

A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 9

9.51 Sensitivity Test for School Lane, Cambourne

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Rule 8(1)(k)

Infrastructure Planning (Examination Procedure) Rules
2010

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**A428 Black Cat to Caxton Gibbet
improvements
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9.51 Sensitivity Test for School Lane, Cambourne

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1 Background

- 1.1.1 The joint authorities of Cambridgeshire County Council (CCC), Huntingdonshire District Council (HDC) and South Cambridgeshire District Council (SCDC) submitted a Local Impact Report (LIR) **[REP2-003]** in response to the Applicant's Development Consent Order (DCO) application for the A428 Black Cat to Caxton Gibbet improvements (the Scheme). The LIR **[REP2-003]** included comments regarding the forecast increase in traffic on School Lane through Cambourne, which would not expect to happen as a result of the Scheme. This was noted in the 'Applicant's Comments on Local Impact Reports' **[REP3-009]** which states that:
- a. *The model shows increases in traffic on the A1198 south of the A428 and on School Lane both of these will need to be monitored as the School Lane impact in particular is not something that would be expected as a result of the Scheme.*
- 1.1.2 This technical note addresses the joint authorities comment relating to the expected over-estimation of traffic on School Lane in the 'Do Something' DS (i.e. with Scheme) scenario. This note also sets out the network coding issues identified around Cambourne in the A428 Stage 3 Strategic model, and provides analysis of predicted flows in Cambourne based on a sensitivity test with the network coding issues corrected.
- 1.1.3 Cambourne is the largest settlement in South Cambridgeshire, with an approximate population of 12,000 people and 4,250 homes¹. It comprises the villages of Lower Cambourne, Great Cambourne, Upper Cambourne and West Cambourne. **Figure 1-1** shows the 2040 'Do Minimum' DM (i.e. without Scheme) network and zones of the A428 Stage 3 Strategic model around Cambourne. It contains West Cambourne which is an on-going development site that will generate additional traffic over the next 10 to 20 years.

¹ <https://www.cambridgeshire.gov.uk/directory/listings/cambourne-town-council>

A428 Black Cat to Caxton Gibbet improvements
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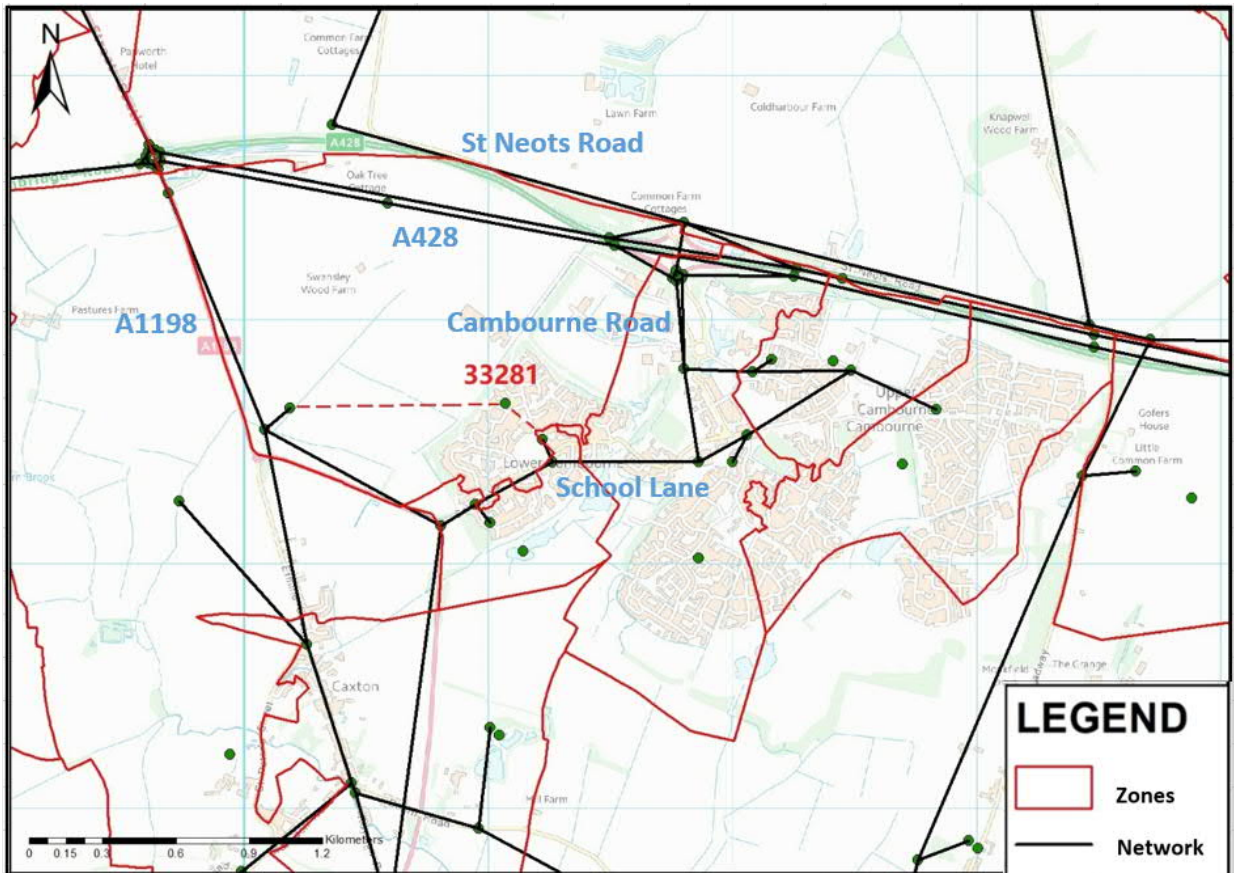


