



# Summary Report

Bradford on Avon Town Council and Wiltshire Council

04 January 2024

# BRADFORD-ON- AVON TRAFFIC STUDY

# Notice

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## Document history

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## Client signoff

<b>Client</b>	Bradford on Avon Town Council and Wiltshire Council
<b>Project</b>	BRADFORD-ON-AVON TRAFFIC STUDY
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# 1. Introduction & Background Context

**This Summary Report presents the key findings of the Bradford on Avon Traffic Study, investigating potential changes to traffic management in and through Bradford on Avon. A full Technical Report presenting the work in more detail is also available (Reference; Bradford-on-Avon Traffic Study Report v3.0)**

In 2021, Bradford on Avon Town Council consulted residents of the town regarding the 'Future of Transport' - to understand local priorities to improve transport within the town. The consultation followed a temporary traffic management system introduced during the Covid pandemic which made some town centre streets one-way for motorised traffic, reallocating road space to pedestrians and cyclists to aid social distancing in the town centre. Analysis of responses to the consultation highlighted three key issues which local people want to see addressed;

- Pedestrian and cyclist safety
- Traffic volumes
- Air quality

AtkinsRéalis has been commissioned by Wiltshire Council and Bradford on Avon Town Council to build and use a microsimulation traffic model to consider interventions to achieve the optimum traffic system in the town in order to address the three key issues identified in the Future of Transport consultation. The study considers the feedback to the temporary Covid traffic management scheme and seeks to identify a traffic management arrangement that can address the issues in the town on a long-term basis.

An inception meeting took place in early June 2023 with representatives from AtkinsRéalis, Wiltshire Council and Bradford on Avon Town Council which confirmed the vision and aims for this study. The aims of this study are based on the three key issues identified in the Future of Transport consultation, albeit more focused in order to make them measurable in the context of this study.

1. To safely reallocate space to provide high-quality walking and cycling routes;
2. To facilitate slow but steady traffic movements in the town; and,
3. To improve air quality in the town.

Traffic volume was identified as a key issue by the consultation. The scope of this study cannot consider measures to reduce traffic volume in the town in full – much of the town centre traffic are through trips, and a wider consideration of re-routing and knock-on impacts throughout the network would be required. This study is focussed on trips within the town network, and therefore is based on an assumption that across town movements remain, and any re-routing will be within the Bradford on Avon town network. Hence the focus of this study is to facilitate slow but steady traffic movement – to minimise congestion but prevent fast vehicle movements that would generate safety concerns and potentially attract further traffic.

The overall aim of the study is to create a new traffic management system that moderates traffic speeds whilst simultaneously improving air quality and improving the street environment for people walking, cycling and spending time in the town centre.

## 2. Study Methodology

### Method

For this traffic study, three traffic management options were identified based on their ability to achieve the aims of the study. Each of the three options were then tested using a micro-simulation model of Bradford on Avon to determine their impact on traffic flows in the town. The microsimulation model was also used to complete a high-



level quantitative assessment of air quality for each of the model scenarios. A high-level assessment of opportunities for footway widening under each option was also completed to determine the level of space reallocation could be achieved to enhance the street environment for pedestrians and cyclists.

