



Bath Clean Air Plan

Bath and North East Somerset Council

Consultation Response Report

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Acronyms and Abbreviations

B&NES	Bath and North East Somerset Council
CAP	Clean Air Plan
CAZ	Clean Air Zone
DEFRA	Department of Food and Rural Affairs
DfT	Department for Transport
FBC	Full Business Case
HGV	Heavy Goods Vehicle
JAQU	Joint Air Quality Unit
LGV	Light Goods Vehicle
NO2	Nitrogen Dioxide
OBC	Outline Business Case
PRMS	Public Realm and Movement Strategy
RPZ	Residents Parking Zones
UK	United Kingdom

1. Introduction

Poor air quality is the largest known environmental risk to public health in the UK¹. Investing in cleaner air and doing more to tackle air pollution are priorities for the EU and UK governments, as well as for Bath and North East Somerset Council (B&NES). B&NES has monitored and endeavoured to address air quality in Bath, and wider B&NES, since 2002. Despite this, Bath has ongoing exceedances of the legal limits for Nitrogen Dioxide (NO₂) and these are predicted to continue until 2025 without intervention.

In 2017 the government published a UK Air Quality Plan for Nitrogen Dioxide² setting out how compliance with the EU Limit Value for annual mean NO₂ will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, B&NES, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how B&NES will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance B&NES is considering implementation of a Clean Air Zone (CAZ), including both charging and non-charging measures, in order to achieve sufficient improvement in air quality and public health.

Jacobs has been commissioned by B&NES to produce an Outline Business Case (OBC) for the delivery of the CAP; a package of measures which will bring about compliance with the Limit Value for annual mean NO₂ in the shortest time possible in Bath. The OBC assesses the shortlist of options set out in the Strategic Outline Case³, and proposes a preferred option including details of delivery. The OBC forms a bid to central government for funding to implement the CAP.

1.1 Context

Between 16th October and 26th November 2018 Bath and North East Somerset Council (B&NES) consulted on a proposal to implement a Class D charging Clean Air Zone (CAZ) as a means to urgently reduce harmful levels of Nitrogen Dioxide (NO₂) across the city, as outlined in an Outline Business Case (OBC).

This consultation was undertaken in the context of a complex project within which there are a number of key constraints. These govern the actions of the Council and therefore what is negotiable and its ability to act on feedback. These include the following:

- B&NES is mandated by central Government to take action on air quality and to bring concentrations of NO₂ to below 40 µg/m³ as an annual mean, in the shortest possible time, and by 2021 at the latest. The Council is committed to taking proactive action to improve air quality. The Council may face potential fines or legal action if they do not put into place a package of measures to address air quality within this time frame.
- Technical work undertaken prior to the start of the consultation process showed that a charging CAZ is the only mechanism capable of reducing emissions to appropriate levels. Based on the evidence available at the time of the consultation, a Class D CAZ was identified as the option most likely to achieve compliance in the required timeframe.
- A CAZ would need to be implemented in line with the principles set out in the Government's 'Clean Air Zone Framework'. This document, published in 2017, explains the approach that Local Authorities should take when introducing a zone.

¹ Public Health England (2014) Estimating local mortality burdens associated with particular air pollution.

<https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution>

² <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

³ Bath and North East Somerset Council Clean Air Plan: Strategic Outline Case, March 2018

http://www.bathnes.gov.uk/sites/default/files/siteimages/Environment/Pollution/strategic_outline_case_bath_28.03.2018_with_anexes.pdf

- Funding for a CAZ is dependent upon the Government's Joint Air Quality Unit (JAQU) approving a Full Business Case (FBC). There are also strict rules on how the available funding can be spent.
- The final decision on the type of charging zone and the detail of this will be made by elected Cabinet Members.

In this context the aim of the consultation process was to provide an opportunity for discussion between the Council and any persons concerned about the Class D CAZ proposal or its impacts. It also provided a forum for the sharing of information and ideas on how issues could potentially be resolved. Given that the Council is mandated to take action, the main focus of the consultation was seeking comments relating to how the Class D CAZ and the proposed package of supporting measures published for consultation could be refined to:

- Improve their effectiveness in tackling air quality issues.
- Help to mitigate any potential impacts on either specific groups or locations.
- Better support the community and road users to adapt and adjust.

