

TECHNICAL NOTE

DATE:	July 2023	CONFIDENTIALITY:	Public
SUBJECT:	Hywel Dda - Updated Traffic Counts		
PROJECT:	70104118 - Hywel Dda Land Services	AUTHOR:	AM
CHECKED:	LM	APPROVED:	AW

INTRODUCTION AND BACKGROUND

WSP was commissioned by BDP to support Hywel Dda University Health Board (HDUHB) in understanding the traffic implications of providing a new hospital in West Wales through the preparation of traffic diagrams. There are four hospitals which currently exist within the Health Board’s area (Withybush, Glangwili, Bronglais and Prince Philip). The new hospital would combine some of the existing services into a new facility. There are three (3) locations being considered for the new hospital, two (2) in Whitland and one (1) in St Clears. The sites are known as: St Clears (Formerly Site 17), Whitland Spring Gardens (Formerly Site 12) & Whitland: Tŷ Newydd (Formerly Site C). In a previous technical note, WSP demonstrated the potential impact that a new hospital would have on the transport network in 2027 at each of the proposed sites. This was calculated by redistributing and redirecting a percentage of traffic movements from each of the existing hospitals to the new sites instead, using staff postcode data to establish origins for trips to the hospitals.

Before the redistributed traffic flows were added to the network, baseline traffic flows needed to be obtained to provide a comparison for the net change in traffic because of the proposed hospital. For the initial assessment, the source data of these base flows was as follows:

- Traffic data from a local Transport Assessment carried out in 2017 (used in conjunction with NOMIS data (Census 2011)) used to gain an understanding of the current baseline situation at St Clears.
- For Whitland, there was a lack of survey data for the exact locations of the proposed sites, so data from a Transport Statement by Jubb (2014) and an AADT Survey conducted by DfT (2018) were used to establish baseline traffic flows. NOMIS (Census 2011) (place of residence) and work data was also used to calculate the percentage of journeys travelling to the East and the West of Whitland and applied to this data given that the survey results were for sections of the highway only (rather than establishing the directional movements of the traffic).

Following the initial assessment, WSP has commissioned traffic surveys at the proposed site locations and the corresponding network, in line with the original assessment. The commissioned surveys provide a more accurate understanding of the current traffic flows at the sites, and more accurately informs the impact on the network. The following is included within this note:

- The flow diagrams that were calculated and presented as part of the original assessment;
- The results of the traffic surveys presented as OD tables and flow diagrams;
- The difference between the calculated and surveyed flows, and what this means; and,



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- New traffic flow diagrams presenting the updated impact assessment i.e. the base flows, the hospital flows and the percentage increase that will be imposed on the existing network.

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TRAFFIC DATA ANALYSIS

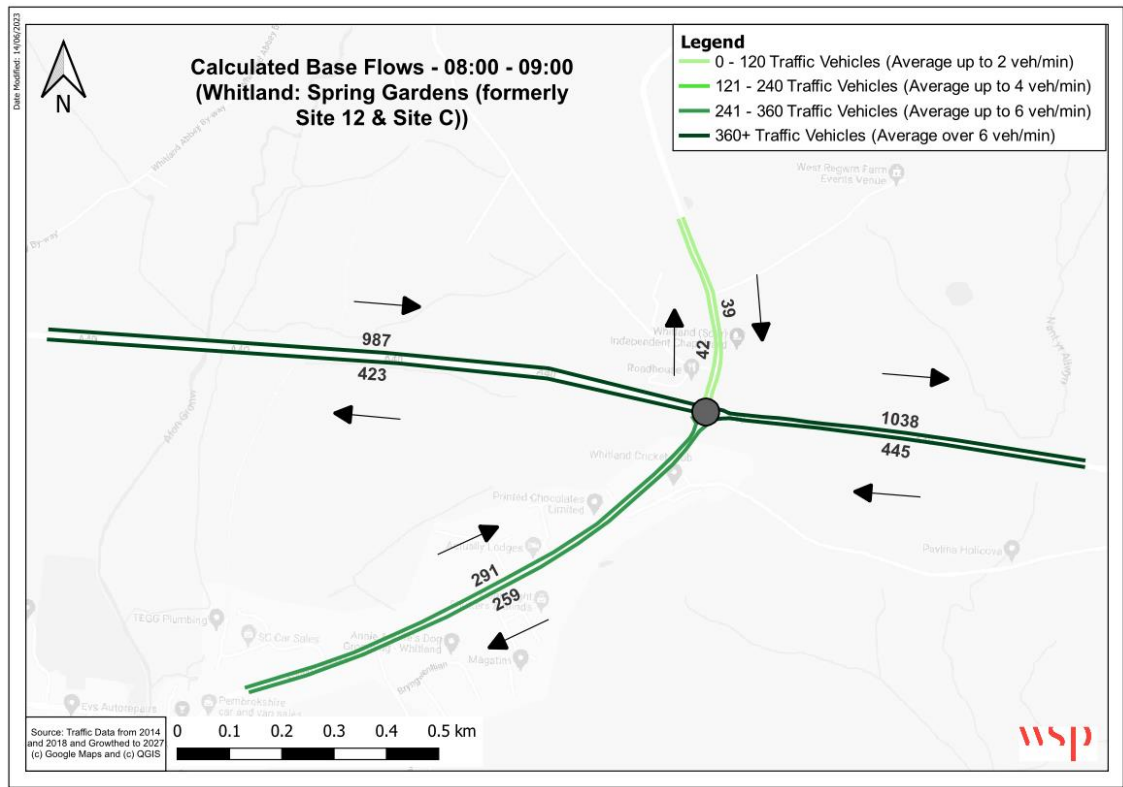
Original Baseline Traffic Flows

The baseline flows which were calculated for the original assessment, based on a number of sources, are summarised in the following figures. Due to the limited data available, the turning movements at the junctions were not able to be calculated; however, the flows on each of the links are summarised.

WHITLAND

Figure 1 and Figure 2 represent the AM and PM peak hour flows, respectively, at the A40 / B4328 Spring Gardens roundabout junction, which would see a notable uplift in traffic as a consequence of a new hospital in Whitland.