Figure 1-1 : Strategic Model Network Around Cambourne

2 Network Issues

- 2.1.1 Following a review of the A428 Stage 3 Strategic model, some network issues were identified in the Cambourne area as follows:
- a. Speeds on School Lane were coded too fast (82kph) from the A1198 to Broad Street (between node 2553 and 2367) and Back Lane (link 2367-2366) as there is a 48kph speed limit on this section.
 - b. Cambourne Road between the A428 and Cambourne Road/Broad Street/Back Lane roundabout had link capacities of 650 passenger car units (PCUs) which is too low for a two lane dual carriageway.
 - c. Sections of the roundabouts at the Cambourne Road/A428 junction were incorrectly coded with one rather than two circulatory lanes.
- 2.1.2 In order to assess the impact of these coding issues around Cambourne, the Applicant undertook a sensitivity test on the 2040 DM and DS scenarios. The following corrections were made:
- a. The speed flow curves (SFC) on School Lane were removed and replaced by a fixed speed of 40kph (25mph). Although the sign posted speed limit on School Lane is 30mph, a speed of 25mph was considered more appropriate to reflect the non-linear geometry and junction delay.
 - b. The Cambourne Road link capacity was increased 4,199 PCUs, to reflect that this road is a two lane dual carriage way with a national speed limit, by applying the 'Rural All-Purpose D2²' SFC between the A428 and Cambourne Road/Broad Street / Back Lane roundabout.
 - c. Sections of the roundabout on the Cambourne Road/A428 junction were re-coded with two circulatory lanes.

² D2 refers to 2 lane dual carriageway

3 Assessment

3.1.1 The results of the Cambourne Sensitivity Test ('Sensitivity Test') have been compared with the A428 Stage 3 Strategic model that was used for the DCO submission ('DCO model'). The 2040 DS AM scenario has been used as a comparator.

3.1.2 **Figure 3-1** shows the forecast traffic flow comparison between the Sensitivity Test and the DCO model for the 2040 DS AM scenario. The green bandwidth represents an increase in traffic flow in the Sensitivity Test while the blue bandwidth represents a decrease. It indicates that the traffic flow changes due to the corrections are primarily in the local Cambourne area, and impacts on medium and long distance trips are moderate. Compared to the DCO model the Sensitivity Test forecasts:

- a. A decrease in both directions on School Lane east of the A1198 (143 PCUs eastbound and 221 PCUs westbound).
- b. A decrease on the A1198, south of the A428, of 132 PCUs northbound and 48 PCUs southbound.
- c. An increase on Cambourne Road south of the A428 in both directions (218 PCUs northbound and 103 PCUs southbound).
- d. An increase on both roundabouts at the Cambourne Road/A428 junction. This is a result of the capacity correction on Cambourne Road rather than the changes made to the circulatory lanes. Changes to the circulatory lanes alone made little difference when compared to the DCO model.

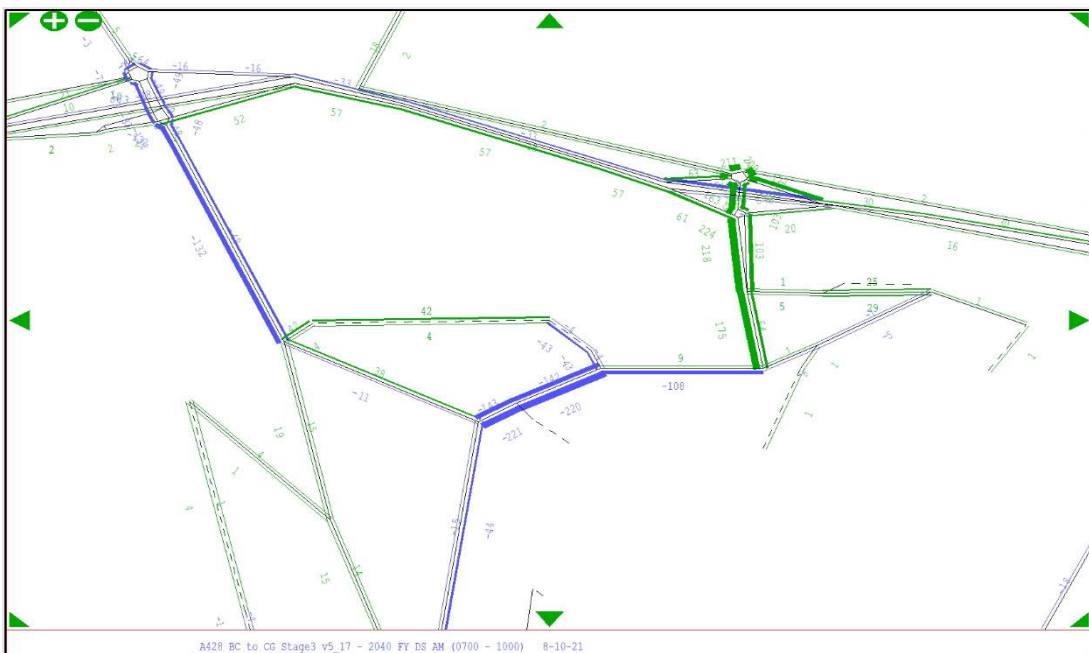


Figure 3-1 : Flow Comparison – Sensitivity Test Less DCO Model (2040 DS AM Peak)