1.2 Overview of consultation feedback

The feedback from the formal consultation is reported in the document OBC 25a - Report on Formal Consultation and should be read alongside this report. Feedback was varied and detailed. However, overall respondents showed an **understanding of the need to address air quality in Bath**. A wide range of comments were submitted by individuals, groups and businesses on many aspects of the proposed Class D CAZ. In particular comments focused on the proposed boundary, who and what vehicles should be charged, potential economic impacts and the support that would be needed to drive behaviour change. Whilst some respondents did not support a charging zone many focused their feedback on identifying ways in which the proposed Class D CAZ proposal could be evolved to maximise its impact and reduce any unintended consequences. The main themes from the feedback are summarised as follows:

- There were a number of **suggestions for further consideration of alternatives to the proposed Scheme**, these included: a Class C CAZ, congestion charge, construction of a link road/bypass and various other non-charging measures.
- Opinions on the **proposed Class D CAZ boundary** were mixed. Some respondents wanted the zone to be smaller whilst others thought the zone should be larger. Requests ranged from a smaller zone using the river as a boundary, to exclusion of through routes, specific streets and residential areas. Others felt the zone should be extended further to cover additional residential areas and, in some areas, there were particularly strong views on extending the boundary to include additional parts of the city centre.
- **Individuals, including residents and commuters wanted to see more support** to help them comply with a Class D CAZ. Many suggestions were made including adjusting the operating hours, providing discounts or adjusting the charging structures through concessions and exemptions, and altering the minimum emission standards.
- **Businesses also highlighted a need for more support**. This was particularly important for smaller businesses including sole traders and independent retailers, many of whom were concerned about the economic impacts to their business operations as a result of a Class D CAZ. These concerns were extended to their customers, suppliers and employees.
- Many respondents were concerned about the **timescales** of implementation for the proposed Class D CAZ. Both individuals and businesses felt that a longer time was needed to minimise the economic impacts associated with changing vehicles and behaviour.
- Overall there was a call for **public transport improvements to support behaviour change**, ranging from reduced fares, extended bus services and operating hours and improved park and ride facilities across B&NES.

- There were concerns about the **displacement impacts of a CAZ**. These included concerns that traffic, congestion and rat running would increase in areas adjacent to the proposed zone boundary and that parking in residential areas would be used by those looking to avoid driving into the proposed zone. Additionally, there were concerns that non-compliant vehicles would re-route and that this would worsen air quality and increase traffic and congestion in areas outside of the zone, both in neighbouring areas and in towns/locations further afield, including Wiltshire.

1.3 Evolution of the proposals, post consultation

Since the close of the consultation period key areas of work have been ongoing, as follows and as shown in Figure 1.1:

- Building on the initial work undertaken prior to the consultation, additional technical work has been undertaken to further consider the options to achieve air quality compliance. This has comprised further traffic and air quality modelling and a review of the baseline modelling. This work has been informative and has identified additional options with the potential to meet the air quality targets. This process is documented in OBC 08 – Options Assessment Report.
- Additional consideration of the potential impacts of a charging CAZ and the measures which could be taken forward to help support this scheme, in particular the best ways of providing support for residents and businesses to move towards lower emissions vehicles.
- Additional work to consider, in the context of the evolving technical work, the comments and suggestions put forward through the consultation itself.
- In parallel, there has been ongoing engagement with elected Cabinet Members.