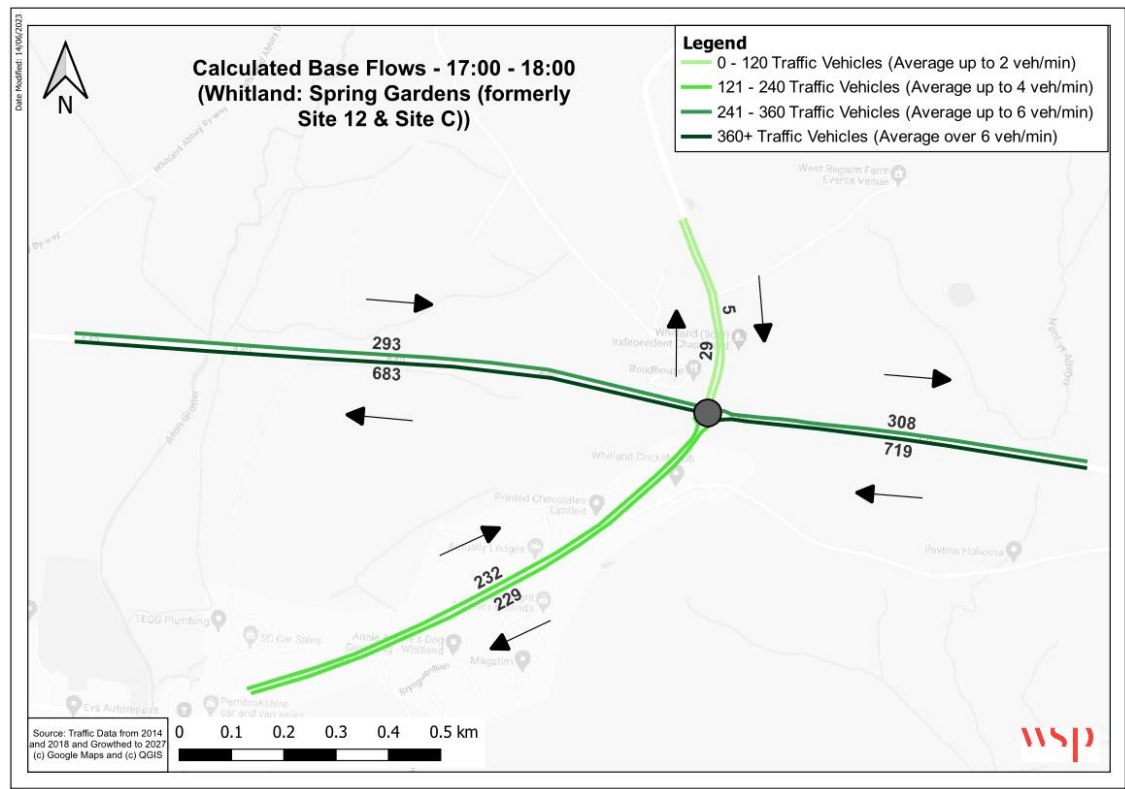
Figure 1: Calculated Base Flows: Whitland: AM Peak Hour



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Figure 2: Calculated Base Flows: Whitland: PM Peak Hour



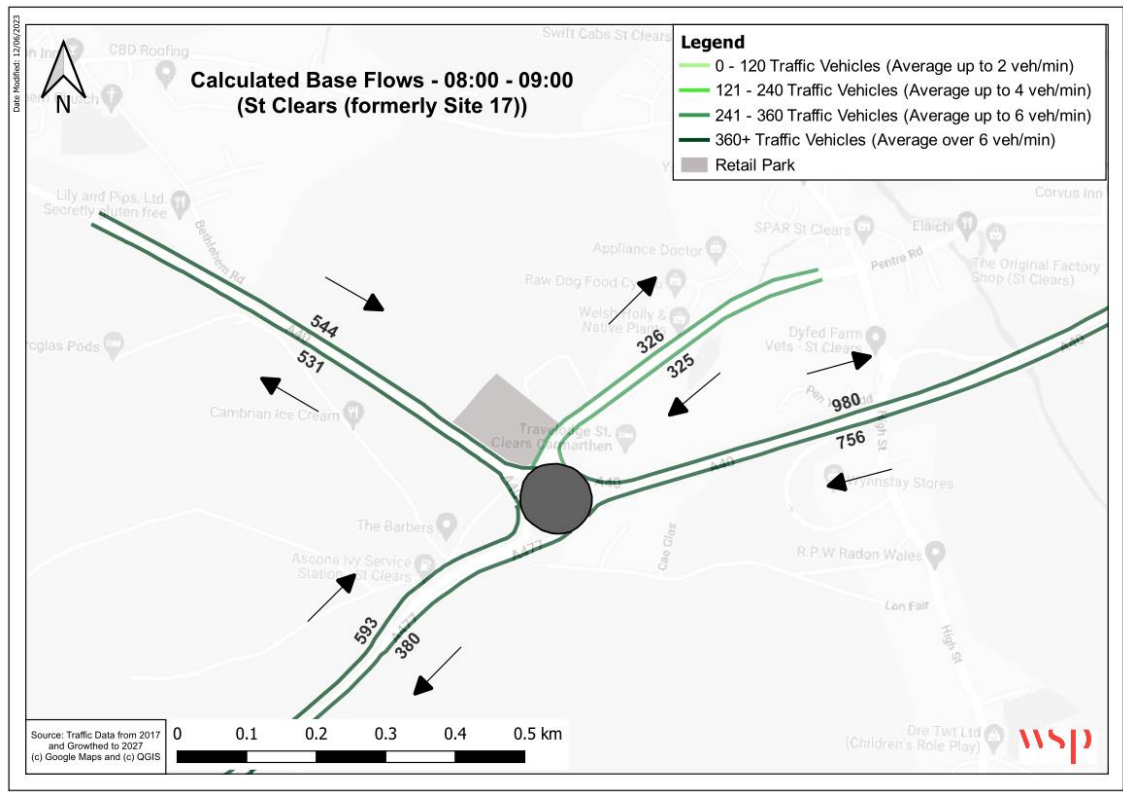
ST CLEARS

Figure 3 and Figure 4 represent the AM and PM peak hour flows, respectively, at the A40 / A477 / Tenby Road roundabout junction, which would see a notable uplift in traffic as a consequence of a new hospital in St Clears.

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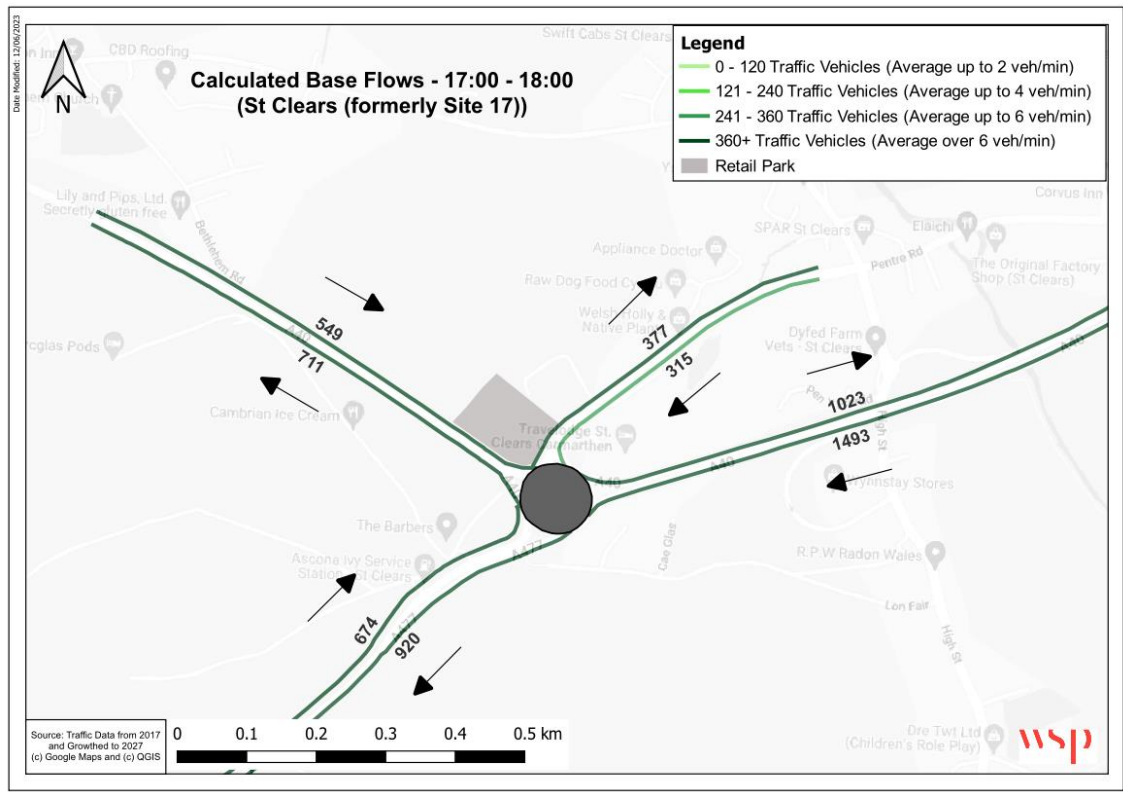
Figure 3: Calculated Base Flows: St Clears: AM Peak Hour



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Figure 4: Calculated Base Flows: St Clears: PM Peak Hour



SUMMARY

Traffic survey data was collected for other junctions in the vicinity of both Whitland and St Clears; however, for the purposes of the original assessment only these two key junctions were considered and will be discussed herein.