- 3.1.3 The difference in traffic flows in the Sensitivity Test was primarily driven by the higher capacity on Cambourne Road and, to a lesser extent, the reduced speed on School Lane.
- 3.1.4 **Figure 3-2** and **Figure 3-3** present Volume over Capacity (V/C) on links as a percentage, for the DCO model and Sensitivity Test respectively in the Cambourne area. These figures show that the forecast V/C on Cambourne Road is significantly reduced in the Sensitivity Test from 101% in the DCO model to 53% northbound and from 90% to 31% southbound, even though traffic volumes are higher in the Sensitivity Test. There is also a reduction in V/C on School Lane in the Sensitivity Test as flow has decreased and the SFC (that defines a link capacity) has been removed.

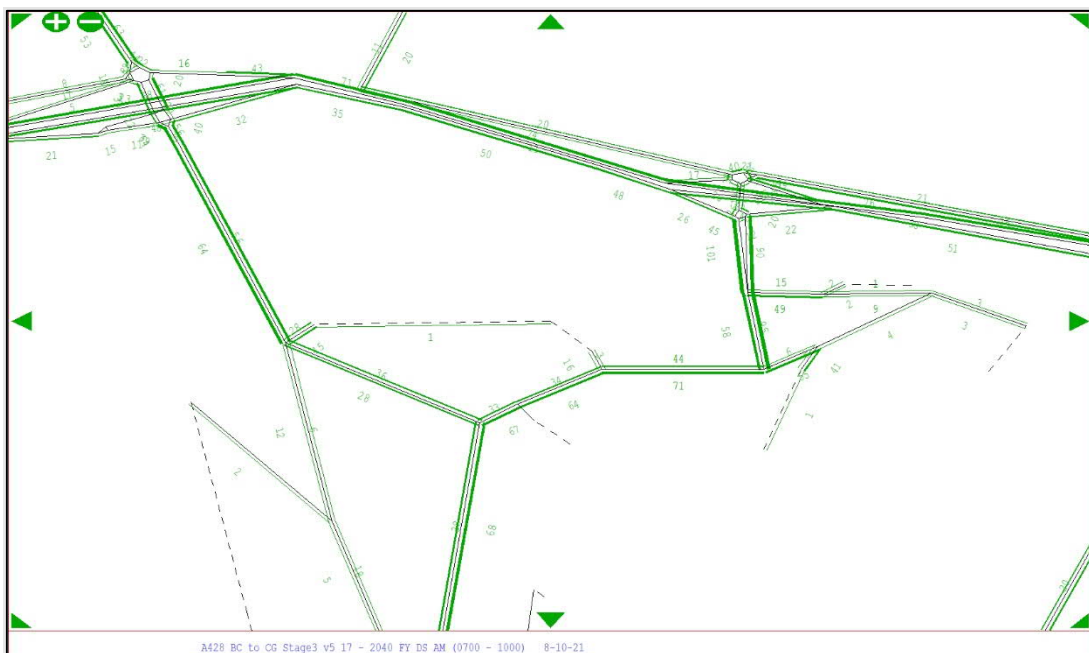


Figure 3-2 : Volume over Capacity % – DCO Model (2040 DS AM Peak)

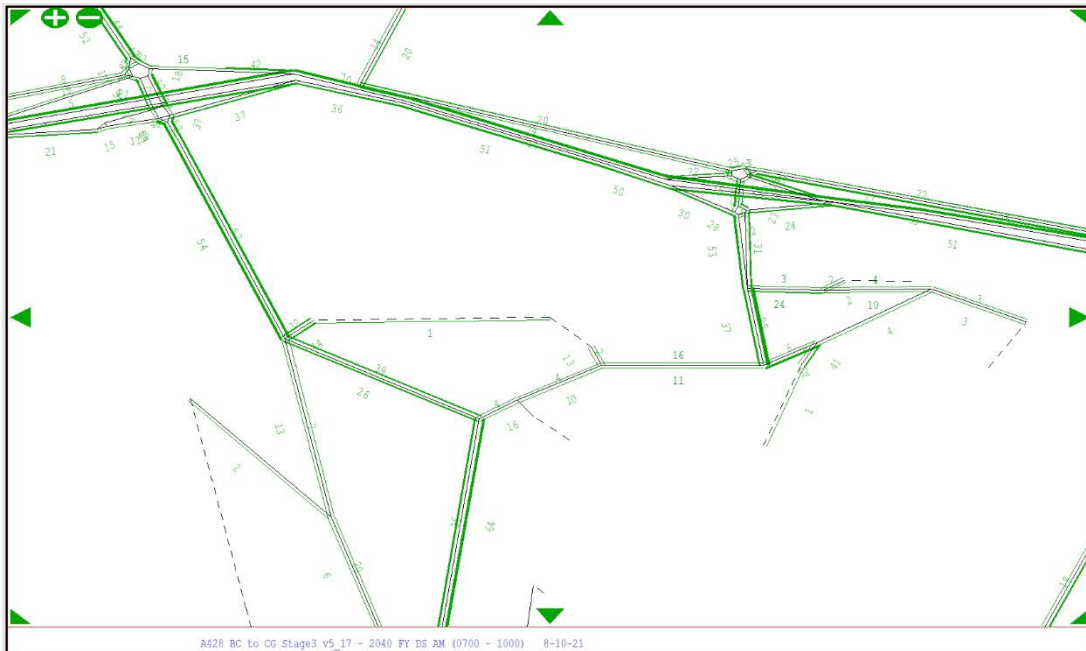


Figure 3-3 : Volume over Capacity % – Sensitivity Test (2040 DS AM Peak)

