Technical Note

Project: **Land North of the Viaduct, Ledbury**

Subject: **Response to HC Comments**

Client:	Bloor Homes Western	**Version:**	4
Project No:	3468	**Author:**	JW
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1 Introduction

1.1.1 During late 2018, PJA prepared a Transport Assessment (TA) relating to a planning application for the development of Land North of the Viaduct Ledbury (Ref P171532/O) for up to 625 dwellings and employment uses. The TA was submitted to Herefordshire Council (HC) in January 2019.

1.1.2 In February 2019, comments were provided by WSP Ltd in its role as consultant to HC, requesting provision of additional information summarised as follows:

1 Additional analysis of walking and cycling distances from the site to the Bromyard Road Trading Estate;

2 Additional analysis of pedestrian demand at the Hereford Road / Bromyard Road / The Homend junction and its effect on the capacity of the proposed signalisation scheme;

3 Further consideration of access to the bus depot and interaction with the proposed traffic signals;

4 Requirement for a Road Safety Audit of the proposed highway works;

5 Comments relating to the Travel Plan.

1.1.3 This note addresses Items 1 – 3 above. Item 4 will be addressed separately, Item 5 is addressed within a revised Travel Plan.

1.1.4 Following discussions with WSP in March 2019, Item 6 provides further detail regarding the principle of a single point of access.

2 Item 1 – Walking Distances to Bromyard Road Trading Estate

2.1.1 As described within the TA, it is estimated that there would be 13 two-way pedestrian trips per day between the residential development and the Bromyard Road Trading Estate. Both the

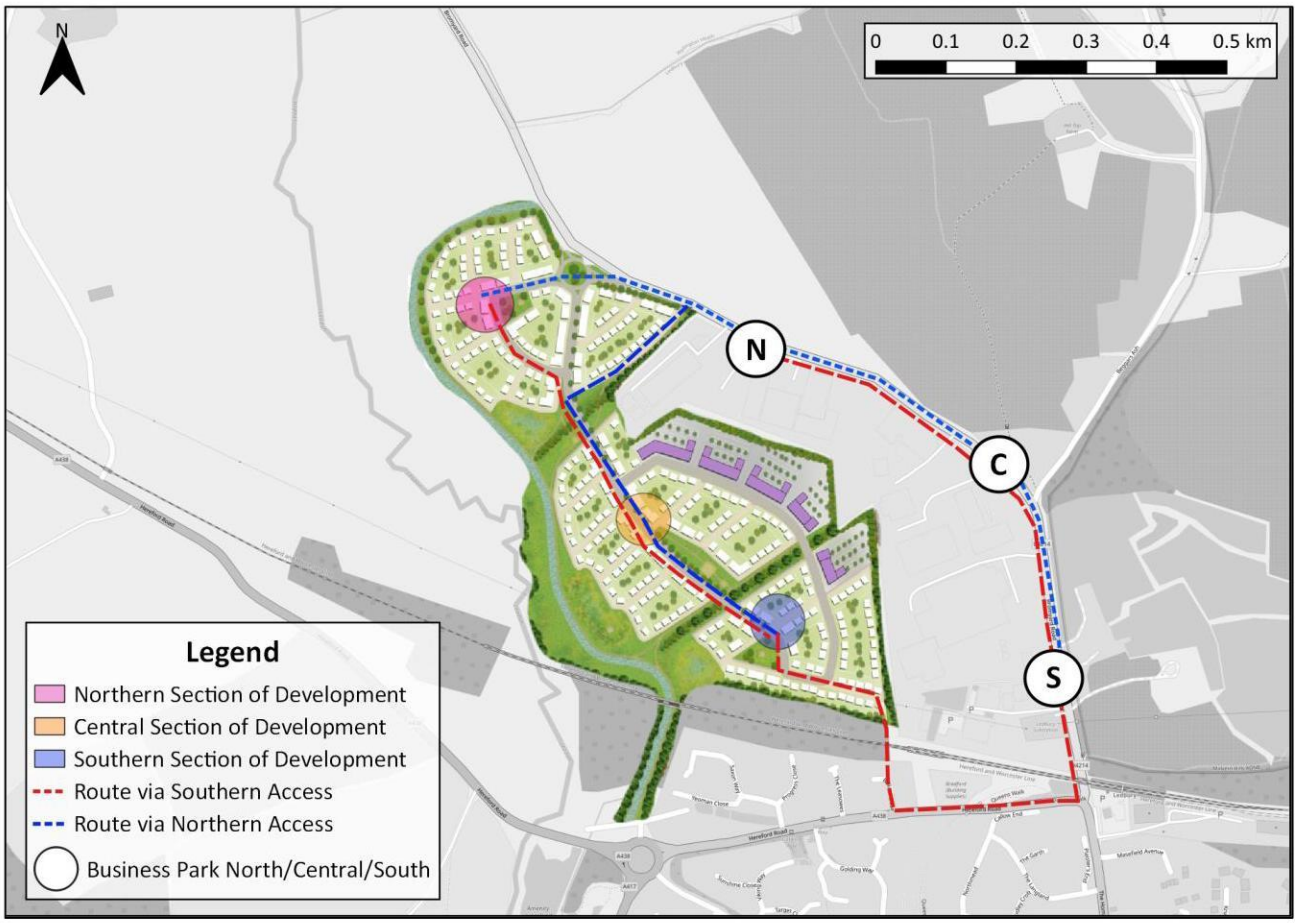
residential element of the development site and the Bromyard Road Trading Estate can be divided into Northern, Central and Southern sectors.