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Observed Traffic Surveys

Manual Classified Counts (MCCs) have been provided by The Severnside Group for the sites shown in Figure 5 and Figure 6. The surveys were conducted on the following dates: 16/05/2023, 17/05/2023 and 18/05/2023. The figures provide MCC's camera locations for the A40 / B4328 Spring Gardens and A40 / A477 / Tenby Road roundabout junctions, respectively.

Figure 5: Survey Site Location: Whitland



Figure 6: Survey Site Location: St Clears



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The traffic survey data was analysed to obtain the peak hour traffic counts for each location. An average across each of the days has been taken for the AM peak hour (08:00 - 09:00) and PM peak hour (17:00 - 18:00). This data was then grown to the year 2027, in line with the previous data, using TEMPro (Trip End Model Presentation Program).

OD TABLES

Table 1: Origin-Destination table presenting the MCC's obtained for Whitland, during the AM peak hour

Whitland					
AM Peak Hour (2027) - 08:00 - 09:00					
Origin	Destination				
		A	B	C	D
	A	0	16	42	11
	B	9	1	171	423
	C	26	143	1	11
	D	6	373	4	0

Table 2: Origin-Destination table presenting the MCC's obtained for Whitland, during the PM peak hour

Whitland					
PM Peak Hour (2027) 17:00 - 18:00					
Origin	Destination				
		A	B	C	D
	A	0	8	27	7
	B	14	0	138	351
	C	42	133	1	10
	D	17	428	11	0

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Table 3: Origin-Destination table presenting the MCC's obtained for St Clears, during the AM peak hour

St Clears					
AM Peak Hour (2027) - 08:00 - 09:00					
Origin	Destination				
		A	B	C	D
	A	1	74	97	146
	B	78	4	314	435
	C	125	378	0	18
	D	103	416	17	0

Table 4: Origin-Destination table presenting the MCC's obtained for Whitland, during the PM peak hour

St Clears					
PM Peak Hour (2027) 17:00 - 18:00					
Origin	Destination				
		A	B	C	D
	A	1	61	88	99
	B	45	5	418	384
	C	118	378	0	17
	D	109	437	17	0

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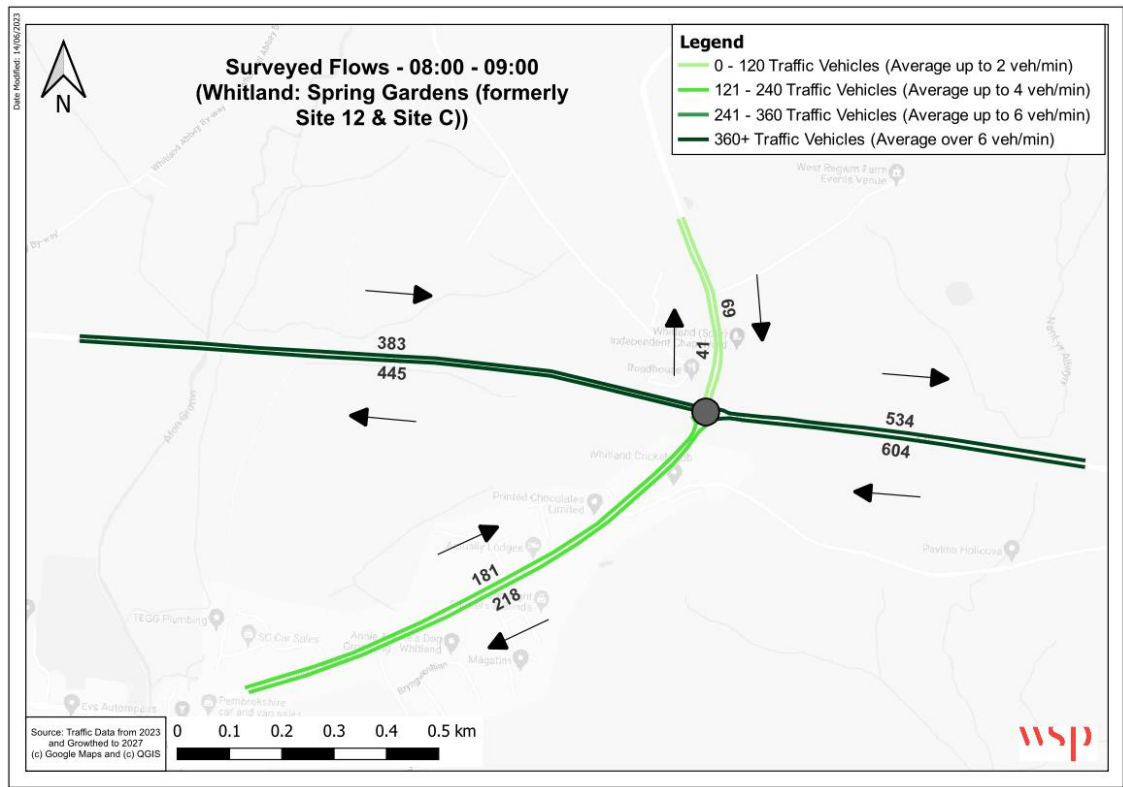
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TRAFFIC FLOW DIAGRAMS

WHITLAND

Figure 7 and Figure 8 provide total link flows based on the MCCs undertaken in May 2023 at the A40 / B4328 Spring Gardens roundabout junction for the AM and PM peak hours, respectively. The flows are provided for each of the links in line with the original baseline flows to provide an easily comparable visual representation for the data.