- 3.1.5 To identify the change in the distribution of local traffic, several Select Link Analyses (SLA) have been carried out that include the West Cambourne zone 33281 (both origin and destination), the A1198 NB (south of Lower Cambourne) and the A1198 SB (north of Caxton Gibbet roundabout). These SLAs have been carried out for both the DCO model and the Sensitivity Test models. The results are presented in Appendix A. This analysis confirms that there is very limited change in flows outside the Cambourne area, i.e. north and west of Caxton Gibbet, east of Cambourne junction and the A1198 south of Lower Cambourne.
- 3.1.6 **Figure 3-4** and **Figure 3-5** show the routing of traffic originating from the West Cambourne zone (33281) for the DCO and the Sensitivity Test models respectively. These figures demonstrate that traffic from West Cambourne heading eastbound on the A428 diverts off the A1198 via Caxton Gibbet junction in the DCO model and on to Cambourne Road in the Sensitivity Test. Cambourne Road has become a more attractive route in the Sensitivity Test given the network changes on Cambourne Road.
- 3.1.7 However, these figures also show that the volume of A428 eastbound traffic, east of Cambourne Road, is very similar in both models with 177 PCUs in the DCO model and 187 PCUs in the Sensitivity Test. Westbound traffic on the A428, west of the Caxton Gibbet roundabout, is 208 PCUs in both models. Northbound (north of Caxton Gibbet roundabout) and southbound traffic (south of Royston Road) on the A1198 is also very similar in both directions in both models. This indicates that the impacts of the network changes made in the Sensitivity Test are localised.

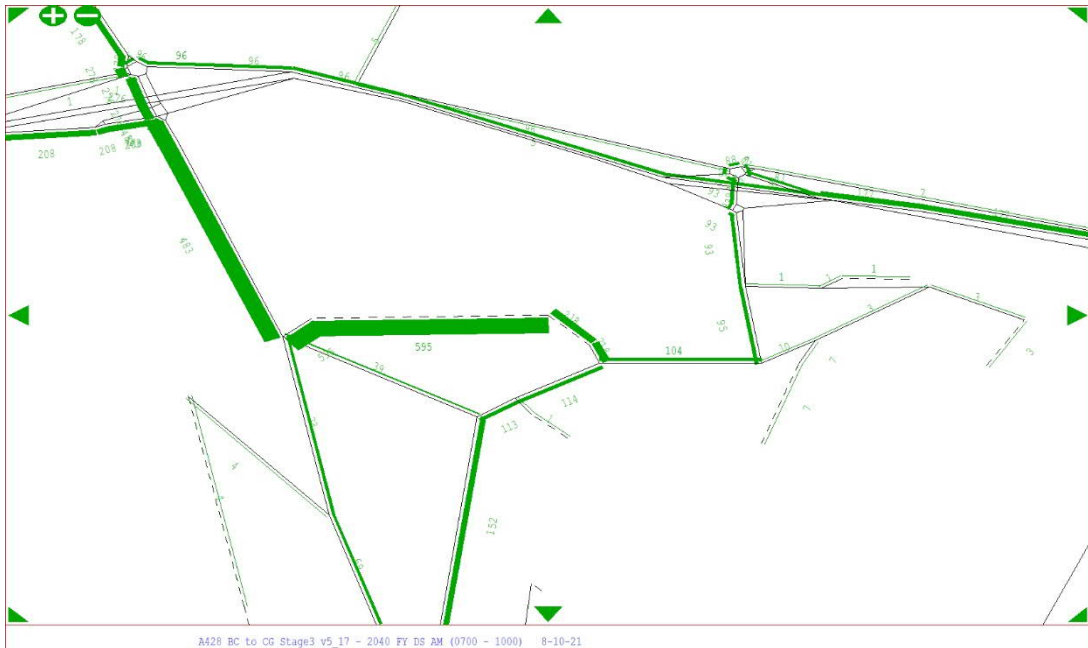


Figure 3-4 : Select Link Analysis on Zone 33281 (Origin) – DCO Model (2040 DS AM)