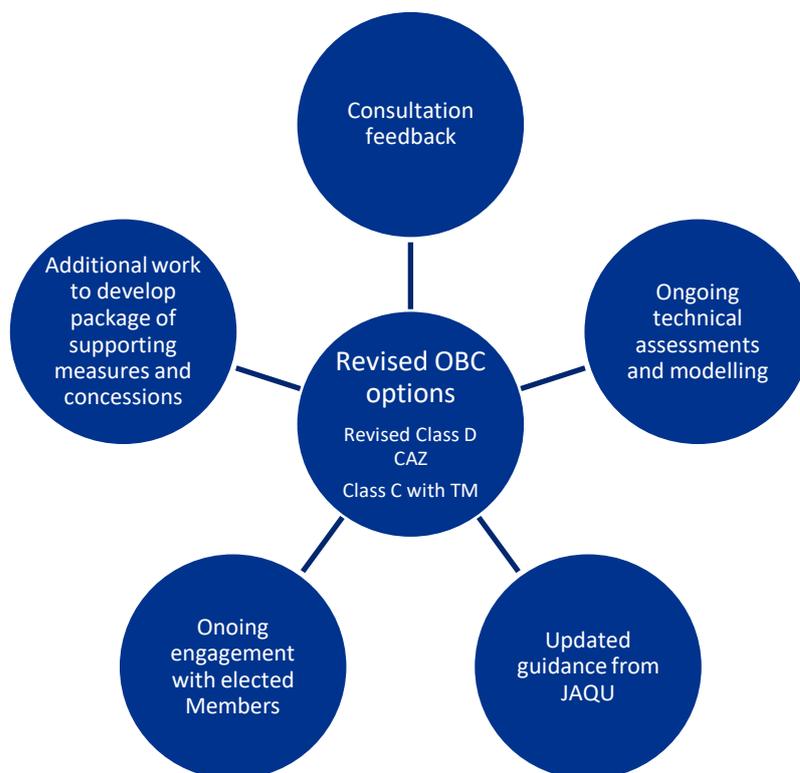


Figure 1.1 – Factors contributing to evolution of proposals

Findings from these areas of work have informed a revised Outline Business Case (OBC). The revised OBC identifies two **potential options** for reducing concentrations of NO₂ to below 40 µg/m³ as an annual mean in the shortest possible time and by 2021 at the latest. These are:

- **A revised Class D CAZ.** The revised Class D proposal responds, as far as possible within the technical constraints of the scheme, to the consultation feedback. In particular it includes changes to the proposed CAZ boundary, a revised and reprioritised package of supporting measures and concessions and an enhanced scheme for providing financial support to assist residents and businesses to move towards compliant vehicles.
- **A Class C CAZ** supported by traffic management measures and signal timing changes. This scheme has been identified as a possible option based on revised traffic and air quality modelling. It offers the opportunity to address some of the key areas of feedback raised in the consultation.

These options are explained fully in document OBC 08 – Options Assessment Report.

1.4 Purpose of this report

This report explains how the revised OBC and the options set out above have been considered in the context of the consultation feedback. Specifically, it:

- Summarises and refers to additional technical work which has been undertaken in direct response to key areas of consultation feedback. Given the volume of consultation feedback and the wide variety of comments received, it is not possible to consider or respond to every comment or request. This report therefore sets out how the broad themes raised in the consultation feedback have been considered.
- Explains the changes that have been made to the proposed Class D CAZ scheme in response to the consultation feedback; and

- Explains, in cases where it has not been possible to adjust the Class D CAZ scheme in line with consultation feedback, why this is not possible.
- Comments on the implications of the feedback received in the context of a Class C CAZ with traffic management option.

The information in this report is intended to provide evidence that can be considered by Officers and elected Cabinet Members to help support their discussions on how to best take forward a Scheme to address air quality in Bath and achieve compliance with the Government Directive.

This report does not replicate detail included elsewhere within the suite of OBC documents. The documents identified in Table 1.1 should therefore be read alongside this report.