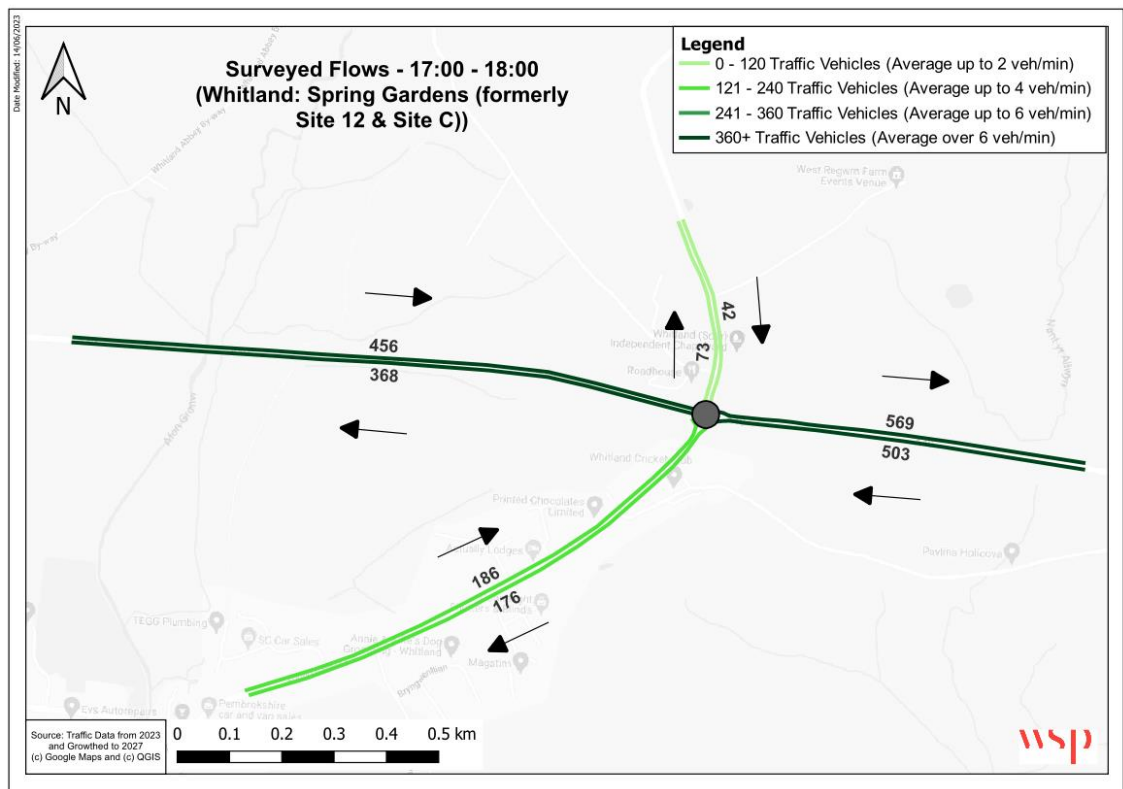
Figure 7: Surveyed Flows: Whitland: AM Peak Hour



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Figure 8: Surveyed Flows: Whitland: PM Peak Hour



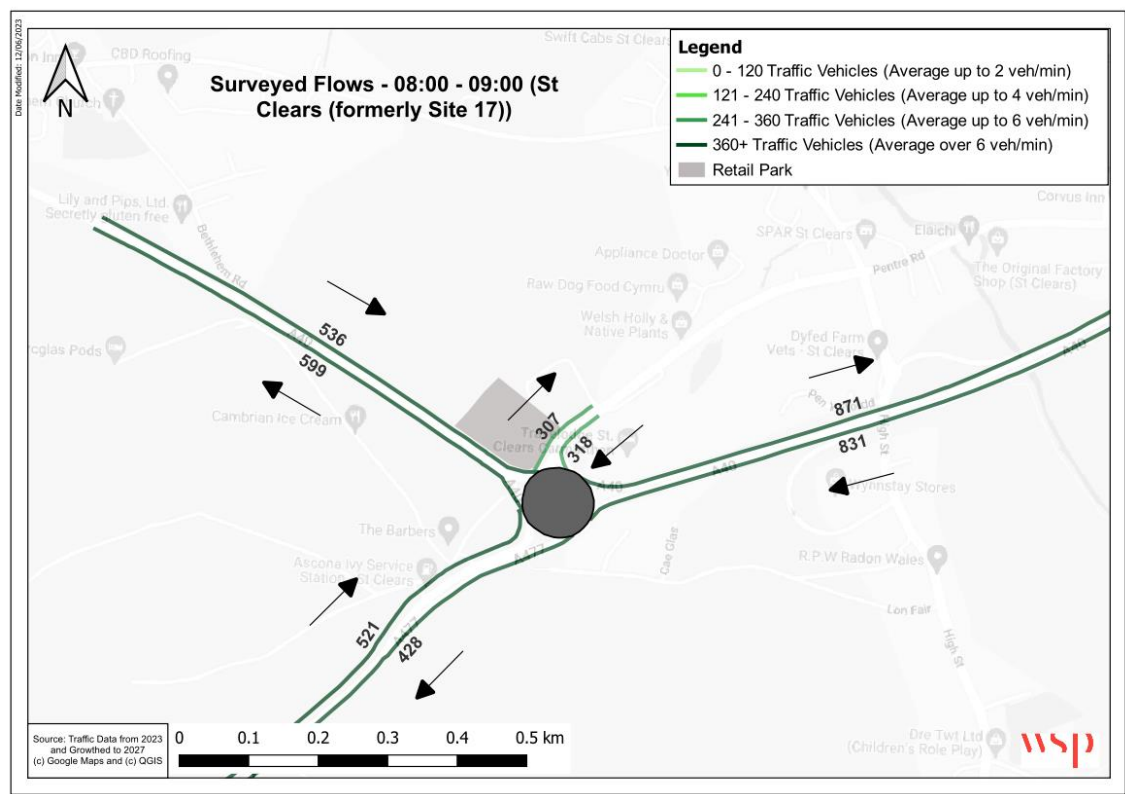
ST CLEARS

Figure 9 and Figure 10 provide total link flows based on the MCCs undertaken in May 2023 at the A40 / A477 / Tenby Road roundabout junction for the AM and PM peak hours, respectively. The flows are provided for each of the links in line with the original baseline flows to provide an easily comparable visual representation for the data.

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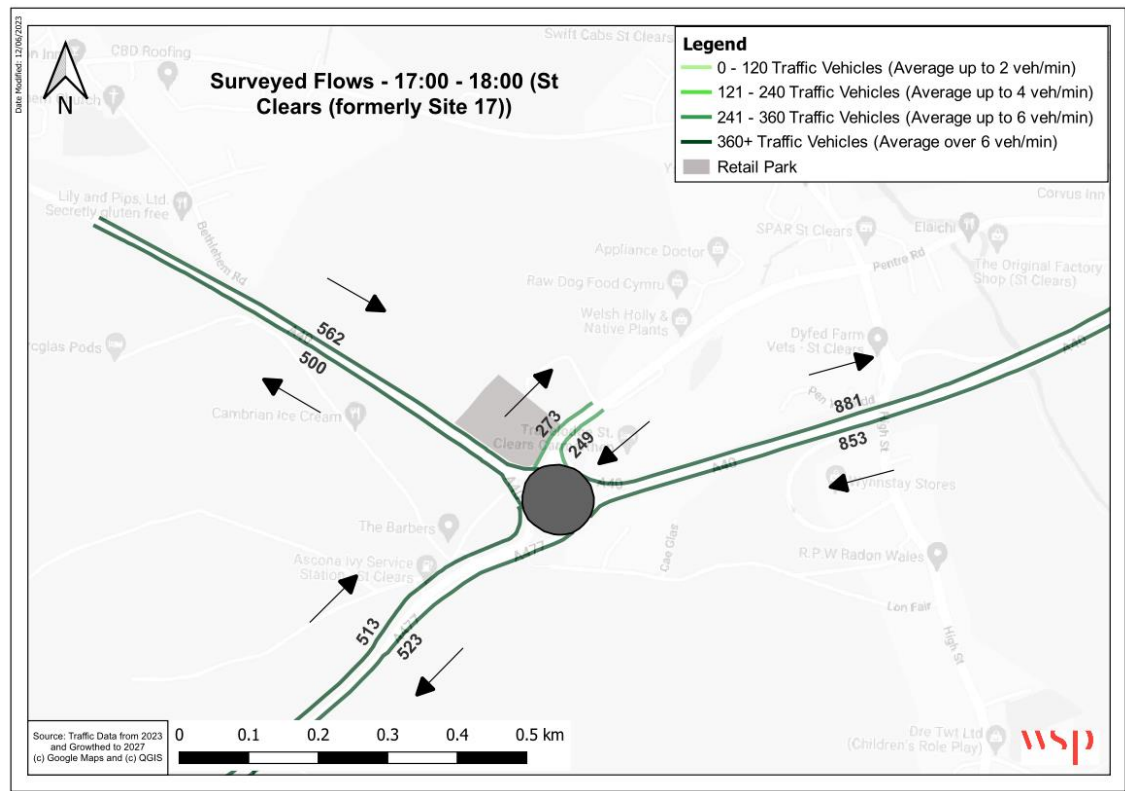
Figure 9: Surveyed Flows: St Clears: AM Peak Hour



