each arm of the junction, comparing the delay output between 2017 existing and 2031 base + development (residential + school) scenarios.

Table 10 shows that during the AM peak as a result of the development proposals (residential + school) and the mitigation works at the junction, the A1081 (N) would only experience an increased delay of 4 seconds per vehicle and Beech Road would only experience an increased delay of 14 seconds per vehicle. The remaining arms of the junction would experience a reduction in delay, most notably Batchwood Drive which would experience a reduction of 1 minute 28 seconds per vehicle. The increase in delay at the A1081 (N) and Beech Road arm is considered marginal and would not be considered severe with respect to para. 32 of the NPPF.

During the PM peak, the delay on all arms would significantly reduce with all arms experiencing a reduced delay of over 1 minute with the most significant change taking place on the Batchwood Drive arm which would experience a reduction in delay of 1 minute 48 seconds per vehicle.

To further understand the comparative operation of the Ancient Briton junction under the various assessment scenarios Figure 1 and Figure 2 illustrates the comparison in peak hour queuing between the 2017 existing and the 2031 base + development (residential with school) scenarios.

Figure 1 illustrates that the queue lengths will increase, although not significantly, on the A1081 (N) and Beech Road arms and the queue lengths will decrease on the A1081 (S) and Batchwood Drive arms between 2017 existing conditions and the 2031 + development (residential + school) AM peak scenario.

Figure 2 illustrates that the queue lengths from 2017 existing conditions to the 2031 base + development (residential + School) scenario will decrease on all arms of the junction, significantly so on the A1081 (S) and Batchwood Drive arms and, in particular, the queue length on Beech Road would no longer queue past the Seymour Road junction under 2031 base + development (residential + school) conditions during the PM peak scenario.

Figure 1 Queue Length Comparison – AM Peak

Figure 2 Queue Length Comparison – PM Peak

Summary

In summary, the junction capacity analysis has identified that as a result of the development proposals all priority junctions within the study area would continue to operate within capacity and the impact on the signalised junction it not considered to be severe.