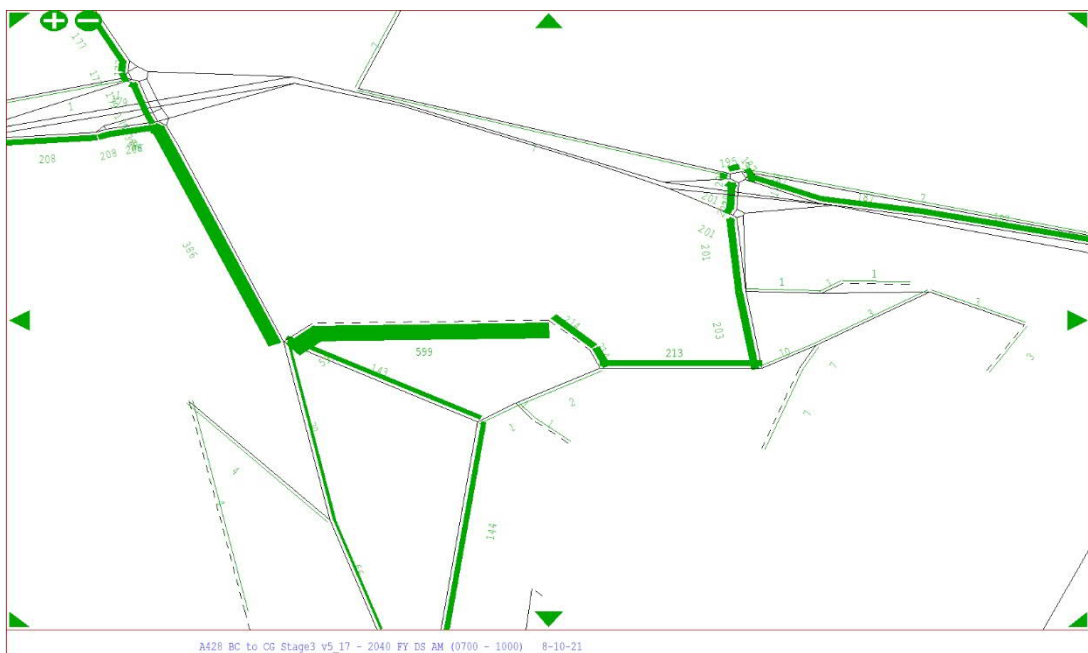


Figure 3-5 : Select Link Analysis on Zone 33281 (Origin) – Sensitivity Test (2040 DS AM)

4 2040 Daily Traffic Forecasts

- 4.1.1 To assess traffic impacts at a daily level, Annual Average Daily Traffic (AADT) flows have been calculated for selected roads in Cambourne and the surrounding area for the Sensitivity Test model. These flows have been compared with the corresponding AADT flows calculated from the DCO models and summarised in Table 4-1 in the form of 2-way AADT.
- 4.1.2 Table 4-1 shows that there are significant flow reductions on School Lane, west of Lower Cambourne, in the Sensitivity Test. Volumes on this link reduced from 8,345 in the 2040 DM DCO model scenario to 3,512 in the Sensitivity Test. Similarly, traffic reduced from 8,238 vehicles in the 2040 DS DCO model to 3,209 vehicles in the Sensitivity Test. This equates to an approximate reduction of 60% in both scenarios in the Sensitivity Test.
- 4.1.3 This reduction is partly driven the network changes but it is also driven by the location of the two West Cambourne zone spigots (i.e. the stub or link that connects the zone that loads trips to the highway network). As shown in Appendix A (Figures A1 to A4) traffic from the West Cambourne zone routed via School Lane in the DCO model to access the A1198 southbound, whereas traffic in the Sensitivity Test is routeing directly onto the A1198 southbound.
- 4.1.4 The difference in AADT flow between the two models on School Lane to the east of Lower Cambourne are much lower with a reduction of -220 vehicles in the 2040 DM scenario. However, the reduction in the DS scenario is greater (-1,394 vehicles) in the Sensitivity Test indicating that the Scheme will have a beneficial effect on School Lane.
- 4.1.5 **Table 4-1** also shows a reduction in AADT (-17% and -10% for 2040 DM and DS respectively) on the A1198 south of Caxton Gibbet and increases (37% and 31% for 2040 DM and DS respectively) on Cambourne Road in the Sensitivity Test. These are consistent with the SLAs discussed in Section 3, where traffic from West Cambourne is routeing via Cambourne Road to access the A428 eastbound in the Sensitivity Test, rather than using the Caxton Gibbet Roundabout via the A1198.
- 4.1.6 **Table 4-1** also presents AADT comparisons outside the local Cambourne area and shows that changes in AADT in the Sensitivity Test are moderate, ranging between 2% to -4%.

Table 4-1 : Traffic Flows – 2040 2-Way AADT in Vehicles

Area	Road	DCO Model		Cambourne Sensitivity Test		Diff - Test Less DCO		Diff% - Test Less DCO	
		2040 DM	2040 DS	2040 DM	2040 DS	2040 DM	2040 DS	2040 DM	2040 DS
Cambourne Area	A1198 (South of Caxton Gibbet)	20,255	22,646	16,860	20,278	-3,395	-2,368	-17%	-10%
	School Lane (West of Lower Cambourne)	8,345	8,238	3,512	3,209	-4,833	-5,029	-58%	-61%
	School Lane (East of Lower Cambourne)	9,989	10,374	9,770	8,981	-220	-1,394	-2%	-13%
	Cambourne Road	15,035	15,603	20,590	20,488	5,555	4,885	37%	31%
Outside Cambourne	A428 (West of CG)	31,387	63,799	31,551	63,899	164	100	1%	0%
	A1198 (North of CG)	22,647	19,530	23,113	19,576	466	46	2%	0%
	A428 (East of Cambourne Jn)	49,422	68,198	49,807	68,627	385	429	1%	1%
	A1198 (South of Lower Cambourne)	14,445	14,573	13,851	14,021	-594	-552	-4%	-4%