Table 1.1 – Documents to be read alongside this report

Document	Key content in the context of this report
OBC 25a – Report on Formal Consultation	This summarises the feedback submitted in the formal six-week consultation period.
OBC 04 – Technical Note on the CAZ Boundary	This explains the rationale for the proposed CAZ boundary. It is assumed that the CAZ boundary would be the same for a Class C as for a Class D.
OBC 05 - Proposed System Design Features and Payment Exemptions	This explains the proposed exemptions and concessions across both Class D and Class C options.
OBC 08 – Options Assessment Report	This document explains the process of optioneering that has been undertaken. It explains how the Class D option was initially identified. It also sets out the additional work undertaken post consultation to identify a Class C with traffic management measures and signal timing changes option. It also describes the supporting measures that will be delivered (subject to funding) alongside the CAZ.
OBC 11 – AQ3 Air Quality Modelling Report	This contains details of the options tested to identify the CAZ charge. It also compares Class C and D scenarios.
OBC 26 – Evaluation, Monitoring and Benefits Realisation Plan	This sets out the monitoring that has been specified in response to consultation feedback.

1.5 Structure of this report

This report follows the structure of the consultation questionnaires. Following this introduction:

- Chapter 2 discusses the feasibility of the suggested **supporting measures or scheme alternatives**;
- Chapter 3 discusses additional work undertaken to consider comments on the proposed **CAZ boundary**;
- Chapter 4 sets out the issues related to the various suggestions received relating to the **CAZ charges**;
- Chapter 5 considers **concessions, exemptions and vulnerable groups**;
- Chapter 6 considers wider issues, related to the perceived consequences of a **Class D CAZ**; and
- Chapter 7 clarifies the **next steps**.

2. Alternatives to a Class D CAZ

Action taken in response to consultation feedback

Work undertaken in response to the consultation feedback and following additional traffic and air quality modelling has identified that a Class C CAZ supported by traffic management and traffic signal timing changes has the potential to deliver the required air quality improvements, in addition to the original Class D proposal. This option is presented in the revised OBC alongside an updated Class C CAZ option.

2.1 Overview of feedback and response

The consultation asked for suggestions for alternative options that could be considered instead of a Class D CAZ. For full details of the feedback provided see Chapter 13 of OBC 25a – Report on Formal Consultation. A wide range of suggestions were put forward. These included:

- Alternative types/classes of CAZ, in particular a Class C CAZ;
- Congestion charge;
- Infrastructure improvements, for example delivery of the A36-A46 link and/or east of Bath Park and Ride; and
- Significant improvements to public transport or traffic management (i.e. a focus on non-charging measures).

2.2 Context for consideration

In examining possible alternative ways in which the air quality issues in Bath could be addressed it is important to consider the extent to which they would:

- Contribute directly to making an air quality improvement.
- Be deliverable and enable compliance with air quality standards by 2021.

Many of the ideas identified in the consultation responses as potential alternatives have been considered in previous phases of the project, are outside of the scope of this work, are not deliverable within the timescales set out in the Government Directive or are issues that are otherwise being considered by the Council under its regular work on transport and planning. This section clarifies the Council's position on these issues, within the context of this project.

Consideration of the consultation feedback related to alternatives has therefore focussed on further assessment of a Class C option, as the alternative proposal with most potential to deliver the required air quality improvements.

2.3 Consideration of a Class C CAZ

The consultation feedback included a range of responses that encouraged the Council to consider the feasibility of a Class C CAZ in more detail. In particular respondents recognised that the information published in support of the consultation on a Class D CAZ demonstrated a small margin of difference between the overall air quality impacts of a Class C and a Class D scheme. On this basis respondents felt that a Class C should be further considered as a means of achieving a similar air quality outcome, with a perceived lesser overall impact.

Other respondents referred to a Class C CAZ as an alternative option indirectly through other feedback, for example by suggesting that longer concession periods should be given to cars, that charges should focus on heavy vehicles or by expressing concern about the affordability impacts of charging cars.

2.3.1 Revised modelling on a Class C CAZ

In parallel to the consultation, further work was undertaken to review the traffic and air quality modelling. In particular the models were reviewed to reflect new guidance from JAQU. This:

- Identified that, within the baseline modelling, only one exceedance is now predicted in 2021 with a Class C CAZ (as opposed to two indicated by previous modelling);
- Indicated that this one remaining exceedance in 2021 would be at Gay Street and that this could potentially be addressed by traffic management measures and traffic signal timing changes at Queens Square.