## Option Identification

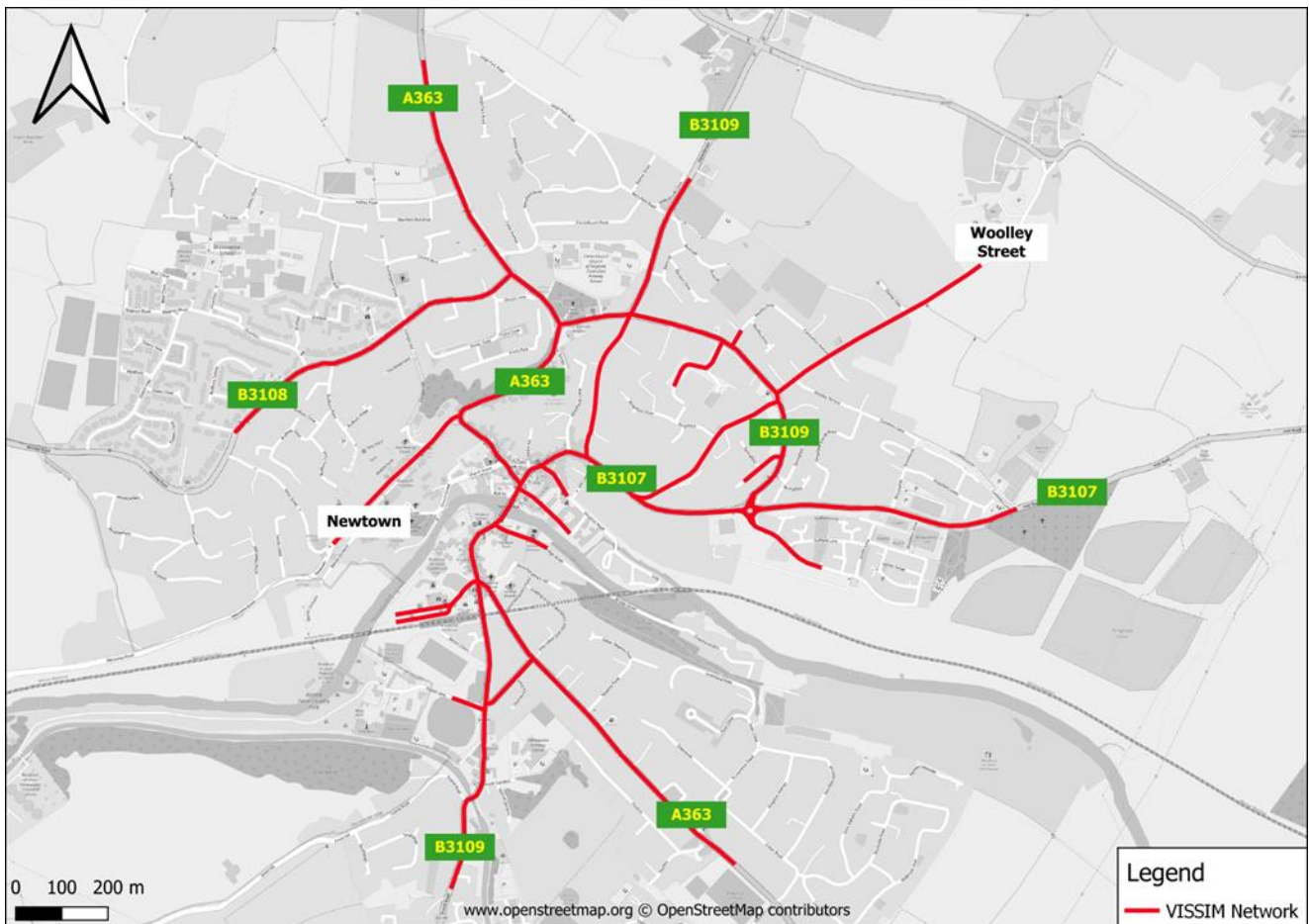
Following an inception meeting with Bradford on Avon Town Council and Wiltshire Council officers, site visits and analysis of the Future of Transport Consultation responses, a longlist of proposed interventions was developed. A high-level assessment of the longlisted options against the study aims was completed, and following discussion with the project team, three shortlisted options were agreed to be evaluated using the microsimulation model:

- Option A - Market Street & Silver Street One-way
- Option B - Pinch Point Priority Narrowing
- Option C - Silver Street One-way & Market Street Priority Narrowing

## Microsimulation Model

Traffic microsimulation models simulate vehicle behaviour within a predefined road network to predict the impacts of changes to traffic flows or from changes to the physical environment – in this case traffic management schemes within the centre of Bradford on Avon. Microsimulation models are useful for analysing traffic operation in urban areas, including traffic interactions of individual vehicles at junctions, roundabouts and pedestrian crossings. Figure 2-1 shows the extent of the microsimulation base model network.

Figure 2-1 - Model Network



Base model traffic flows and journey times have been validated against traffic count data and journey time data. Industry best practice has been followed to ensure that the base model is a good representation of the existing situation. During this process, the model was further refined using observations from video surveys so that driving behaviour in the model represented driving behaviour observed on the ground.