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Figure 10: Surveyed Flows: St Clears: PM Peak Hour



Difference

WHITLAND

For the AM peak hour, it is observed that previously predicted background traffic data was higher than the observed 2023 counts for A40 Eastbound traffic and Unnamed Road Southbound traffic. It was observed to be less for all other movements. For the PM peak hour, it was observed that the previously predicted background traffic data was higher than the observed 2023 counts for both directions on the Unnamed Road, and for the A40 Westbound traffic. However, it was less for all other movements. The previously predicted background traffic for the roundabout at Whitland have been determined to be notably overestimated in the first assessment when compared to the 2023 observed surveyed counts for the A40 Westbound in the AM peak and A40 Eastbound in the PM peak. This means that the overall impact on the highway network (background growth plus hospital traffic) will be less than previously calculated for these

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movements. However, it will also mean that the percentage impact of the hospital traffic relative to the background traffic will likely be higher.

Despite the percentage change being significant along the Unnamed Road in both directions, the actual number of trips do not change between the calculated and surveyed counts by more than 37 in the Southbound direction and 44 in the Northbound direction, which is in the range of 0-2 traffic vehicles per minute.

ST CLEARS

For the AM peak hour, it is observed that previously predicted background traffic data was generally in line with the observed 2023 counts. It was observed that the highest percentage difference was for A40 Eastbound traffic and A477 Southbound traffic at just over 12% increase. It was observed to be less for all other movements. For the PM peak hour, it was observed that the previously predicted background traffic data was higher than the observed 2023 counts. Of note, the observed data was up to 43% less than the predicted counts for A40 Eastbound traffic, A477 Southbound traffic and Tenby Road Northbound. However, the difference was less for all other movements. The background traffic for the St Clears roundabout has also, for the majority, been overestimated in the previous assessment, meaning that the impact on the highway network will not be as significant as previously calculated. However, it will also mean that the percentage impact of the hospital traffic relative to the background traffic will likely be higher.

The surveyed flows along the arms of the roundabout at St Clears do not differ by more than $\pm 50\%$ from the calculated flows, with the majority only varying by 0 to -25%. The flows that were initially undercounted (represented by a positive change on the diagrams) do not exceed more than a change of +75 traffic vehicles per hour.

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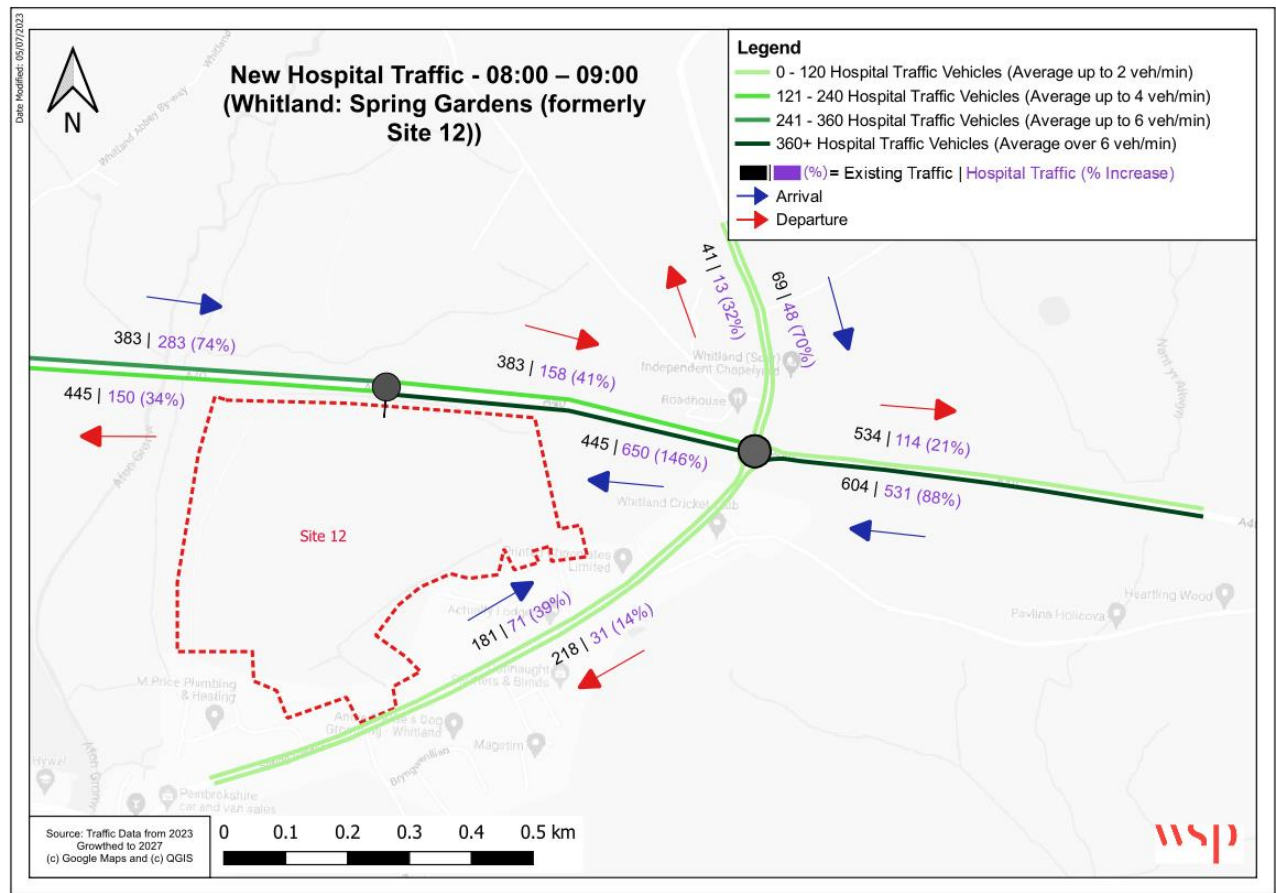
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REVISED IMPACT ASSESSMENTS

WSP have updated the impact assessment flow diagrams in the previous technical note to consider the surveyed flows in place of the calculated flows. The diagrams show the impact that a new hospital would have on the existing network. The percentage increase that the hospital flows will impose on the network as a proportion of the base flows has also been updated to reflect the change in impact due to the new base flow numbers. The hospital traffic numbers remain unchanged from those presented previously.

Within the diagrams, the arrows represent arrivals and departures to the proposed hospital site. The green lines along the road represent the hospital traffic numbers.