This change in the modelling results implied that a Class C CAZ could, with appropriate supporting measures, potentially be capable of delivering the required air quality improvements. This result, coupled with the strong feedback from the consultation which emphasised the importance of reviewing a Class C CAZ as a potential option, meant that further work was undertaken to assess a Class C scheme in more detail.

2.3.2 Identification of traffic management measures to support a Class C CAZ

In light of the updated modelling information, further work was undertaken to review previously considered traffic management measures for Queens Square. Various schemes looking at changes to the layout and traffic operation of Queens Square had been developed previously as part of the 'Public Realm and Movement Strategy' (PRMS). Review of these options identified that the Option 3b scheme emerging from this PRMS work had potential, with some modification, to manage traffic on Gay Street in a way that would be compatible with a Class C CAZ. This option was therefore taken forward for testing in association with a Class C CAZ.

The detail of this traffic management scheme is discussed further in document OBC 08 – Options Assessment Report.

2.3.3 Assessment of a Class C option, with traffic management and signal timing changes

The Options Assessment Report (OBC 08) sets out the full details of the work undertaken to examine the feasibility of a Class C CAZ with additional traffic management measures and traffic signal timing changes to address outstanding emission exceedance 'hot-spots' in the City Centre. This work suggests that the introduction of a traffic management scheme at Queens Square, in addition to a Class C CAZ, could be sufficient to bring air quality within legal limits. This is because the scheme would make Queens Square less attractive as a route for through traffic and would help to control the amount of traffic entering this area. It would cause some traffic to re-route away from Gay Street and Queens Square and encourage, for some journeys, a switch to alternative, more compliant modes.

On this basis, a Class C CAZ with traffic management option is identified within the OBC for consideration alongside a Class D option. However, this approach does have a range of complex pros and cons, as set out in OBC 08 – Options Assessment Report. In particular it is important to note that this option would lead to an increase in traffic on other roads, particularly to the north of Queens Square.

Whilst the formal consultation focused on a Class D option it is possible to interpret the feedback received in the context of a potential Class C option, in order to understand likely reaction. A Class C CAZ option directly addresses the requests received to consider other options and would also address the concerns raised in the consultation feedback in relation to:

- The affordability impact of a Class D CAZ on residents, workers and low-income groups.
- The potential difficulty for non-compliant car drivers under a Class D CAZ to undertake regular essential journeys, for example to the supermarket or hospital.

- The wider knock-on effects of a Class D CAZ because under a Class C CAZ, cars would have no reason to re-route through adjacent areas. However, it is acknowledged that there may remain concerns about larger vehicles rat running.
- The wider impact of a Class D CAZ on footfall, and hence knock on effect for businesses.

However, it is important to note some of the consultation feedback suggested that the proposed Class D CAZ was not going far enough. There were calls for a bolder proposal, for higher charges, a larger zone or for vehicles to be completely banned from the city centre. Other respondents noted that they happy to see non-compliant cars included within the proposals. These respondents may not support a Class C CAZ.

2.4 Consideration of other options

Following the consultation, additional optioneering work also considered the pros and cons of other alternative options. This included, for example, work to assess whether the traffic management scheme identified to support the Class C CAZ could be combined with a Class D option. The findings of this work are reported in OBC 08 - The Options Assessment Report.

2.5 Consideration of other feedback

As noted above, many of the other suggestions put forward as potential alternatives to a charging CAZ are not appropriate to take forward for further consideration. Table 2.1 provides details.