2.1.2 Table 2-1 presents walking distances between each residential and trading estate sector, via the Ballard Close access and via Bromyard Road (from the proposed emergency vehicle and pedestrian access). These routes are presented within Figure 2-1.

Table 2-1: Walking Route Distances (rounded to nearest 50m)

Residential Sector	Via Bromyard Road from Emergency Site Access	Via Hereford Road from Ballard Close Site Access	Notes
Distance to Trading Estate Northern Sector (m)			
Northern	450	2200	Access to northern trading estate sector facilitated by footway from Bromyard Road emergency access
Central	500	1800	
Southern	800	1500	
Distance to Trading Estate Central Sector (m)			
Northern	750	1850	Trading estate central sector inaccessible from both directions due to lack of footway. No scope to provide footway within highway boundary.
Central	800	1500	
Southern	1150	1200	
Distance to Trading Estate Southern Sector (m)			
Northern	1100	1550	Access to southern trading estate sector via Ballard Close access.
Central	1150	1220	
Southern	1450	880	

Figure 2-1: Walking Routes between Development and Trading Estate



2.1.3 In considering the above analysis and accessibility for future residents of the proposed development who may plan to walk to work within the Trading Estate:

- Those residents who live in the northern part of the residential development would need to walk 450m further to access the southern part of the trading estate, compared to the shorter route along Bromyard Road.
- The central part of the trading estate is inaccessible on foot in the existing and proposed situations, due to the lack of footway on Bromyard Road.
- For all other residents, the proposed infrastructure provision would allow safe access to the trading estate via the most direct potential route.

2.1.4 It has been estimated that demand for travel between the development and the Trading Estate would be just 13 pedestrian two-way trips and 7 cycle two-way trips per day. Therefore on the worst case assumption that all these trips take place during the two peak hours, then this would equate to approximately 6 trips in each peak hour, which is one trip every 10 minutes.

2.1.5 As previously described, there is no scope to provide a continuous footway along Bromyard Road within the adopted highway boundary. However, the following measures are proposed to maximise accessibility by sustainable modes:

- Provision of a footway on Bromyard Road from the proposed emergency access to serve the northern part of the Trading Estate;
- Provision of connections up to the development boundary with the Trading Estate to allow potential access to be made in future.

3 Item 2 – Pedestrian Demand at Proposed Signalised Junction

3.1 Peak Hour Pedestrian Trip Generation

3.1.1 Further analysis has been prepared to consider peak hour pedestrian demand at the proposed signalised junction.

3.1.2 As described within the TA, residential pedestrian demand is based upon outputs from the TRICS database. The peak hour and 12-hour pedestrian trip rates are summarised below.

