

## Traffic Signal Modelling and Network Performance Report

The London Borough of Lambeth (LB Lambeth) commissioned Transport for London's Signal Contractor to investigate the options, and potential impacts, of improving road safety by enhancing pedestrian and cycling facilities at three signalised junctions on Wandsworth Road. These sites have been highlighted as there a high number of collisions relating to cyclists and other vulnerable modes in the past 3 years.

- Junction 1: Wandsworth Road – Cedars Road – Queenstown Road – Lavender Hill
- Junction 2: Wandsworth Road – Silverthorne Road – North Street
- Junction 3: Union Road – Stewart's Road

The contractor reviewed the existing junction's data, traffic flows, and site layout drawings to identify physical features that would influence any potential amendments to the road layout. The junctions were then modelled as they currently operate in a deterministic traffic modelling package (LINSIG3). This was carried out at all three locations using full turning counts procured by LB Lambeth and validated by Transport for London (TfL) signal data and on-site observations.

Following the creation of the base models, general data analysis and observations on street, a preferred option has been developed for each site and tested through further traffic modelling.

### Current Junction Performance

- 1.1. At Junction 1, in general the degree of saturation output by the model aligns very well to the degree of saturation observed on site. The overall practical reserve capacity in the AM is -2.4% in the model. This shows the junction is operating very close to its capacity during this peak period. The overall practical reserve capacity in the PM is -12.1% in the model. This shows the junction is operating very close to its maximum capacity during this peak period. Queenstown Road does have a higher modelled degree of saturation than is observed on site in both peaks, due to the right turn lane indicative green arrow that is difficult to validate due to variation in traffic behaviour.
- 1.2. At Junction 2, the degree of saturation output by the model aligns very well to the degree of saturation observed on site. The overall practical reserve capacity in the AM is 4.8% in the model. This shows the junction is operating very close to its capacity during this peak period. In the PM peak, the degree of saturation output by the model aligns very well to the degree of saturation observed on site, with the exception of North Street. The overall practical reserve capacity in the PM is -13.5% in the model. This shows the junction is operating over capacity during this peak period, primarily due to the sheer volume of traffic on Silverthorne Road in comparison to the allocated green time.
- 1.3. At Junction 3, the degree of saturation output by the model aligns well to the degree of saturation observed on site. The overall practical reserve capacity in the AM is 33.3%, with all approaches being well within capacity. The overall practical reserve capacity in the PM is 42.7% in the model. This shows the junction is operating well within capacity.
- 1.4. To summarise the current conditions, Junction 1 operates just within its capacity, Junction 2 is operating over capacity in the PM peak, given the high volume of traffic on Silverthorne

Road. Junction 3 operates well within capacity during both peaks. Table 1.2 below summarise the current junction degree of saturation (Base scenario) both modelled and observed for both the AM and PM peaks per junction.

Table 1.2 Comparison of Modelled and Observed Degrees of Saturation

<b>Base</b>		<b>AM</b>			<b>PM</b>		
<b>Junction 1</b>		Degree of Saturation modelled	Degree of Saturation observed	Variance	Degree of Saturation modelled	Degree of Saturation observed	Variance
Lavender Hill	Arm 1/1	70.50%	74.00%	3.50%	78.90%	78.00%	0.90%
	Arm1/2	70.50%	74.00%	3.50%	78.90%	78.00%	0.90%
Cedars Rd	Arm 2/1	83.90%	74.00%	9.90%	69.90%	79.00%	9.90%
Wandsworth Rd – W/B	Arm 3/1	79.30%	77.00%	2.30%	75.60%	83.00%	2.30%
Queenstown Road	Arm 4/1	82.20%	81%	1.20%	100.90%	80%	20.90%
	Arm 4/2	92.20%	81%	11.20%	100.90%	80%	20.90%

  

<b>Junction 2</b>		<b>AM</b>			<b>PM</b>		
		Degree of Saturation modelled	Degree of Saturation observed	Variance	Degree of Saturation modelled	Degree of Saturation observed	Variance
Wandsworth Rd – SW/B	Arm 3/1	84.00%	78.00%	6.00%	83.30%	86.00%	2.70%
	Arm3/2	84.00%	78.00%	6.00%	83.30%	86.00%	2.70%
North St	Arm 2/1	85.80%	90.00%	4.20%	57.30%	77%	20.30%
Wandsworth Rd – NE/B	Arm 1/1	62.20%	66.00%	3.80%	64.30%	64.00%	0.30%
Silverthorne Rd	Arm 4/1	82.80%	83.00%	0.20%	102.10%	97.00%	5.10%

  

<b>Junction 3</b>		<b>AM</b>			<b>PM</b>		
		Degree of Saturation modelled	Degree of Saturation observed	Variance	Degree of Saturation modelled	Degree of Saturation observed	Variance
Wandsworth Rd – NE/B	Arm 1/1	64.40%	58.00%	6.40%	60.40%	55.00%	5.40%
	Arm 1/2	64.40%	58.00%	6.40%	60.40%	55.00%	5.40%
Union Rd	Arm 2/1	67.50%	67.00%	0.50%	63.10%	69.00%	6.10%
Wandsworth Rd – SW/B	Arm 3/1	50.40%	47.00%	3.40%	62.00%	64.00%	2.00%
Stewart's Rd	Arm 4/1	62.90%	64%	1.10%	48.50%	48%	0.50%