5 Conclusions

- 5.1.1 Following a review of the A428 Stage 3 Strategic model (“DCO model”), network issues were identified in the Cambourne area including issues on School Lane, Cambourne Road and sections of the roundabouts at the Cambourne Road/A428 junction. These network issues were corrected in a Cambourne Sensitivity Test model and traffic flows have been compared with the DCO model to assess the impacts of these corrections.
- 5.1.2 The Sensitivity Test has shown that there was an over-estimation of traffic on School Lane in the DCO model in both the Do Minimum and Do Something scenarios. There was approximately a -60% reduction in both scenarios in Annual Average Daily Traffic (AADT) on School Lane, west of Lower Cambourne in the Sensitivity Test. This reduction was primarily driven by how traffic from the Cambourne area was routing to access the A428 eastbound towards Cambridge, as capacity on Cambourne Road in the DCO model was at capacity and therefore constrained.
- 5.1.3 The difference in AADDT on School Lane to the east of Lower Cambourne was -1,394 in the Do Something (i.e. with Scheme) Sensitivity Test, demonstrating that the beneficial impacts of the A428 Scheme on School Lane should be greater than those indicated in the DCO submission traffic models.
- 5.1.4 In terms of impact on the wider area, the traffic flow difference plot as shown in **Figure 3-1** and Select Link Analysis (SLAs) shown in **Appendix A** demonstrate that the impacts from the network corrections are local to the Cambourne area i.e. north and west of Caxton Gibbet, east of Cambourne junction and the A1198 south of Lower Cambourne with very small impacts beyond this area.

Appendix A

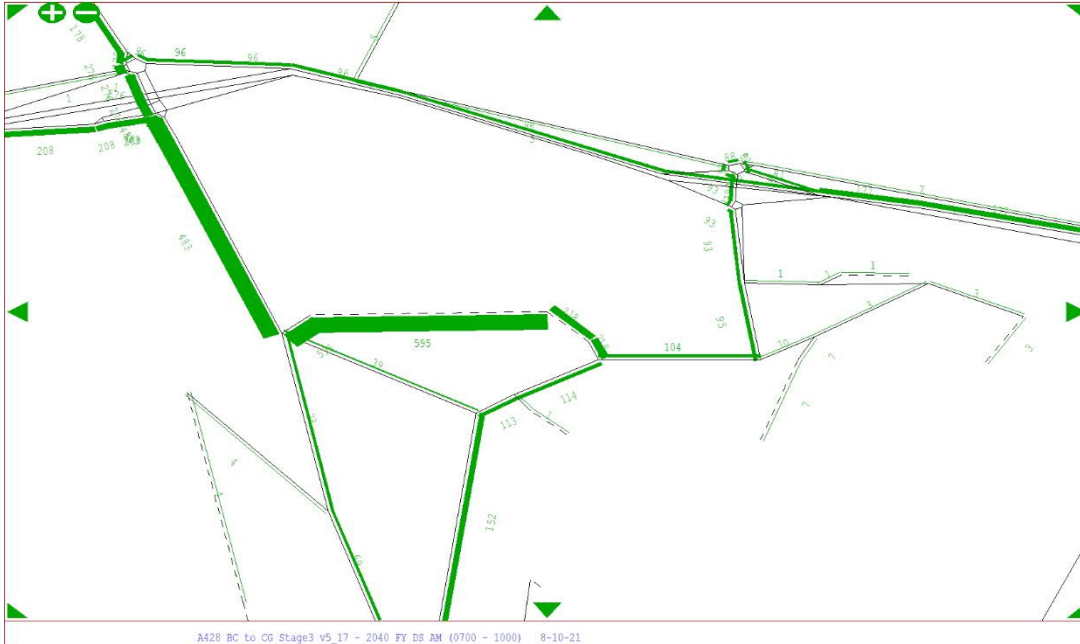


Figure A1: Select Link Analysis on Zone 33281 (Origin) – DCO Model (2040 DS AM)