Table 3-1: Residential Pedestrian Trip Rate Analysis

	Arrival Rate	Departure Rate	Two-Way	Two-Way Rate - % of 12 Hour Rate
AM Peak Hour (08:00 – 09:00)	0.028	0.111	0.139	**13%**
PM Peak Hour (17:00 – 18:00)	0.066	0.038	0.104	**9%**
12 Hour (07:00 – 19:00)	0.550	0.545	1.095	-

3.1.3 The analysis demonstrates that just 13% and 9% of pedestrian trips are in the AM and PM peak hours respectively.

3.1.4 Employment pedestrian demand is based upon application of modal split calculations to vehicle trip generation derived from TRICS. Peak hour and daily vehicle trip generation is presented in Table 3-2 (it is necessary to use total trips rather than trip rates, as the employment development is split into three use classes with separate trip rates).

Table 3-2: Residential Trip Generation Analysis

	Arrivals	Departures	Two-Way	Two-Way Trips - % of 12 Hour Trips
AM Peak Hour (08:00 – 09:00)	137	13	150	**17%**
PM Peak Hour (17:00 – 18:00)	8	111	120	**14%**
12 Hour (07:00 – 19:00)	438	441	878	-

3.1.5 It is reasonable to assume that the distribution of pedestrian trips across a 12-hour period would reflect the distribution of vehicle trips. On this basis, 17% and 14% of pedestrian trips would be in during the AM and PM peak hour respectively.

3.2 Peak Hour Pedestrian Trips at Junction

3.2.1 Upon review of the TA it is apparent that the data within Figure 6-1 does not match Table 6-8 – this is an error due to a late change in methodology.

3.2.2 The total development crossing demand at the proposed signal junction is 347 two-way trips (not 391) – comprising 99 employment trips and 248 residential trips (see Tables 6-4 and 6-7 of the TA).

3.2.3 The peak hour pedestrian crossing demand based is presented in Table 3-3.

Table 3-3: Peak Hour Pedestrian Crossing Demand

	12 Hour (07:00 – 19:00)	AM Peak Hour % of Total	PM Peak Hour % of Total	AM Peak Trips	PM Peak Hour Trips
Residential Trips	248	13%	9%	31	24
Employment Trips	99	17%	14%	17	13
Development Total	**347**	-	-	**48**	**37**

3.2.4 The analysis demonstrates there would be 48 and 37 pedestrian crossings of the proposed signal junction from the proposed development in the AM and PM peak hours.

3.2.5 Pedestrian demand from the development would result in the crossing being called more often than the 35% and 40% calculated based on surveyed pedestrian volumes. However, pedestrians tend to arrive in groups corresponding with rail services and education / employment start times and so would not be spread evenly throughout the hour. As such, it is unlikely that the crossing would be continuously called.

3.3 Junction Capacity

3.3.1 Notwithstanding the points made above, a sensitivity test of the crossing being called every cycle throughout the peak hour has been undertaken to understand the potential operation of the junction.

- The junction model was previously run based upon a simple 90-second cycle time.
- In order to test a realistic junction operation, the model has been run to provide a 90 second cycle time with the pedestrian crossing extending the cycle when called.
- The pedestrian crossing adds 20 seconds to the cycle time, based upon a 7-second crossing 'green time' plus additional intergreen time for the extra stage.
- On this basis the model has been run on a 110 second cycle with the crossing called every cycle.

3.3.2 The results of this assessment are presented within Table 3-4 (model outputs within **Appendix B**).

Table 3-4: Sensitivity Test Results - Pedestrian Crossing Every Cycle

Lane	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	DoS (%)	Delay (s/pcu)	Mean Max Queue (PCU)	DoS (%)	Delay (s/pcu)	Queue (PCU)
1/1 + 1/2 Hereford Road	92%:92%	59	15	98%:98%	97	18
2/1 Bromyard Road	94%	69	22	96%	78	24
3/1 The Homend	94%	13	14	22%	28	15
Cycle Time	110 Seconds			110 Seconds		
Total Delay over all Lanes	16 PCUHrs			32 PCUHrs		
PRC	-4.0%			-8.8%		

3.3.3 For comparison purposes, the results within the TA for the other pedestrian scenarios are presented within Tables 3-5 and 3-6.