In order to calibrate and validate the model, the following data was sourced:

- Traffic count data - obtained in July 2023 at 10 key junctions in Bradford on Avon and 9 key entry/exit points into the town. The date of the traffic surveys was selected to avoid school holidays and major road works in the area.
- Journey time data - sourced from Satellite-Navigation (Sat-Nav) devices from TomTom. Journey times, excluding weekends, Mondays and Fridays, and school holidays, were obtained from Tuesday 2nd May 2023 to Thursday 13th July 2023, to ensure data was consistent with normal peak period traffic conditions.
- Bus service information
- Signalised crossing observation data

The calibration results demonstrated a good match between modelled and observed turning movements within both morning and afternoon peak periods. Accordingly, the 2023 base model was considered fit for purpose and deemed suitable to take forward for forecast year testing.

Peak hours were identified as 7:45 – 8:45 (AM-peak) and 16:15 – 17:15 (PM-peak). These peak hours were determined by an analysis of empirical traffic counts (discussed in section 2.1) which identified the busiest hour within each peak period (AM = 7:00 - 10:00, PM = 16:00 - 19:00).

To assess how the different options would operate in the future, the traffic flows in the model need to represent the likely situation following implementation of the interventions. Therefore, a future year is chosen, and the existing traffic is multiplied by a factor to create the future year baseline traffic level so that the operation of the proposed interventions can be compared with the future year baseline. Following discussions with Wiltshire Council, it was agreed that 2041 would be the future year. This aligns with the Wiltshire Local Plan and is assumed to be multiple years following potential implementation of any interventions. Five model scenarios were tested as part of this study:

- **2023 Base** – Reflects the current situation. Current road network and 2023 traffic demand.
- **2041 Do Nothing** – No changes to the road network, but uses forecast traffic demand for 2041.
- **2041 Option A** – Option A network changes with forecast traffic demand for 2041.
- **2041 Option B** – Option B network changes with forecast traffic demand for 2041.
- **2041 Option C** – Option C network changes with forecast traffic demand for 2041.

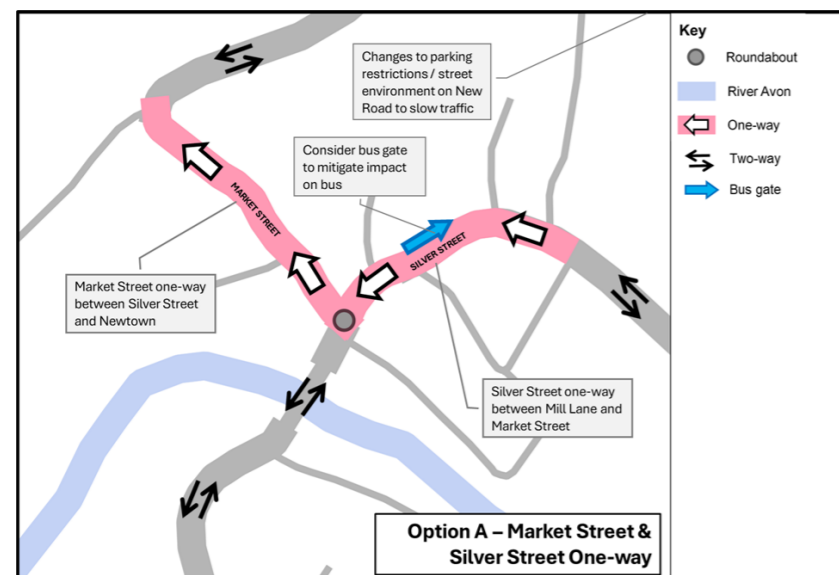


### 3. Shortlisted Options

Following discussions with Bradford on Avon Town Council and Wiltshire Council officers, site visits and analysis of the Future of Transport Consultation responses, a longlist of proposed interventions was developed. A high-level assessment of the longlisted options against the study aims was completed, and following discussion with the project team, three shortlisted options were agreed to be evaluated using the microsimulation model:

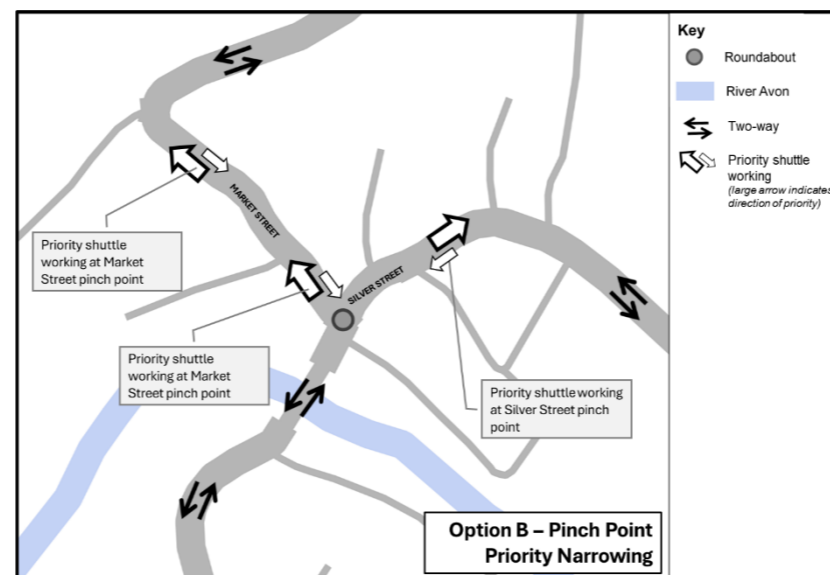
- Option A - Market Street & Silver Street One-way
- Option B - Pinch Point Priority Narrowing
- Option C - Silver Street One-way & Market Street Priority Narrowing

**Option A - Market Street & Silver Street One-way**



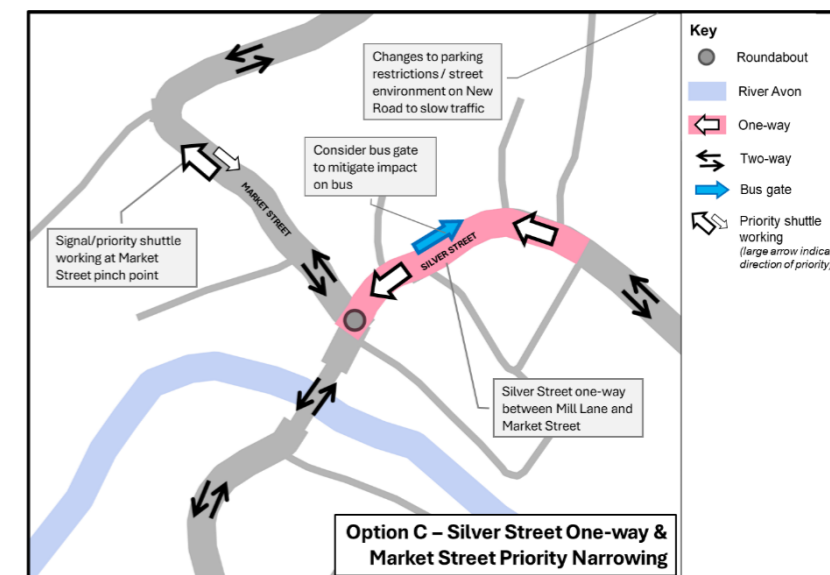
- One-way operation on Silver Street (westbound) and Market Street (northbound).
- Bus gate on Silver Street allowing buses to travel northbound (sensor-activated signal). This is included to avoid the need to divert the bus from Silver Street / New Road, as was required in the temporary COVID traffic management scheme.
- Traffic calming measures to be developed on New Road / Springfield loop to mitigate against increased traffic flows. No specific measures have been included in the model at this stage, but typical measures could include speed control, pedestrian crossings, and improvements to the character of the street.

**Option B - Pinch Point Priority Narrowing**



- Formalised priority narrowing at several of the key pinch points on Market Street and Silver Street.
- Signage and widened footways at three pinch points to formalise the current operation of traffic.
- Traffic heading uphill (northbound on Market Street and eastbound on Silver Street) will be given priority.