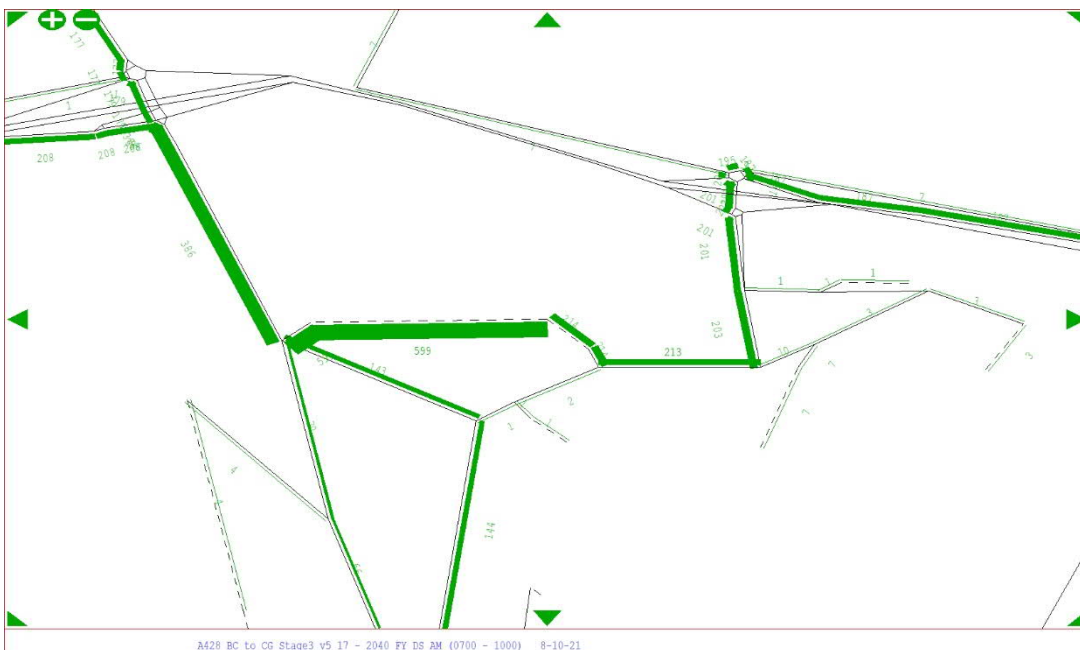


Figure A2: Select Link Analysis on Zone 33281 (Origin) – Sensitivity Test (2040 DS AM)

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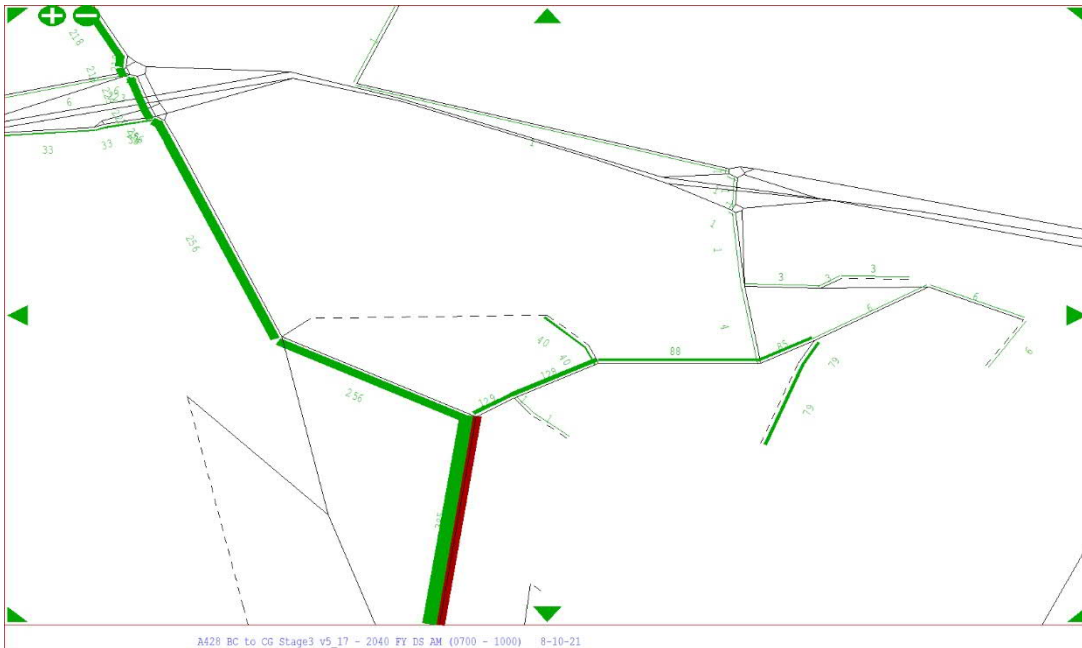


Figure A5: Select Link Analysis on A1198 NB – DCO Model (2040 DS AM)

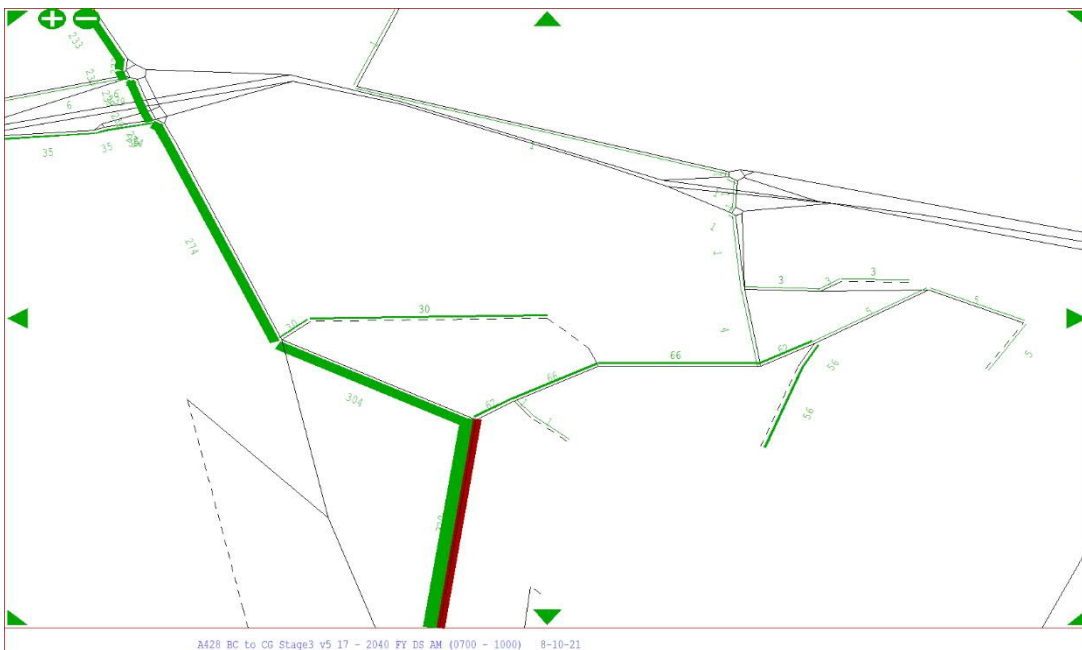


Figure A6: Select Link Analysis on A1198 NB – Sensitivity Test (2040 DS AM)