Table 3-5: Junction Model Results (from TA) - Pedestrians Every Three Cycles

Lane	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	DoS (%)	Delay (s/pcu)	Mean Max Queue (PCU)	DoS (%)	Delay (s/pcu)	Queue (PCU)
1/1 + 1/2 Hereford Road	78%:78%	37	9	82%:82%	47	12
2/1 Bromyard Road	78%	33	17	82%	35	17
3/1 The Homend	64%	27	13	64%	23	13
Cycle Time	270 Seconds (3 cycles with 1 ped stage)			270 Seconds (3 cycles with 1 ped stage)		
Total Delay over all Lanes	16 PCUHrs			17 PCUHrs		
PRC	15.4%			10.1%		

Table 3-6: Junction Model Results (from TA) - Pedestrians Every Two Cycles

Lane	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	DoS (%)	Delay (s/pcu)	Mean Max Queue (PCU)	DoS (%)	Delay (s/pcu)	Queue (PCU)
1/1 + 1/2 Hereford Road	81%:81%	39	11	87%:87%	51	11
2/1 Bromyard Road	82%	38	17	86%	42	28
3/1 The Homend	66%	28	13	66%	24	14
Cycle Time	180 Seconds (2 cycles with 1 ped stage)			180 Seconds (2 cycles with 1 ped stage)		
Total Delay over all Lanes	17 PCUHrs			19 PCUHrs		
PRC	9.8%			3.9%		

3.3.4 The following conclusions can be drawn in considering these results:

- In the existing situation, long queues and delays are experienced on the Bromyard Road arm of the junction. The survey recorded queue lengths in excess of 19 PCUs (beyond the view of the camera), which would be exacerbated by background traffic growth without the proposed development.
- The results of the assessment based upon existing pedestrian demand whereby the crossing would be called every three cycles are presented within Table 3-5. An additional sensitivity test where the crossing is called every two cycles is within Table 3-6. The results demonstrate that the junction would operate within capacity.
- Additional pedestrian demand from the development has been considered in detail (Table 3-3) and would result in 48 additional pedestrian trips in the AM peak hour and 37 additional trips in the PM peak hour at the crossing.
- Additional pedestrian demand would not be spread evenly across the peak hours. Our observations are that demand spikes to correspond with train times, school start / finish

times and employment times within the Trading Estate. It is anticipated that this pattern would continue, and as such it is unlikely that additional demand would be so substantial that the crossing is called every cycle throughout the peak hours.

- Notwithstanding the above, a sensitivity test calling the crossing every cycle has also been prepared. This demonstrates that although there would be a slight deterioration in junction performance, the degree of saturation on all arms would remain below 100%. The queues on each arm would, on average dissipate each cycle. The delay to any vehicles would be a maximum of 97 seconds, which is less than observed at the existing junction during peak periods.
- It should also be considered that the proposed signalisation scheme offers a significant improvement compared to the existing situation:
  - Movements are controlled where currently there are regular conflicts between large vehicles and queueing traffic on Bromyard Road; and
  - The crossing facility will offer a substantial safety benefit to pedestrians where currently there are no facilities and a record of serious collisions.

3.3.5 It can therefore be concluded that the proposed mitigation scheme would continue to offer a capacity and safety benefit compared to the existing situation.

4 Item 3 - Bus Depot

4.1.1 The bus depot access has been reviewed following receipt of the Road Safety Audit which recommended that the depot is retained under traffic signal control.

4.1.2 The stop line on The Homend has been repositioned to the north of the bus depot access. Buses would therefore turn left out of the depot by joining under signal control, or turn right giving way to oncoming traffic.

4.1.3 Drawings presented within **Appendix A** present a bus reversing into the depot from each direction in the existing and proposed situations.

4.1.4 Bus manoeuvres would cause some disruption as vehicles would have to wait whilst a manoeuvre is completed. However, this is no worse than the existing situation.

