

Project number	T15.105	Project name	Land at Caerleon Road, Dinas Powys
Contact/participants			
Noted by	Hywel Purchase/Patrick O'Connor		
Subject	Impact of the proposed residential development of up to 70 residential dwellings on the Cardiff Road/Murch Road traffic signal controlled junction	Date	June 2015

Briefing note

1 Introduction

1.1 Background

1.1.1 Asbri Transport Ltd are commissioned by United Welsh Housing Association to produce this Briefing Note in response to concerns from the Local Highway Authority over the capacity of the Cardiff Road/Murch Road traffic signal controlled junction and its ability to accommodate traffic that will be generated by the proposed development.

1.1.2 Following submission of the outline planning application in 2014, highway officers at the Vale of Glamorgan required revisions to the accompanying Transport Assessment to consider the cumulative impact of the St Cyres School site, LDP allocation MG2 (26) and an approved Medical Centre situated within close proximity to the Cardiff Road/Murch Road signal controlled junction.

1.1.3 An amended Transport Assessment was submitted in February 2015, in support of a planning application for the proposed development of approximately 70 residential dwellings included junction capacity analysis of three junctions, as follows:

- The proposed site access on Caerleon Road – a simple priority junction;
- The Castle Drive/Murch Road priority junction; and,
- The Cardiff Road (A4022)/Murch Road/Millbrook Road traffic signal controlled junction.

1.1.4 Analysis of the proposed and committed development concluded that the Cardiff Road/Murch Road traffic signal controlled junction was operating over-capacity in the 'with development' assessment scenarios and, as such, the junction was suffering from high degrees of saturation and maximum mean queues. The junction was also noted to

be operating above capacity in the 'Base and committed development assessment scenario.'

1.2 Purpose of this Briefing Note

1.2.1 The purpose of this Briefing Note is to further explore the impact of vehicular traffic generated by the proposed development on the performance of the Cardiff Road/Murch Road signal-controlled junction.

1.2.2 This is examined in the context of the impact on the junction's performance when comparing the assessments undertaken of its performance with committed and LDP allocated site's traffic, with that of the assessment that also includes the proposed development traffic. These assessments were reported in the Transport Assessment dated February 2015.

1.2.3 The note also examines mitigation that may be achieved by facilitating and encouraging travel by sustainable modes and the provision of related infrastructure improvements in the site's vicinity. This is detailed in the final section of the report.

2 Previous analysis

2.1 Proposed layout

2.1.1 Access to the proposed development is to be made via a simple priority junction on Caerleon Road. The proposed site layout is shown on **Figure 1**. Geometric measurements of the proposed site access are shown in **Figure 2**, and include footway dimensions, carriageway dimensions and corner radii. A roundabout, located towards the western boundary of the site, and two turning heads provide space for refuse vehicles to manoeuvre when servicing the site. Geometric measurements of both turning heads are shown in **Figure 3**.

2.2 Junction capacity analysis

2.2.1 The operation of the Cardiff Road/Murch Road/Millbrook Road traffic signal controlled junction was assessed in the Transport Assessment for a 2015, 2018 and 2028 'Base' and 'With Development' scenarios using the JCT program LinSig

2.2.2 The results of the analysis are summarised in **Table 2.1** below.

	Capacity analysis											
	Base flows											
	0830-0930		1700-1800		0830-0930		1700-1800		0830-0930		1700-1800	
	DoS	Qu.	DoS	Qu.	DoS	Qu.	DoS	Qu.	DoS	Qu.	DoS	Qu.
2015												
Cardiff Rd (wb) - left/ahead	77.5	25	96.0	43								
Cardiff Rd (wb) - right	32.7	1	23.4	1								
Murch Road	77.1	13	91.8	12								
Cardiff Rd (EB) - Ahead/left	69.1	21	65.4	21								
Cardiff Rd (EB) - right	52.5	3	48.0	2								
Millbrook Rd - Left	25.8	2	19.5	2								
Millbrook Rd - ahead right	70.8	4	92.5	11								
2018	Base				Base + committed				Base + committed + dev.			
Cardiff Rd (wb) - left/ahead	80.9	27	100.1	53	81.2	28	100.4	54	84.3	29	103.2	62
Cardiff Rd (wb) - right	35.1	2	24.6	1	35.1	2	24.5	1	35.1	2	24.6	1
Murch Road	80.2	14	96.0	14	80.9	14	97.5	15	83.7	15	101.5	19
Cardiff Rd (EB) - Ahead/left	72.2	23	68.3	22	72.2	23	68.3	22	74.3	24	70.2	23
Cardiff Rd (EB) - right	55.0	3	49.1	2	56.1	3	51.5	2	58.5	3	51.5	2
Millbrook Rd - Left	26.8	2	20.2	2	26.8	2	20.2	2	26.8	2	20.2	2
Millbrook Rd - ahead right	73.0	4	96.8	13	75.1	4	96.8	13	77.2	5	96.8	13
2028	Base				Base + committed + LDP				Base + comm. + LDP + dev.			
Cardiff Rd (wb) - left/ahead	93.3	38	115.1	119	105.2	63	125.7	165	107.7	71	129.3	177
Cardiff Rd (wb) - right	39.8	2	28.1	1	39.8	2	28.1	1	39.8	2	28.1	1
Murch Road	93.0	20	110.2	26	103.7	34	122.8	47	107.7	43	124.3	54
Cardiff Rd (EB) - Ahead/left	83.3	29	78.4	28	91.1	33	80.6	29	92.6	34	82.9	29
Cardiff Rd (EB) - right	63.2	3	57.3	3	83.0	5	95.9	7	85.4	5	95.9	7
Millbrook Rd - Left	30.8	3	23.4	3	30.8	3	24.2	3	30.8	3	24.2	3
Millbrook Rd - ahead right	85.0	6	111.0	24	99.6	9	125.6	36	101.7	10	125.6	36