Table 2.1 – Consideration of other suggestions for alternative approaches

Alternative scheme suggested	Response/issues to consider
Congestion charge	<p>A congestion charge does not differentiate between pollution levels of different vehicles. This is necessary to improve air quality.</p> <p>The Council proposed to implement a CAZ rather than a congestion charge in line with the Government’s CAZ Framework and because a CAZ is aimed at changing the fleet compositions in order to have a targeted impact on air pollution. In conjunction with other CAZs nationally, it should prompt a transition to less polluting vehicles. It will not prevent non-compliant HGVs and other vehicles from driving through the centre of Bath.</p> <p>The CAZ will form part of Bath’s wider strategy for transport. Additional measures to specifically target congestion will be taken forward by the Council as part of their wider transport strategy for Bath.</p>
Infrastructure measures	<p>Other infrastructure-based alternative solutions identified in the consultation responses, such as delivery of a link road or east of Bath Park and Ride are outside the scope of the Clean Air Fund and could not be funded by this project. They are also not deliverable by 2021 as stipulated by the Government Direction. However, these strategic schemes remain important ambitions for the Council. For clarity, the Council’s position on these schemes is set out below.</p> <p><i>East of Bath link</i></p> <p>Dorset, Wiltshire, and Bath and North East Somerset Councils are working together to study the current transport connections between the M4 and the south coast and their impact on our economy. Evidence has been gathered to support a call for action to improve north-south transport connections in the south west, which could help grow the economy, support local businesses and improve people’s quality of life. The Council have funded the development and promotion of a prospectus, an economic study and a report into how the case for improved north south connectivity aligns with the UK Industrial Strategy. This will form part of a compelling case to encourage the Secretary of State for Transport to mandate Highways</p>

	<p>England to carry out a Strategic Study, for eventual inclusion of the East of Bath link in the second Road Investment Strategy beyond 2020.</p> <p><i>East of Bath Park and Ride</i></p> <p>Future plans will include a Park & Ride package comprising of expansion of three existing sites at Odd Down, Lansdown and Newbridge and to explore the options for and support delivery of a new Park and Ride site to the east of Bath to address future demand for travel and to facilitate further mode shift from cars for travel into the city.</p>
<p>Non-charging measures</p>	<p>Many of the suggestions for alternative ways to tackle air quality submitted during the consultation were based on non-charging mechanisms. In particular these focused on delivering a step change in public transport and Park and Ride provision, with a focus on free or reduced-price travel. A range of other suggestions relating to traffic management, walking, cycling and the school run were also put forward.</p> <p>The extent to which of non-charging measures could deliver the required air quality improvements was considered at an earlier stage of the project. This work concluded that non-charging measures alone would not be sufficient and that a charging CAZ was the only option with sufficient scope to deliver the air quality improvements needed by 2021. For further information refer to OBC 08 - The Options Assessment Report.</p>

3. Proposed Class D CAZ boundary

Action taken in response to consultation feedback

In response to the consultation feedback, and taking account of the results of further assessment, the following adjustments have been made to the proposed boundary of the Class D CAZ option:

- The zone boundary has been amended to include the Pulteney Estate area.
- The zone boundary has been amended to exclude Cranhill Road and Rivers Road.
- Potential further amendments to the zone remain under technical review. These include potential extensions of the zone covering additional areas of the A367 Wells Road and Bathwick. These do not form part of the core scheme presented in the revised OBC at this stage.

3.1 Overview of feedback

Comments relating to the proposed Class D CAZ boundary were extremely varied. Whilst there was some feedback around very different ways of defining a boundary and some comments from people who did not want to see a charging zone defined at all, the majority of feedback focused on identifying potential amendments to the published boundary for a Class D CAZ. In summary these comments reflected:

- Opinions that the zone should be smaller. The majority of respondents who expressed this view did so because of a desire to allow through trips to route around Bath (particularly noting that Bath does not offer a ring road or suitable alternative routes) and to ensure that every day essential journeys would not be impacted by a potential charge.
- Views that the zone should be larger. Some respondents called for a larger zone because they felt tackling current air quality issues in their area required bolder action or wished to see the perceived positive impacts of a CAZ extend across a wider area. However, the majority of requests for a larger zone were made in response to concerns about the potential knock on effects of the CAZ, for example to discourage rat running or parking in areas adjacent to the zone.
- Views that the zone should be designed in a way to enable specific journeys, in particular journeys across the city, to the motorway and to key facilities, such as the hospital.
- Requests for minor adjustments to the boundaries, in particular to mitigate the impact of the zone on residents and to enable them to travel out of the city without clipping the edge of the zone.

This section considers these comments and explores the extent to which the requests made by respondents are technically feasible. It should be noted that this section deals specifically with the consideration of feedback on the boundary of the Class D CAZ (as that was the focus of the consultation exercise). However, at the end of this section the implications of the feedback and related technical assessment are discussed in the context of the Class C CAZ option.