**Option C - Silver Street One-way & Market Street Priority Narrowing**



- One-way operation on Silver Street (westbound).
- Bus gate on Silver Street allowing buses to travel northbound (sensor-activated signal).
- Formalised priority narrowing at the pinch point at the top of Market Street to formalise current operation of traffic (northbound traffic given priority)
- Traffic calming measures to be developed on New Road / Springfield loop to mitigate against increased traffic flows. No specific measures have been included in the model at this stage, but typical measures could include speed control, pedestrian crossings, and improvements to the character of the street.

## 4. Assessment Against Scheme Objectives

Option A (Silver Street and Market Street one-way) offered the greatest potential to redefine the character of the town and reduce the dominance of traffic through significant footway widening and traffic management. However, it has considerable knock-on impacts in terms of congestion in the north and south of the town, and also results in unacceptable impacts on bus journey times making the option unviable. Wider alterations to junctions in the town may have the desired impact of ensuring the network functions as a whole, however this would significantly increase the potential costs and risks associated with the scheme. A significant proportion of traffic is diverted to the New Road / Springfield loop and therefore mitigation measures will need to be developed to calm traffic and enhance pedestrian safety in those locations.

Option B (Pinch Point Priority Narrowing) enables footway widening only at key pinch points on Market Street and Silver Street without having a major impact on traffic flows. However, this option fails to improve the character of the town sufficiently or reduce traffic dominance in the town centre, therefore failing to achieve a central aim of the project.

Option C (Silver Street One-way & Market Street Priority Narrowing) enables a significant change in the character of the town (through limited widening on Market Street and significant footway widening on Silver Street) without having a major impact on traffic flows. This option also increases the amount of traffic on the New Road / Springfield loop and therefore mitigation measures will need to be developed to calm traffic and enhance pedestrian safety in those locations. The next stages of scheme development should consider these measures in detail to demonstrate how the street can be improved to accommodate any increase in traffic and mitigate any impacts.

In terms of air quality, each of the options tested result in a marginal increase in Nitrogen Oxide and Particulate Matter emissions in comparison to the Do Nothing scenario. Ultimately, forecast 2041 emissions are substantially lower than in 2023 due to an expected increase in electric vehicles and a cleaner vehicle fleet overall. Therefore, despite resulting in marginally higher levels of emissions than the Do Nothing scenario, each of the three options are forecast to be significantly below existing emission levels.

The table on the subsequent pages provides an assessment of the three proposed intervention against the aims of this traffic study, in addition to bus service impacts and deliverability risks.