Figure 11: New Hospital Traffic at Site 12; Whitland, Spring gardens during the AM peak hour

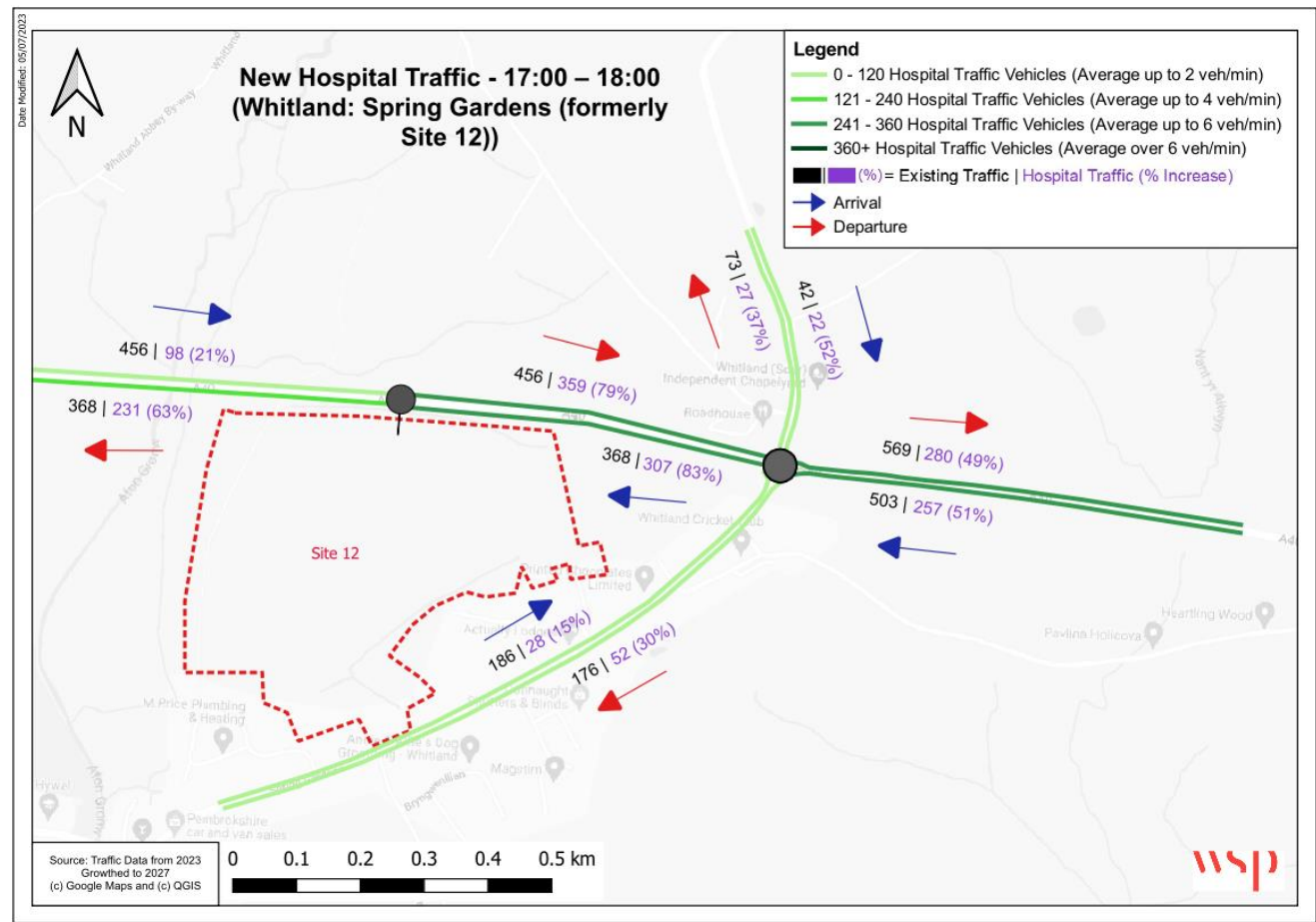


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Should a new hospital be built at Site 12, the largest impact to the road network on the AM peak will likely be seen on the A40 west junction arm for the westbound traffic. An additional 650 vehicle trips will be generated by the hospital on the eastern side of the A40 west arm, on top of the existing 445 observed vehicle trips. This means that there will be an increase from the existing amount of traffic by approximately 146%. It is also observed that 531 hospital traffic vehicles will be added to the A40 East arm for the westbound traffic, representing an 88% increase. The impact on the northern (Unnamed Road) and southern (Spring Gardens) arms will not be as significant. It should be noted that the percentage impact of the additional hospital traffic does not change significantly when compared to the calculated percentage impacts as presented in the original commission for most locations.

Figure 12: New Hospital Traffic at Site 12; Whitland, Spring gardens during the PM peak hour

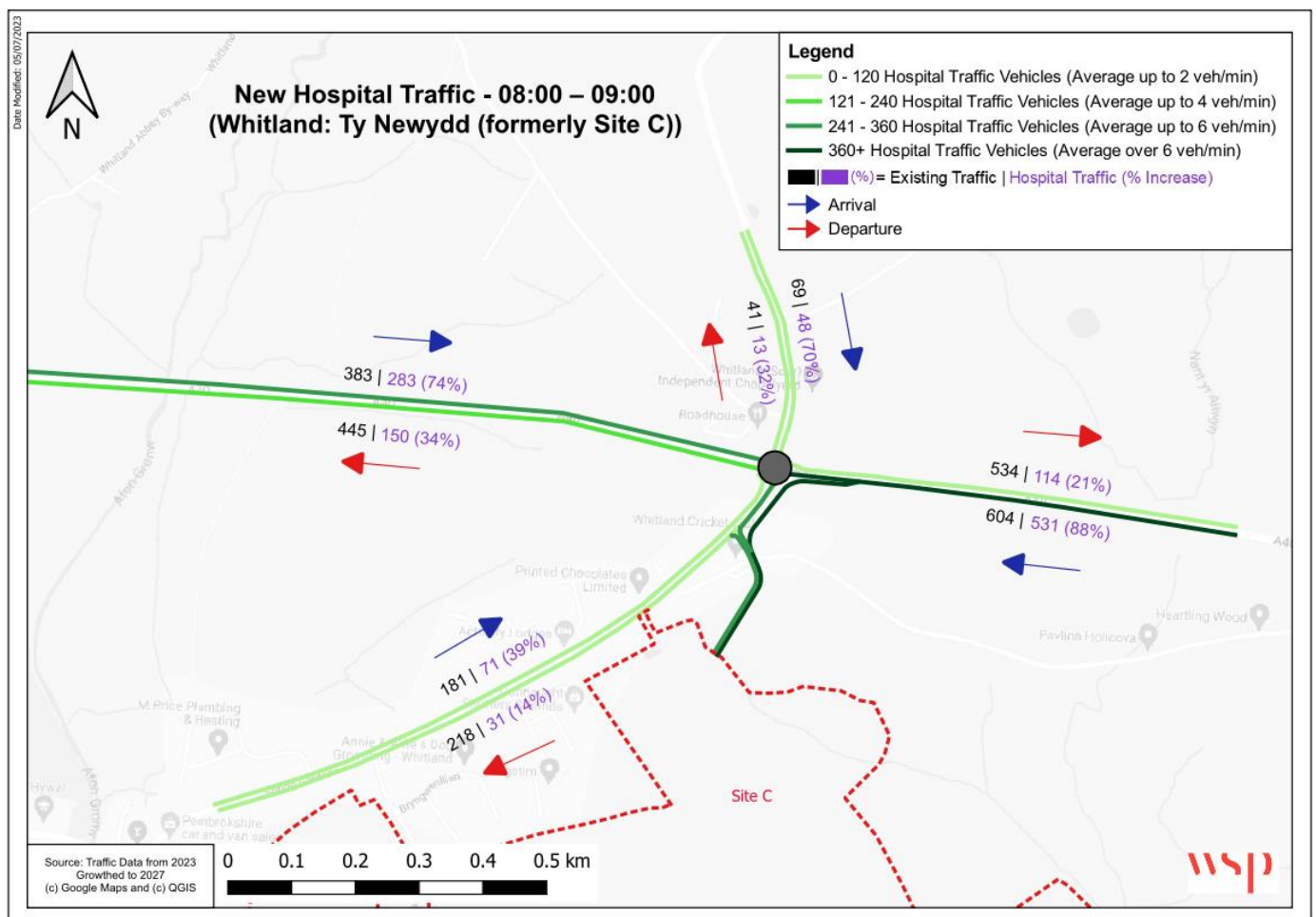


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During the PM peak hour, there is generally less of a significant impact observed at Site 12 as compared to the AM peak hour. However, the most significant percentage increases still occur along the A40, rather than on the northern and southern arms, Unnamed Road, and Spring Gardens B4328 respectively. The most significant addition of traffic to the network is on the A40 west arm in both directions. There is a significant change in the traffic travelling in both eastern and western directions, with likely increases of 79% and 83% respectively.