3.2 Context for consideration

The CAZ boundary published as part of the consultation exercise was defined based on the following rationale:

- The zone should be as small as possible to enable compliance with air quality targets and avoid impacting more people and local businesses than is necessary.

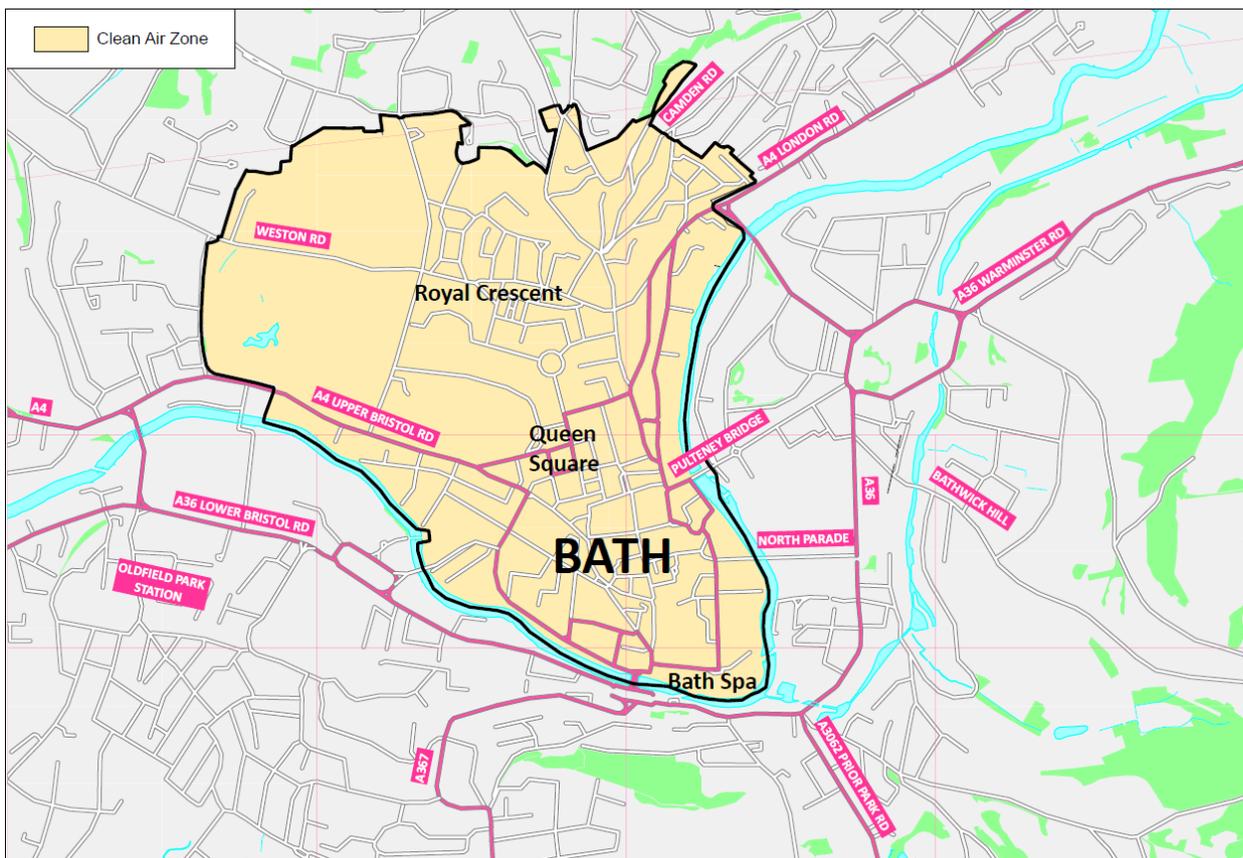
- The boundary needs to be defined in a way that, as far as possible, avoids the potential impacts of rat running, allows safe opportunities for vehicles to turn around before they enter the CAZ, and minimises the impact of street clutter in the form of signage and cameras.

