Appendix 1 – Traffic Modelling Summary

Traffic modelling has been undertaken on the London Road schemes to assess the capacity impacts of introducing bus lanes. A review of the existing conditions shows that bus services are subjected to significant delay and reliability issues along this corridor. Around 45 two-way bus services operate along this route.

LinSig software, with the Reading Transport Model (RTM) traffic flow data, has been used to create a model of the corridor to test the impact of the bus lanes.

The Reading Transport Model (RTM) is a highway network model which has been developed using SATURN software. The model consists of an AM peak hour model (08:00 to 09:00), an average inter peak hour mode (10:00 to 16:00) and a PM peak hour model (17:00 to 18:00). The model has fiver user classes comprising of car commute, car employer business, car other, Light Good Vehicles (LGV) and Heavy Goods Vehicles (HGV). The model has a base year of 2015 and future years of 2021 and 2031.

This is a fixed matrix highway model and will only seek to reroute the traffic, and not consider mode shift or peak spreading. This will demonstrate the worst-case impact of the schemes with all traffic reassigning or queuing. This worst-case scenario is considered unlikely.

LinSig was used as a tool to optimise the traffic signals, but also understand the scale of any capacity reductions, as a result of the reallocation of road space for bus priority. This would provide an indication of the level of traffic which would not be able to travel through the corridor within the peak hour.

London Road – Liverpool Road to Amity Street:

It has been determined that the westbound traffic flows would need to reduce by 18% (approx. 260 vehicles) in the AM peak hour and by 19% (approx. 220 vehicles) in the PM peak hour, in order to mitigate the impacts of introducing bus lanes.

The purpose of introducing this bus lanes, is to provide reliable bus services from east of Reading and support the growth of sustainable transport modes. The results indicate that if the number of vehicles on the road does not decrease, then the introduction of the bus lanes, could potentially result in an increase in westbound general traffic queues, and in particular impact traffic entering Reading from outside the borough.

It should be noted that the effects of Liverpool Road and other access points and driveways cannot be accurately modelled, as the traffic flows are not known, however it is expected that this will be consistent with the existing conditions and right turning traffic into the driveways can cause intermittent delays on the corridor.

We intend to monitor traffic on the adjoining residential streets and, if necessary, review what measures could be introduced to mitigate any displacement, with particular emphasis on safety on these residential streets. This work has been recommended as a result of the traffic modelling undertaken during the bus lane design. If we can further increase bus passenger numbers, we anticipate in the long term this will reduce the number of private cars using both main roads and residential streets.

London Road – Sidmouth Street to London Street:

It has been determined that the west bound traffic flows would need to be reduced by 10% (approx. 350 vehicles) in the AM peak hour and by 8% (approx. 300 vehicles) in the PM peak hour, in order to mitigate the impacts of introducing bus lanes.

The results indicate that if the number of vehicles on the road does not decrease, then the introduction of the bus lanes, could potentially result in an increase in westbound general traffic queues, particularly at the approach to London Street/Crown Street,

The proposals are expected to significantly decrease bus journey times and reliability within the corridor. The bus lanes may help to reduce bus journey times to off-peak speeds, which are around 5 minutes quicker.

Southampton Street:

A traffic modelling consultant was appointed to provide a capacity assessment for the Southampton Street / A329 / Bridge Street / Mill Lane junction ("Oracle Roundabout"). Detailed junction modelling has been completed for the existing and proposed junction layouts to assess the likely operation of the proposed junction using LinSig.

For the purposes of this assessment, the junction has been tested as a standalone junction in isolation from the effects of upstream and downstream junctions. Congested conditions on the adjacent road networks and queues approaching the Oracle MSCP entry barriers can lead to traffic blocking back through the junction at busy periods of the day.

To understand the current vehicle demand through the signalised roundabout, traffic surveys were undertaken on a typical weekday in October 2023 for a 12hr (7am to 7pm) period. The traffic survey were also extended to include a Saturday period so given the town centre location.

The multi-lane approaches on the external arms and circulating around the junction result in some clear issues with the existing junction arrangement that could be negatively affecting its operational performance at peak times. The main issue observed at the junction is poor lane discipline linked to traffic flows movements from Southampton Street (south) heading straight on to Bridge Street or right to the MSCP or Mill Lane.