4.1.5 It is suggested that at detailed design stage, signage warning of reversing vehicles could be provided.

5 Item 6 – Single Point of Access

5.1.1 As described within Section 4.2 of the TA, access to the site will be gained via a new four-arm roundabout junction with Bromyard Road. The roundabout will provide two entry arms to the proposed development. A separate emergency access will be provided on Bromyard Road immediately to the south of the proposed roundabout.

5.1.2 The following considerations have been applied in assessing the suitability of the site access proposals:

- Whether the provision of a single point of access complies with the relevant policy guidance;
- Whether the development could be accessed by emergency vehicles or other road users should an accident or other event block the site access; and
- Whether providing a single point of access would result in an unacceptable impact on the capacity of the highway network that could not be mitigated against?

5.2 Planning Policy – Single Point of Access

5.2.1 The Herefordshire Highway Design Guide for New Developments was published in 2006 and provides typical design criteria for new access roads. The design criteria states that a maximum of 200 dwellings can be served via a single access road with emergency access.

5.2.2 Manual for Streets was subsequently published in 2007 and states:

"The length of cul-de-sacs or the number of dwellings have been used by local authorities as criteria for limiting the size of a development served by a single access route. Authorities have often argued that the larger the site, the more likely it is that a single access could be blocked for whatever reason. The fire services adopt a less numbers-driven approach and consider each application based on a risk assessment for the site, and response time requirements."

5.2.3 Manual for Streets supersedes policies within older local design guides where there is a conflict and as such provides the most relevant advice on this matter.

5.2.4 It can therefore be concluded that Manual for Streets does not provide any blanket specification which could limit the development served via a single point of access. Further consideration of emergency access requirements is set out below.

5.3 Emergency Access Requirements

5.3.1 In considering the risks of an emergency vehicle being unable to access the site:

- In the event of an accident at the site access, restricting entry to one of the development arms, the proposed roundabout provides a second entrance to the development that could be used by all vehicles (via an internal looped estate road);
- The proposed access comprises a large diameter roundabout, which could be partly blocked without obstructing other movements. However, in the unlikely event that the entire roundabout is blocked there would be an access for emergency vehicles off Bromyard Road to the south of the roundabout; and
- In the event that Bromyard Road is blocked either to the north or south of the roundabout, alternative routes are available in both directions.

5.3.2 It can therefore be concluded that there is no risk of emergency vehicles being unable to access the development.

5.3.3 Consideration has been given to whether a second emergency access could be provided under the viaduct, and this matter have been discussed in detail with HC/WSP. It has been decided not to take this option forward for a number of reasons, which include the setting of the Grade II listed Viaduct, and the potential impact on the Green Corridor linking the site to the Riverside Walk.

5.4 Junction Capacity

5.4.1 The TA demonstrates that the proposed access would operate well within capacity with minimal queueing or delay. Based upon the proposed access strategy, the TA also demonstrates that the development could be accommodated on the highway network, subject to a suitable mitigation scheme at the Bromyard Road / Hereford Road junction (which has been designed in consultation with HC / WSP and demonstrated to be deliverable).

5.4.2 It can therefore be concluded that providing access via a single junction would not result in an unacceptable impact on the capacity of the highway network.

6 Conclusions

6.1.1 This technical note has addressed application comments provided by WSP.

- Analysis of walking distances to the trading estate has been presented;
- Detailed analysis of peak hour pedestrian demand at the proposed signalised junction has been provided.

- A sensitivity test of the capacity of the proposed signalised junction has been provided. The capacity of the junction is considered to be no worse than the existing situation, and the scheme would provide substantial capacity and safety benefits;
- Following the RSA the signal junction design has been amended to retain the bus depot access under signal control; and
- Further justification has been provided of the proposed single point of access to the development.

6.1.2 It is therefore considered that the matters raised in the HC consultation response have been addressed, with a revised Travel Plan and a Stage 1 Road Safety Audit separately provided.

Appendix A Bus Depot Access Drawings

Appendix B Junction Model Output Reports