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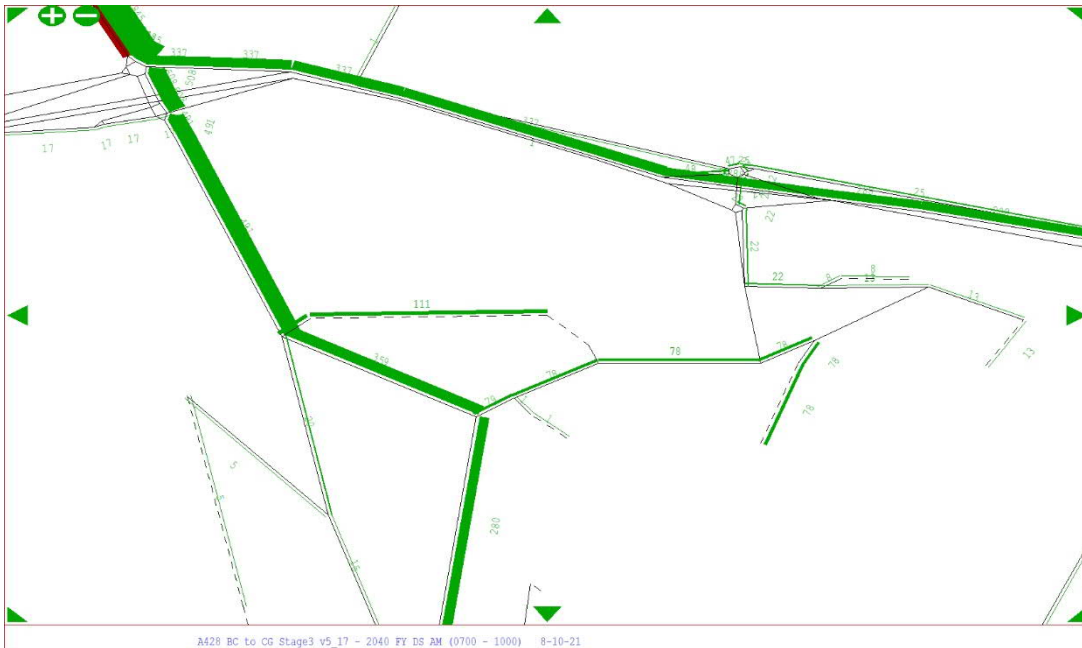


Figure A7: Select Link Analysis on A1198 SB – DCO Model (2040 DS AM)

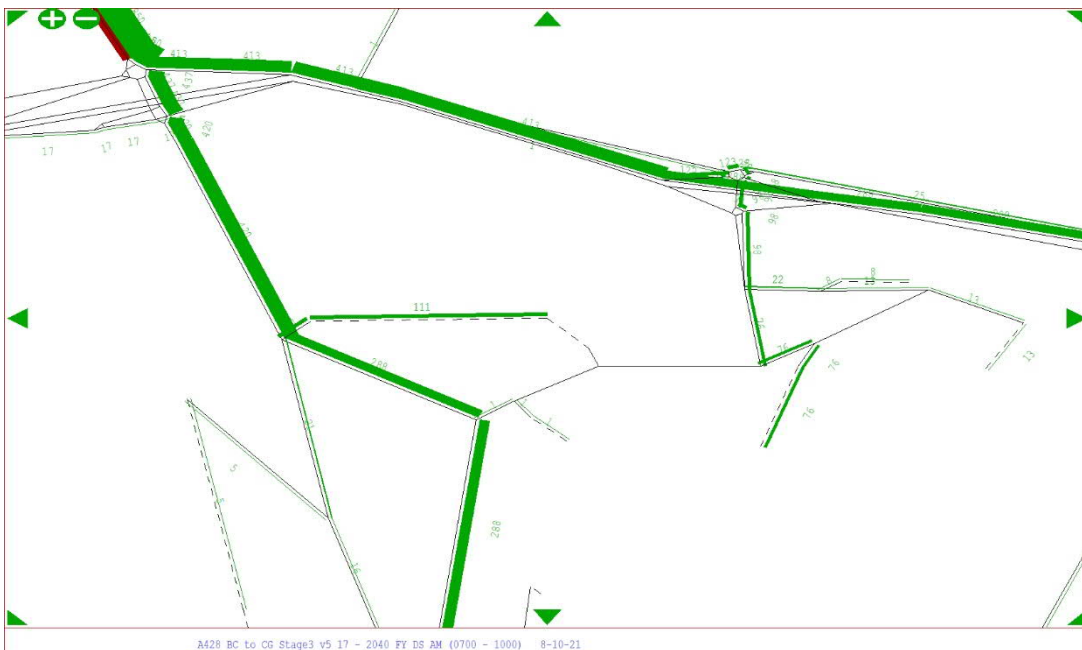


Figure A8: Select Link Analysis on A1198 SB – Sensitivity Test (2040 DS AM)