Using the existing modelling as a baseline, a revised model has been generated to reflect the highway changes being proposed by the bus improvement scheme. The proposed model uses the same signal modelling parameters as the existing model and makes changes to the geometric layout of the junction.

It was observed in the existing scenario that there was a level of poor lane discipline on the Southampton Street approach resulting non-permitted routes around the junction. The proposed junction layout will provide improved lane markings on the approaches and through the junction, and improved signage to increase awareness of lane allocations. Therefore, the proposed layout model has been based on the allocated lane marking and permitted movements only.

The reduction in performance between the existing and proposed is a result of the change in lane markings and flow allocations. The proposals will move all left turning vehicles into a single lane compared to the existing scenario where they are able to use both the inside and middle lane to turn left. This in turn will relieve the vehicle demands on the central lane where queues are predicted to reduce.

In conclusion, the below changes are expected as a result of this proposal:

- Minimal or no change in queue lengths on the Oracle Exit, Bridge Street, or A329 Slip Road approaches.
- Southampton Street Lane 1 has recorded significant increases in queue lengths across AM and PM peak hours, although the effect of these queues is mitigated through the signal phasing.
- Southampton Street Lane 2 (middle lane) queues have largely been removed compared to existing as the lane will only be accommodating traffic heading to Bridge Street.
- Southampton Street Lane 3 has recorded an increase in queues compare to existing although are not severe with a maximum queue of 5.1 PCUs estimated in the Saturday peak hour. Increase in queue a result of lane 3 allocated as right turn traffic only (i.e. to Oracle MSCP, A329 east and Mill Lane).

Oxford Road/Bedford Road:

Localised detailed junction modelling has been completed in Linsig software for the existing and proposed junction layouts to assess the changes in operational performance.

The existing junction operates within its capacity and the observed queue length survey results highly a significant amount of reserve capacity currently at the junction.

Using the existing modelling as a baseline, a revised model has been generated to reflect the highway changes being proposed at the junction. The proposed layout model utilises the same modelling parameters as the existing junction with the exception of the flare lengths being reduced on the approach to the junction.

The proposed layout modelling results show that the junction would continue to operate within capacity. The reduction in the approach lane capacity still allows for the queue lengths to be within the maximum theoretical capacity.

Given the amount of reserve capacity in the existing junction, the proposed bus improvement alterations to this junction would not have a material impact on the highway network performance.

Oxford Road / Norcot Road

As part of the Oxford Road bus improvement scheme, a westbound bus lane has been introduced on the approach to the Reading Retail Park access junction, some 100m east of the Norcot Road Roundabout. To accommodate the new bus lane, it was necessary to reduce the length of a ghost island right turn lane into the retail park by half its current length (45m to 22.5m).

Traffic surveys using video footage of the junction were undertaken to monitor the current operation of the right turn lane and observe if any queue blocking does occur on the Oxford Road. The surveys were undertaken on Thursday 6th July 2023 (AM 0700 - 1000 and PM 1600 - 1900) and Saturday 8th July 2023 (1000 - 1700) and the video footage was analysed over the whole period to identify any potential issues.

Analysis of the video footage identified the following key observations:

- No more than 3 vehicles were observed queuing in the right turn lane to enter the retail park.
- At busy times in the morning and evening peak hours on Thursday, traffic was seen to queue back from the Norcot Road Roundabout across the access to the retail park. This did not prevent drivers from turning right into the park as westbound traffic on the Oxford Road would leave gaps to allow access.
- The busiest times for the retail park was Saturday afternoon where more cars were observed using the right turn lane into the park. At this time, traffic flow westbound on the Oxford Road was fairly constant but there was sufficient gaps in the traffic to allow entry into the park.
- On no occasion did the right turning traffic using the ghost island lane block the eastbound traffic on the Oxford Road.

On the evidence of the observation survey, the reduced length of the ghost island right turn lane will still have adequate capacity to cater for the traffic demand into the retail park. The reduction in length to 22.5m will still have sufficient space to accommodate 3 - 4 vehicles which is compatible to the longest queue that was observed in the video footage.