Figure 13: New Hospital Traffic at Site C; Whitland, Ty Newydd during the AM peak hour

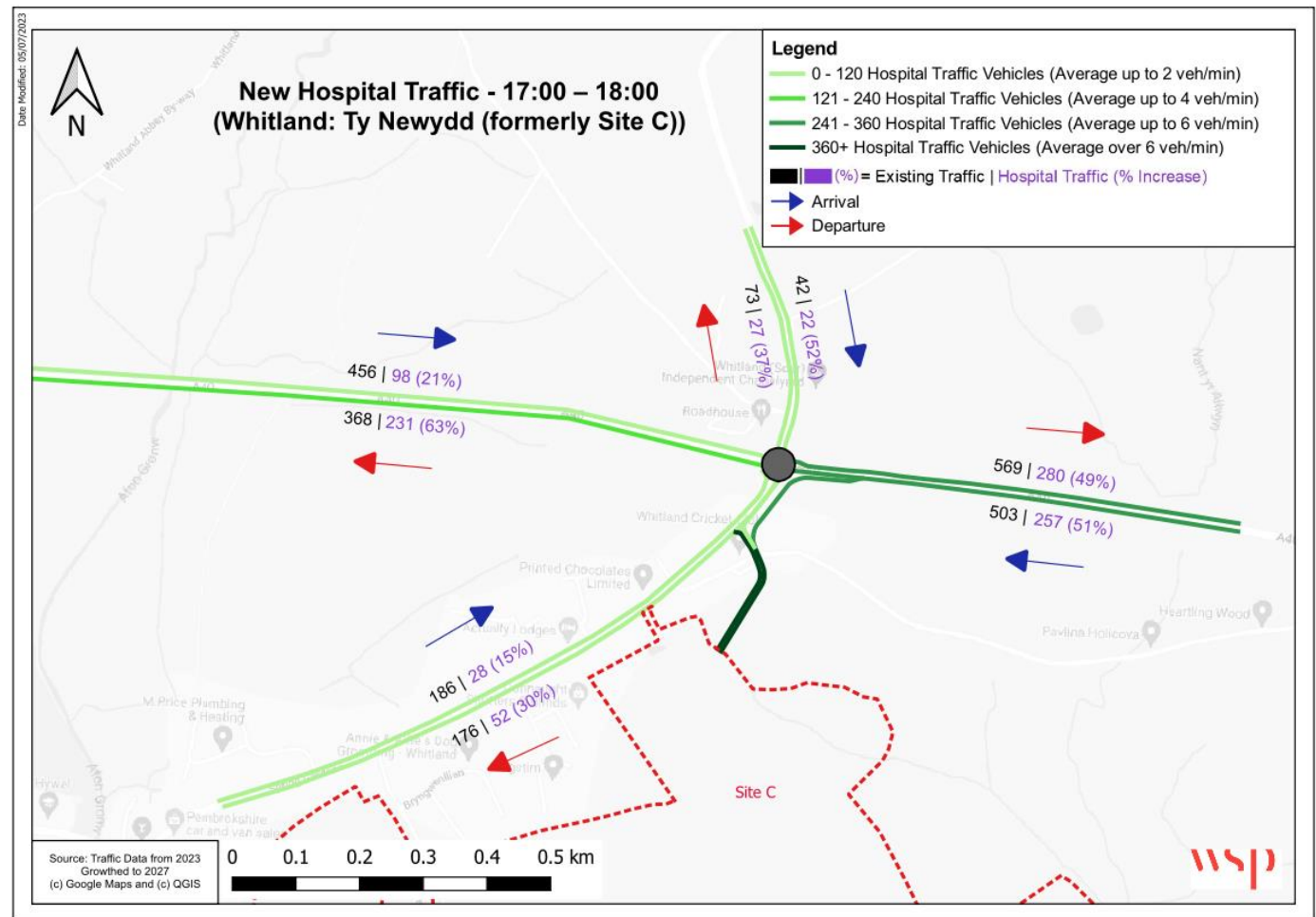


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At Site C, during the AM peak hour, the most significant impact on the network can be seen on the A40. In particular, the A40 east arm for traffic travelling westbound (88%), and on the A40 west arm for traffic travelling eastbound (74%). Traffic moving southbound towards to hospital along the northern arm introduces a 70% increase on the existing network. It should be noted that the percentage impact of the additional hospital traffic does not change significantly when compared to the calculated percentage impacts as presented in the original commission for most locations.

Figure 14: New Hospital Traffic at Site C; Whitland, Ty Newydd during the PM peak hour