Table 2.1 LinSig results – Cardiff Road/Murch Road/Millbrook Road junction – with pedestrian stage

2.2.3 It can be seen from the table above that the existing junction is operating over capacity in the base 2015 PM peak period scenario with a degree of saturation of 96% on the Cardiff Road arm and a maximum queue of 43 PCUs.

- 2.2.4 The degree of saturation increases to 125.7% in the 'Base + Committed + LDP allocated sites' scenario with a maximum queue predicted by the model in the PM. peak period of 165 pcu's on the Cardiff Road west-bound approach to the junction.
- 2.2.5 During the AM peak period, the junction operates within capacity up until the '2028 base' scenario where the degree of saturation is 93.3% on the Cardiff Road arm with a maximum queue of 38 PCUs.
- 2.2.6 As one would expect, the junction's predicted performance deteriorates further in the '2028 + Committed + School LDP + development' scenario. The degree of saturation increases to 129.3% in the 'with Development' assessment scenario with a maximum queue of 177 PCUs predicted for the Cardiff Road left-turn and ahead link.
- 2.2.7 It should be noted that the above analysis assumes that the 'all-red' pedestrian stage is called every cycle, whereas in practice the pedestrian stage is called far less often (particularly during the pm peak period). In view of this the analysis of the junction's performance has therefore been re-run, without the pedestrian stage, and the results are summarised in see **Table 2.2** below.

	0830-0930		1700-1800		0830-0930		1700-1800	
	DoS	Qu.	DoS	Qu.	DoS	Qu.	DoS	Qu.
2018	Base + committed				Base + committed + dev.			
Cardiff Rd (wb) - left/ahead	66.1	22	80.8	32	68.3	23	83.5	34
Cardiff Rd (wb) - right	35.1	2	24.6	1	35.1	2	24.6	1
Murch Road	66.4	12	81.2	11	67.8	13	82.7	12
Cardiff Rd (EB) - Ahead/left	59.5	19	55.6	17	60.9	19	57.5	18
Cardiff Rd (EB) - right	56.1	3	51.5	2	58.5	3	51.5	2
Millbrook Rd - Left	24.3	2	18.2	2	25.5	2	18.2	2
Millbrook Rd - ahead right	60.1	4	81.6	10	68.6	4	81.6	10
2028	Base + committed + LDP				Base + comm. + LDP + dev.			
Cardiff Rd (wb) - left/ahead	85.2	33	102.8	73	88.1	35	104.0	77
Cardiff Rd (wb) - right	39.8	2	28.1	1	39.8	2	28.1	1
Murch Road	85.7	21	100.9	23	87.5	22	103.6	28
Cardiff Rd (EB) - Ahead/left	74.8	26	66.7	23	76.7	27	67.5	23
Cardiff Rd (EB) - right	83.0	5	95.9	7	85.4	5	95.9	7
Millbrook Rd - Left	28.0	3	21.1	3	28.0	3	21.8	3
Millbrook Rd - ahead right	79.7	6	99.2	17	81.3	6	104.7	20

Table 2.2 Linsig results – Cardiff Road/Murch Road/Millbrook Road junction – no pedestrian stage

2.2.8 It is noted from table 2.2 that the predicted performance of the junction has improved with a reduction in both the degree of saturation and the predicted queue lengths. It was concluded that there was an overall improvement in capacity when the pedestrian stage is removed from the operation of the junction. In reality, the operation of the junction is likely to be somewhere between the two results identified in Tables 2.1 and 2.2 above.

2.2.9 Irrespective of whether the capacity modelling output is used for the ‘with’ or ‘without pedestrian stage’ assessments it is reasonable to compare the ‘base + committed’ assessment scenario with that of the ‘base + committed + development scenario’ of either of the ‘with pedestrian stage’ or ‘without pedestrian stage’ assessments. When doing so it can be seen that the proposed development will have a marginal impact on

the performance of the junction in 2028 with relatively low increases in queues resulting.

- 2.2.10 It should also be noted that when high degrees of saturation are predicted by the model then the queue lengths that are reported may be unreliable and may not reflect actual queue lengths experienced by users of the junction.

