7 Network Impact Assessment *(To be completed by NP-NM)*

7.1 Model Integrity

A base LinSig model has been produced of the existing signalised junction 32/019 Hertford Road / Ponders End High Street / Derby Road / Lincoln Road / South Street. This model went through the full LMAP checks and is fully fit for purpose. ARCADY modelling was submitted for the proposed give way double roundabout. No modelling assessment was undertaken for the minor relocation of pedestrian crossing 32/049 from nearer Queensway to Garfield Road.

Modelled flows are from June 2016 during the AM and PM peak periods. The proposed model assumes no flow redistribution. In addition although the pedestrian crossings across each arm of the roundabout have been modelled as Zebra crossings out of necessity, in actualitiy these crossings are only courtesy crossings as opposed to being formal facilities. Therefore the proposed results represent the worst-case scenario.

Because of the different ways that LinSig and ARCADY calculate model outputs it is difficult to carry out a reliable comparison between the delay which the proposed design will incur compared to that of the existing scenario. Therefore the network impact assessment will copmpare queue lengths and Degree of Saturation (DoS) vs Ratio of flow to capacity (RFC). The proposed model queue length and RFC results refer to the 15 minute time segment in which model outputs are highest. For ease of comparison within this assessment between DoS and RFC outputs, RFC results will be expressed as a perecentage instead of a decimal which is how RFC is presented within Arcady. Therefore an RFC of 0.5 will be stated as an RFC of 50% wihin this report.

7.2 Network Impact Assessment

The proposed design is a completely new give-way double roundabout, replacing an existing signalised junction running UTC SCOOT control. This UTC SCOOT junction is also installed with Bus Priority which will be lost when the signals are removed. Three high frequency bus routes, two low frequency bus routes and one night bus route travel through the junction and these routes no longer have the potential to benefit from bus priority measures as a result of the scheme

Included are new courtesy crossings across each arm of the double roundabout. No pedestrian crossing facilities exist at all at the existing junction so these courtesy crossings would provide an improvement in service to pedestrians.

The existing junction runs UTC SCOOT control during the day running at a cycle time of 104 seconds in the same UTC SCOOT region as junction 32/021 Hertford Road / Nightingale Road / Galliard Road. This UTC SCOOT region is currently configured to aid northbound and southbound progression along Ponders End High Street / Hertford Road. As a result of the scheme linking between the operation of

these two intersections will be lost. Furthermore all exisiting contingency plans and procedures for use in the instance of an incident, during events or roadworks to aid particular traffic movements or diversion routes will no longer be available.

The existing junction runs close to absolute capacity. Degree of Saturation (DoS) on every arm of the junction is above 90% during both the AM & PM peak periods (apart from Derby Road which carries very low flow and so is not significantly impacted as part of these proposals. The modelling results show that in the proposed scenario the double roundabout will still run close to absolute capacity.

AM Peak

During the AM peak DoS on A1010 Ponders End High Street southbound increases from an existing 94% to an RFC value of 99% in the proposed scenario. Likewise DoS on A1010 Hertford Road northbound increases from an existing 93% to an RFC value of 104%. These values show that during the AM peak there will be absolutely no resilience or spare capacity at the junction on the A1010 in either direction. However maximum queue lengths are predicted to decrease at this junction on the A1010 in either direction during the AM peak as a result of the scheme. The queue on Ponders End High Street southbound will decrease from an existing 25 PCU down to 13 PCU in the proposed AM scenario. The queue on Hertford Road northbound will slightly decrease from an existing 24 PCU down to 21 PCU in the proposed AM scenario. This is likely to be due to the fact that the junction is converted to give way, so queues will no longer build and build whilst vehicles wait for opposing signal stages to finish before the main road receives green.

The DoS on South Street increases slightly from an existing 93% to an RFC value of 96% in the proposed AM scenario. The queue on South Street will decrease slightly from an existing 15 PCU down to 9 PCU in the proposed AM scenario. Lincoln Road sees a decrease in DoS down from an existing 95% to an RFC value of 82% and a decrease in queue length down from an existing 15 PCU down to 4 PCU in the proposed AM scenario.

PM Peak

During the PM peak DoS on A1010 Ponders End High Street southbound stays roughly the same decreasing from an existing 95% to an RFC value of 94% in the proposed scenario. However the queue on Ponders End High Street southbound will decrease more noticeably from an existing 24 PCU down to 9 PCU in the proposed PM scenario. Likewise during the PM peak the queue on A1010 Hertford Road northbound will decrease significantly from an existing 26 PCU down to 6 PCU in the proposed scenario, whilst DoS on Hertford Road northbound also decreases from an existing 99% to an RFC value of 89%. Whilst these results show that the proposed give way roundabouts would still run close to capacity, the operation of the A1010 northbound and southbound may perform better in the proposed scenario under the new design.