### Proposed Change Junction Impact

- 1.5. Junction 1 capacity impacts relate to lost time generated by intergreen changes and the introductions of the early releases. The addition of cycle early release has a major impact on the capacity of the junction during the AM peak period. During the PM peak the capacity impact is neutral, this is based on the removal of the extendable all red pedestrian detection and the removal of the pinch point on Queenstown road.
- 1.6. Junction 2 capacity impacts relate to additional lost time through the provision of early releases on all four arms, and through increases in intergreen values caused by pushing back the vehicular stoplines to accommodate the deeper ASLs. The addition of cycle early

release has a major impact on the capacity of the junction. There are currently bus lanes on the approaches to Wandsworth Road to minimise delays to buses delays. Based on the results above there will be additional congestion most notably on Silverthorne Road and North Street

- 1.7. Junction 3 capacity impacts relate to additional lost time through the provision of early releases on all four arms, and through increases in intergreen values caused by pushing back the vehicular stoplines to accommodate the deeper ASLs. The addition of the cycle early release has an impact, but due to the amount of traffic using the junction the junction operates well within capacity.
- 1.8. Table 1.3 below summarises the modelling outputs of the proposed changes in both the AM and PM peaks per junction.

Table 1.3 Modelling Outputs of the Proposed Changes

**Proposed**

<b>Junction 1</b>		<b>AM</b>		<b>PM</b>	
		Degree of saturation	Mean max queue	Degree of saturation	Mean max queue
Lavender Hill	Arm 1/1	100.10%	27.1	99.40%	27.8
	Arm 1/2	100.10%	N/A	99.40%	N/A
Cedars Road	Arm 2/1	82.20%	11	67.90%	7.3
Wandsworth Rd – W/B	Arm 3/1	104.00%	35.6	88.50%	17.3
Queenstown Road	Arm 4/1	74.80%	5.7	96.90%	16.7
	Arm 4/2	82.10%	N/A	96.90%	N/A

<b>Junction 2</b>		<b>AM</b>		<b>PM</b>	
		Degree of saturation	Mean max queue	Degree of saturation	Mean max queue
Wandsworth Rd – SW/B	Arm 3/1	106.30%	49.8	108.80%	59.4
	Arm 3/2	106.30%	N/A	108.80%	N/A
North Street	Arm 2/1	100.80%	16.7	55.40%	5
Wandsworth Rd – NE/B	Arm 1/1	98.70%	22.4	108.00%	38.8
Silverthorne Rd	Arm 4/1	97.40%	14	106.80%	29.1

<b>Junction 3</b>		<b>AM</b>		<b>PM</b>	
		Degree of saturation	Mean max queue	Degree of saturation	Mean max queue
Wandsworth Rd – NE/B	Arm 1/1	78.70%	14.5	71.10%	12.2
	Arm 1/2	78.70%	N/A	71.10%	N/A
Union Rd	Arm 2/1	81.00%	7.8	73.60%	5.3
Wandsworth Rd – SW/B	Arm 3/1	76.40%	9.3	72.00%	12.8
Stewart's Rd	Arm 4/1	77.20%	6.7	55.00%	4

- 1.9. Comparing the current and proposed modelling outputs, the capacity impacts of the proposals can be determined. This is summarised Table 1.4 for both the AM and PM peaks per junction.

Table 1.4 Capacity Impacts of Proposed Changes

<b>Practical reserve capacities</b>	<b>AM Base</b>	<b>AM Proposed</b>	<b>PM Base</b>	<b>PM Proposed</b>
<b>Junction 1</b>	-2.40%	-15.60%	-12.10%	-10.40%
<b>Junction 2</b>	4.80%	-18.10%	-13.50%	-20.90%
<b>Junction 3</b>	33.30%	11.10%	42.70%	22.30%

### **Modelling Conclusion**

- 1.10. The proposed changes would cause the Junction 1 Cedars Road / Lavender Hill to be operate over capacity in the AM Peak. In the PM peak the proposed changes would provide minor improvement to the existing junction capacity. Junction 2 would operate over capacity in both the AM and the PM peak, most notably in the AM Peak given that the PM peak already operates over capacity. The modelling outputs provide assurance that Junction 3 Stewarts Road/ Union Road has the capacity to cope with proposed changes and for junction capacity to remain within acceptable limits.
- 1.11. There are bus lanes provided on the approaches to these junctions which will help minimise the impact to public transport. Further measures for buses, including extension of the westbound bus lane and the operation of the bus priority in the signal controllers will also be explored to give additional mitigation against the expected decrease in junction performance.
- 1.12. The capacity impacts of the proposals relate to lost time generated by intergreen changes and the introductions of the cyclist low-level signal early releases. Low level cycle signals on each approach reduces the practical reserve capacity by up to 12% in the worst case scenario. However, the proposed new facilities will provide greater confidence to roads users, facilitating a change to more sustainable modes of transport whilst addressing the road safety issues being experienced along the Wandsworth Road. The addition of these facilities will contribute to the reduction of collisions to all road users particularly vulnerable road users and this must be weighed up against the impact on capacity.