Microprocessor Optimised Vehicle Actuation (MOVA)

- 2.2.11 The MOVA signal control strategy was researched and developed by Transport Research Laboratory (TRL) where a series of computers or microprocessors are able to assess the best signal timings, according to the layout of the junction (where it is installed) and current traffic conditions.

- 2.2.12 MOVA has two operational modes; the first dealing with uncongested conditions and the second with situations when the junction is reaching its maximum capacity. In this mode MOVA accounts 'for which approaches are over-loaded, the efficiency of green use, the amount of use of any local flaring of the carriageway, and determines the signal timings which will maximise the junction's throughput under the actual flow conditions prevailing.' (Source: Traffic Advisory Leaflet 3/97 'The "MOVA" signal control system.

- 2.2.13 The Vale of Glamorgan have confirmed that MOVA is installed at the Cardiff Road/Murch Road/Millbrook Road traffic signal controlled junction and have confirmed that with this computer software installed a reduction of 13% to the predicted Degree of Saturation can be applied.

- 2.2.14 It is therefore considered that the existing junction is likely to have sufficient capacity in reality to accommodate the proposed development at Caerleon Road together with committed development (proposed Health Centre) and development on the St Cyres School Site.

- 2.2.15 Mitigation may also be considered by way of facilitating and encouraging travel by sustainable mode and this is examined in the following section.

3 Mitigation

3.1.1 It has been determined that there is little by way of geometric improvement that could be implemented at the signal junction that would improve its operational performance. This view is also shared by officers of the Local Highway Authority. It is considered therefore that encouraging and facilitating sustainable travel that will restrain the volume of vehicular trips that will assign to the junction will offer the most effective means of mitigation.

3.1.2 The development and implementation of an effective residential Travel Plan may restrain vehicle trip generation of the proposed development to a reduced level to that derived in the previous transport assessment. A Travel Plan that complies with current best practice and commits to facilitating and encouraging sustainable travel by residents of the proposed development may therefore reduce the development's impact on the performance of the signal junction.

3.1.3 It should also be noted that it is the LDP allocation of 300 dwellings on the site of the former St Cyre's School that will exert the greatest traffic impact on the operational performance of the signal junction of Murch Road and Cardiff Road and not that of the development proposed.

3.1.4 As detailed earlier in the report, the application site is located approximately 270m south-west of Eastbrook Railway Station. Whilst there is a footway link that connects the end of Caerleon Road with a footbridge to the station, it is considered that the footpath may be upgraded in terms of width and surfacing materials. Low level lighting could also be installed for the alignment between the western end of Caerleon Road and the station entrance.

4 Conclusions

4.1 Conclusions

4.1.1 Overall, it is considered that traffic generated by the proposed development can be accommodated within the existing highway network without significantly increasing delays to existing road users. It is the impact of the much larger housing allocation on

the St Cyre's school that impacts to the greatest degree on the signal junction's performance.

4.1.2 It is also considered that the development proposals – which incorporate traffic calming measures along Caerleon Road – go some way to address the concerns raised by local residents at the recent public consultation event.

4.1.3 It is therefore considered that the impact of the proposed development could be mitigated to an acceptable degree without significantly increasing delays to existing road users. Mitigation in the form of the implementation of an effective Travel Plan that is complemented by measures to enhance both pedestrian movement and the site's connectivity to Eastbrook Railway Station will reduce the proposed development's vehicular trip generation.

Figures



Drawing Title Proposed site layout	Client United Welsh Housing Association	 Unit 9 Oak Tree Court Mulberry Drive Cardiff Gate Business Park Cardiff CF23 8RS T 029 2073 2652	Scale: 1:500 @ A3					
	Job Title Land at Caerleon Road, Dinas Powys		Designed by: HP Drawn by: HP Ckd/Appd: PO'C 1st Issued: Jun 2015 Job No: T15.105	Rev.	Date.	Amendment.	Des.	Drn.
								Rev

Figure 1



Drawing Title Proposed site access with dimensions	Client United Welsh Housing Association	 Unit 9 Oak Tree Court Mulberry Drive Cardiff Gate Business Park Cardiff CF23 8RS T 029 2073 2652	Scale: 1:500 @ A3					
	Job Title Land at Caerleon Road, Dinas Powys		Designed by: HP Drawn by: HP Ckd/Appd: POC 1st Issued: Jun 2015 Job No: T15.105	Rev.	Date.	Amendment.	Des.	Drn.
							Figure 2	Rev



Drawing Title Proposed turning head with dimensions	Client United Welsh Housing Association	 Unit 9 Oak Tree Court Mulberry Drive Cardiff Gate Business Park Cardiff CF23 8RS T 029 2073 2652	Scale: 1:500 @ A3					
	Job Title Land at Caerleon Road, Dinas Powys		Designed by: HP	Drawn by: HP	Rev.	Date.	Amendment.	Des.
			Ckd/Appd: PO'C	Drg No: Figure 3			Rev	
			1st Issued: Jun 2015					
			Job No: T15.105					