In the proposed PM scenario the DoS on South Street also decreases from an existing 98% to an RFC value of 83%, plus the queue on this approach will decrease from an existing 17 PCU down to 4 PCU. However Lincoln Road sees an increase in

DoS up from an existing 94% to an RFC value of 104% in the proposed PM scenario whilst queues remain practically unchanged.

Conclusion

What these results demonstrate is that whilst whilst some queue lengths may decrease, in general RFC has increased in comparison to exisiting levels of DoS. Furthermore the proposed results indicate that Hertford Road northbound during the AM peak and Lincoln Road during the PM will be over capacity with RFC values of over 100%. No approaches currently have a DoS of over 100%.

One of the biggest problems with this scheme would be that by removing signal control TfL would no longer be able to make strategic decisions to make changes to the operation of the intersection at certain times of day based on fluctuations in vehicle flow. In addition all contingency plans and procedures will be lost. Therefore in the instance of an road traffic accident, or during long term or unplanned emergency roadworks TfL will no longer be able to aid particular traffic movements or diversion routes.

However queue lengths on all approaches are likely to reduce during the peaks as shown by the modelling and outside of the peak periods modelled here during times when vehicle flow is much lower such as late evening and overnight it is likely that this junction to double roundabout conversion would result in a significant improvement in reducing delay through the junction.

7.3 Assessment Summary

The scheme has been assessed / audited and approved by:

OD-OM Principal Traffic Control Engineer:	Gordon Sheppard - *Outcomes Management, North*
OD-OM Area Performance Manager:	Rosalind Trew - *Outcomes Management, North*

Contact Details:	
Name:	Gordon Sheppard
E Mail Address:	[redacted]
Telephone Number:	[redacted]

Note: Please ensure that the relevant line in the document control table (section 4.1) has been completed.

8 Document Control

Issue	Date	Change Summary	Author	Checker	Approver
1	Nov 11	Initial draft	A Parkins	A Scriven	R Pye
2	Dec 13	TD references updated to RSM and RD references updated to AMD	R Pierson	J Fraser	

Appendix A – References

Reference	TfL file location	Title	Author	Content

Provide a key for the full path to file servers (do not provide drive letters alone)

Appendix B – Comparative Performance Statistics

Period	Arm/Link		On Street Observations			Base Model			Proposed Model		
	Link Number	Link Description	JT (s)	DoS (%)	Q Len (Veh)	DoS (%)	Q Len (PCU's)	Delay (s/PCU)	RFC (%)	Q Len (PCU's)	Delay (min)
Weekday AM Peak	1	Ponders End High Street southbound		89.8		94.2	24.7	69	99	13.2	0.65
	2	South Street		91.5		93.3	15.4	87	96	8.6	0.88
	3	Ponders End High Street northbound		97.4		93.1	24	62	104	21.5	1.31
	4	Lincoln Road		99		95.3	15.2	105	82	4	0.64
	5	Derby Road		N/A		10.1	0.4	55	9	0.1	0.14
	Cycle Time		104								
	PRC (%)					-5.8					

Period	Arm/Link		On Street Observations			Base Model			Proposed Model		
	Link Number	Link Description	JT (s)	DoS (%)	Q Len (Veh)	DoS (%)	Q Len (PCU's)	Delay (s/PCU)	RFC (%)	Q Len (PCU's)	Delay (min)
Weekday PM Peak	1	Ponders End High Street southbound		97		95.1	24.1	74	94	9.4	0.54
	2	South Street		97.5		97.6	17	117	83	4.1	0.49
	3	Ponders End High Street northbound		97		98.9	26.4	105	89	6.3	0.54
	4	Lincoln Road		100		93.7	16.8	86	104	12.9	1.29
	5	Derby Road		N/A		28.9	1.1	63	14	0.2	0.14
	Cycle Time		104								
	PRC (%)					-9.9					

Arm / Link = Traffic, Pedestrians and Buses etc., i.e. buses, pedestrian phases and any other significant road user group should be modelled as separate links.
Link Description should include the link address, compass position and direction of movement (e.g. High Street West bound ahead)

DoS = Degree of saturation JT = Journey Time Q Len = Mean Max Queue Length RFC = Ratio of flow to capacity
PRC = Practical reserve capacity. This is calculated from the maximum degree of saturation on a link and is a measure of how much additional traffic could pass through the junction while maintaining a maximum degree of saturation of 90% on all links