	Scheme Aims				Other Impacts
Scheme options	Safely reallocate space for walking and cycling	Facilitate slow but steady traffic movements	Improve air quality in the town	Bus service impacts	Deliverability risks
Option A – Silver Street and Market Street one-way	Through the implementation of the one-way system, and reduction to a single traffic lane, Option A enables significant footway widening on Market Street and Silver Street. Most importantly, this option enables widening at several key locations where pedestrian safety is currently a concern. <b>Significant opportunity to re-define the character of the whole town centre.</b>	Decrease in average speed across the network, primarily driven by significant increases in congestion due to significant increase in vehicle flows on Mount Pleasant, New Road and Springfield (as a result of one-way system), and also on Frome Road where northbound traffic experiences difficulty finding gaps in traffic at the Market Street / Silver Street roundabout. Some increase in average speed on Market Street and Silver Street due to one-way system. <b>Less impact from traffic on Market Street and Silver Street, but increased traffic flows and congestion on New Road loop and Town Bridge.</b>	Compared to the Do Nothing scenario, results in a greater increase in Nitrogen Oxides and Particulate Matter emission than Options 5 and 2, although significantly less emissions than the current situation due to predicted changes to the vehicle fleet by 2041. <b>Small adverse impact vs 2041 Do Nothing that may be offset by mode shift / re-routing. Overall significantly below existing emissions.</b>	Significant journey time delay for southbound D1 bus trips, with a 17% and 63% increase in journey times in the AM and PM peak respectively. No change or slight reduction in journey time for northbound D1 bus trips as a result of the Silver Street bus gate. <b>Unacceptable impact upon bus journey times – option is not viable if this can't be addressed through other bus priority measures.</b>	Management of side roads with during bus gate operation (Coppice Hill, Kingston Road, Whiteheads Lane, Whitehill). Implications for delivery drivers on Silver Street / Market Street. Need to provide sufficient space for holding bus at signals at the bottom of Silver Street. Network resilience in the event of major incidents. Bus transponder technology and implementation. Developing suitable traffic calming to address impacts on New Road loop.
Option B – Pinch Point Priority Narrowing	More substantial footway widening possible at priority narrowing locations where carriageway narrowing permits vehicles in one direction. These locations are where existing footway is very narrow and therefore provides key safety improvements. However, widening less substantial than for Option A. Silver Street widening not as significant as Option A or Option B. <b>Addresses key pinch-points only.</b>	Slight increase in average speeds across the network. Primarily driven by improved journey times for northbound traffic on Market Street and Silver Street. Contributes to increases in traffic travelling anti-clockwise on Silver Street, Springfield and New Road. Ultimately the use of priority narrowing system will contribute to increased stop-start congestion in these areas. <b>Minor impacts on traffic flows but dominance of traffic remain in the town centre.</b>	Minor increases in Nitrogen Oxides in the AM and PM peaks, and minor increase in Particulate Matter in the PM Peak. No increase in Particulate Matter emissions in the AM-peak. Significantly less emissions than the current situation due to predicted changes to the vehicle fleet by 2041. <b>Small adverse impact vs 2041 Do Nothing that may be offset by mode shift / re-routing. Overall significantly below existing emissions.</b>	Small impacts to southbound D1 bus trips in both the AM and PM peak. Significant decrease in bus journey times in the AM peak (-14%) and small journey time decrease in the PM peak (1%). <b>Acceptable impacts on bus services.</b>	Degree of compliance with priority shuttle. Ensuring that vehicles have sufficient visibility of approaching traffic.
Option C – Silver Street One-way & Market Street Priority Narrowing	More substantial widening possible at priority narrowing location where carriageway narrowing permits vehicles in one direction. However, due to use of single priority narrowing location, this option does not permit footway widening in the southern section of Market Street, which is currently a key safety concern. This option also enables considerable footway widening on Silver Street as a result of one-way system. <b>Significant opportunity to re-define the character of Silver Street / town centre. Doesn't address all pinch points on Market Street.</b>	Slight increase in average speeds across the network. Primarily driven by improved journey times for northbound traffic on Market Street, and westbound traffic on Silver Street. Contributes to increases in clockwise traffic on Market Street, Mount Pleasant, New Road and Springfield. Increases congestion on Town Bridge, St Margaret's Street and Frome Road where northbound traffic experiences difficulty finding gaps in traffic at the Market Street / Silver Street roundabout. Ultimately the use of priority narrowing system will contribute to increased stop-start congestion in these areas. <b>Less impact from traffic on Silver Street, but increased traffic flows and congestion on New Road loop and south of the town.</b>	Minor increases in Nitrogen Oxides and Particulate Matter in the AM and PM peaks. Significantly less emissions than the current situation due to predicted changes to the vehicle fleet by 2041. <b>Small adverse impact vs 2041 Do Nothing that may be offset by mode shift / re-routing. Overall significantly below existing emissions.</b>	Slight decrease in bus journey times in both the AM and PM peak (0% and 6% respectively). Significant decrease in bus journey times in the AM peak (-12%) and small journey time decrease in the PM peak (1%). <b>Acceptable impacts on bus services.</b>	See all risks from Option A and Option B



## Summary and Recommendation

Overall, Option C better fulfils the aims of this study, and by extension the aims of the Town Council that emerged from the Future of Transport consultation. Accordingly, our recommendation would be that Option C would be the most suitable scheme to progress to the next stages of scheme design, with the caveat that further work should focus on refining the design of the scheme and associated mitigation measures in addition to considering the array of deliverability risks identified within the full traffic study report.



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