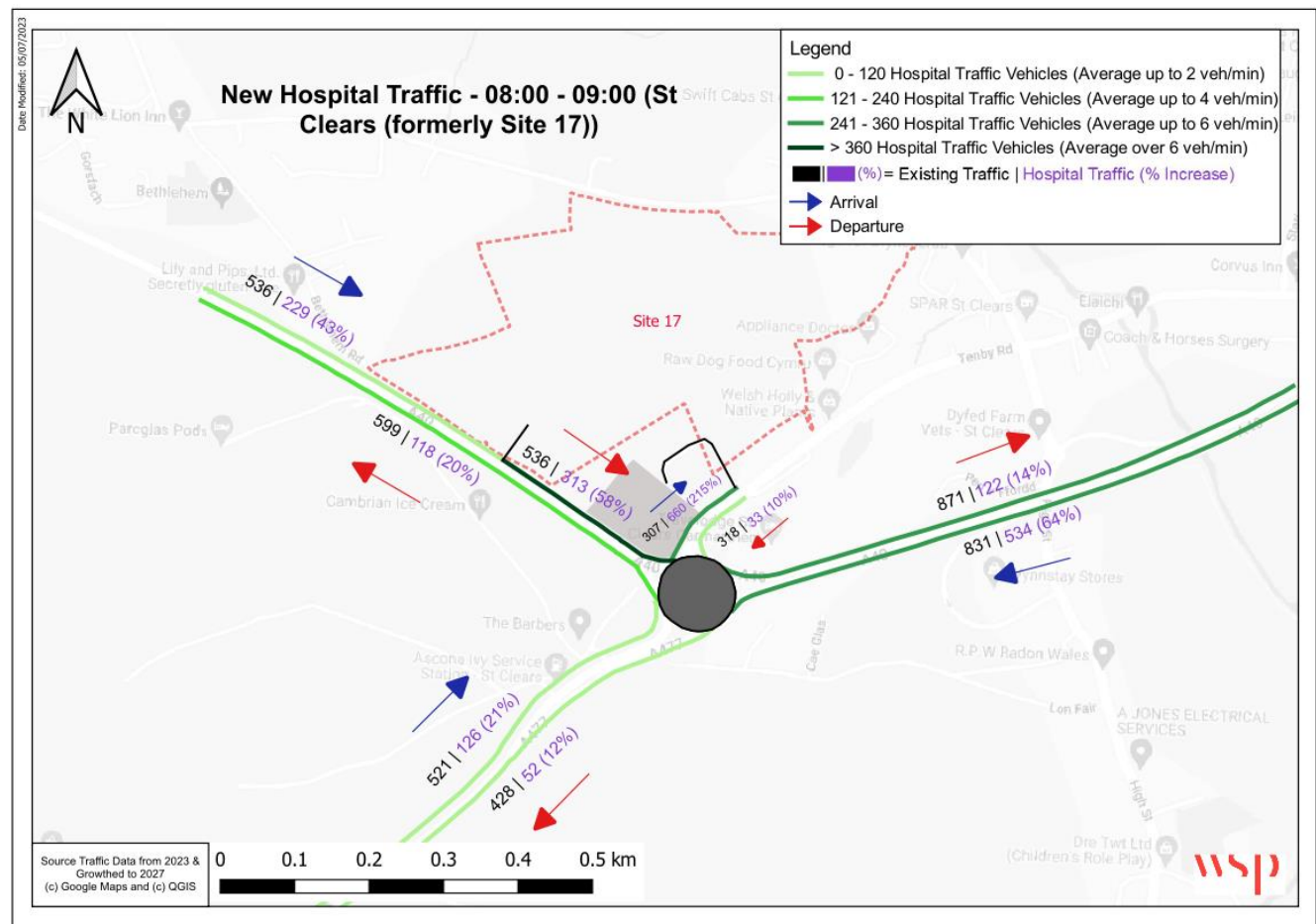


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During the PM peak hour at Site C, there is generally less of a significant impact observed. The most significant number of vehicles added to the network are along the eastern arm of the A40. The traffic generated here from the addition of the proposed hospital results in an approximately 50% increase in traffic in both directions. It should be noted that the percentage impact of the additional hospital traffic does not change significantly when compared to the calculated percentage impacts as presented in the original commission for most locations.

Figure 15: New Hospital Traffic at Site 17; St Clears during the AM peak hour



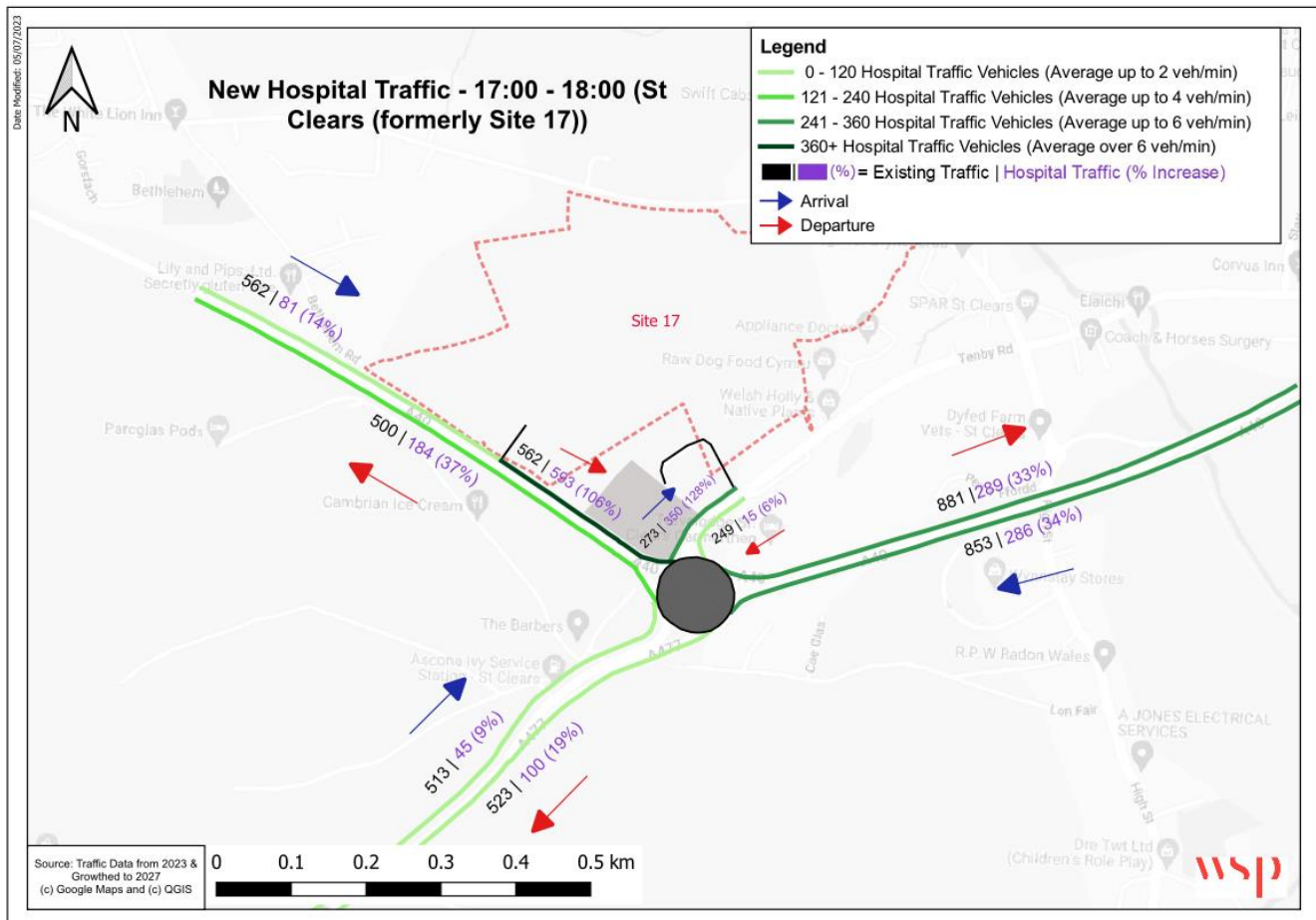
At Site 17, the introduction of a new hospital imposes a significant impact on the network in the AM, particularly on the section of Tenby Road between the A40 roundabout junction and the site access. Traffic travelling northbound along Tenby Road towards the site access will increase by 215%, which equals an

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addition of 660 vehicles added on to the section of highway in the AM peak. Although not as significant, vehicles exiting the hospital on the A40 eastern arm of the roundabout result in a 58% increase in traffic onto the network. There is also a significant number of vehicle trips added on to the eastern arm of the A40, travelling west, towards the proposed hospital Site which represents a 64% increase over the existing traffic volumes. It should be noted that the percentage impact of the additional hospital traffic is not dissimilar to the calculated percentage impacts as presented in the original commission.

Figure 16: New Hospital Traffic at Site 17; St Clears during the PM peak hour



During the PM peak hour, the most significant increase in traffic is along Tenby Road travelling northbound between the A40 junction and the site access, which experiences a 128% increase in traffic volumes.

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Similarly, since vehicles exiting the hospital will be required to travel on the eastern side of the A40 west arm of the roundabout, an additional 593 vehicles will travel along this stretch of road, representing a 106% increase in traffic. It should be noted that the percentage impact of the additional hospital traffic does not change significantly when compared to the calculated percentage impacts as presented in the original commission.

CONCLUSION

The surveyed traffic flows demonstrate that, at all sites, the calculated base flows were mainly overestimated. While the overall impact in terms of congestion will be less, the percentage impact of the hospital traffic relative to the background traffic will likely be higher.

The percentage impacts are generally in line with those presented in the original scope of work; however, some locations are observed to have a higher percentage impact than previously demonstrated, as is to be expected with a lower base traffic flow.