The suggested boundary alterations have been considered in line with these principles, and assessment has focused on whether the suggestions are technically feasible. Document OBC-04 explains the rationale for the boundary and how this has evolved through various stages of the project.

3.3 Assessment of a smaller zone

A variety of requests were made via the consultation process to consider a smaller zone. These comments are set out in detail in Chapter 7 of OBC 25a – Report on Formal Consultation.

A common suggestion was that the A36 and A4 should be excluded from the zone as these are through routes used by traffic moving through and around Bath. In response to this feedback, additional traffic and air quality modelling work was undertaken to examine the extent to which compliance with the required air quality targets could be delivered with a smaller zone as shown in Figure 3.1. This removed all sections of the A36 and the A4 London Road/Cleveland Place junction from the zone.



- A4 London Road, east of Cleveland Place;
- A367 Wells Road, near Oldfield Road;
- A36 Lower Bristol Road, between Pines Way and Windsor Bridge Road; and
- A4 Upper Bristol Road, between Windsor Bridge Road and Newbridge Hill.

The maximum concentration was 47 µg/m³.

A further 'sensitivity' test was also undertaken with just the removal of the A4 London Road/Cleveland Place. The results with this test still showed a maximum concentration is 40.8 µg/m³, with three PCM-equivalent receptors in exceedance. This scenario is thus still non-compliant, albeit the difference with the Class D CAZ as proposed via the consultation is marginal.

On the basis of this work a smaller zone was ruled out and has not been considered further.

3.4 Consideration of minor boundary adjustments

The consultation feedback also included requests for specific smaller areas to be excluded from the CAZ. These comments are set out in detail in Chapter 7 of OBC 25a – Report on Formal Consultation. These typically related to areas on the edge of the proposed boundary, or where respondents had identified that minor amendment could mean that their street may not be unnecessarily disadvantaged by the CAZ. In most cases the implication was that respondents were asking for the boundary to be drawn closer to the main routes, and not to include the side roads. In some cases, there were parallel requests from others who would prefer to see the boundary enlarged in the same area.

These comments have been examined and **Table 3.1** provides commentary on the extent to which each may be practical or feasible. Consideration has made in terms of:

- The original rationale for the proposed boundary;
- The extent to which they may open-up potential rat runs;
- How practical they might be in terms of camera placement; and
- Whether they may lead to wider issues or have other knock on impacts.

This work has identified some instances where a request made through the consultation process could be accepted without affecting air quality compliance or opening-up new potential avoidance routes. The two amendments carried forward into a revised boundary are the exclusion of Cranhill Road and an amendment at Rivers Road. However, many of the suggested amendments have potential disadvantages or issues.

Table 3.1 – Consideration of requests for minor boundary amendments (exclusions)

Streets suggested for exclusion from the zone via minor amendment to proposed Class D zone boundary	Notes on feasibility/issues to consider
<p>Pulteney Gardens, Pulteney Grove, Pulteney Avenue, Lime Grove, Lime Grove Gardens</p>	<p>These roads were included in the boundary that went out for consultation due to a late boundary amendment to move the cordon point on the A36 back from Widcombe to a point just south of Bathwick Roundabout. This was to make signing easier and to provide safer, more suitable 'escape' routes to allow re-routing choice 'at the cordon' position. In particular:</p> <ul style="list-style-type: none"> • The entrance to the CAZ is now clearly signed at Bathwick Hill Roundabout; this will allow all vehicles, particularly HGVs, to use Bathwick Hill or the A36 North (via a 'U' turn or using Vane Street) to exit the roundabout and avoid entering the zone; • The proposed signage before the canal will also make it clear to non-compliant LGVs and cars that crossing the canal bridge will result in entry into the CAZ. Vehicles are able to re-route at this point using either Horseshoe Walk or Abbey View; and • As proposed at consultation stage the boundary avoids issues with non-compliant vehicles routing past Widcombe Primary School to turn, or 'entrapment' issues with HGVs forced to enter if reaching Widcombe. <p>Excluding these roads would require new cordon points at the Lime Grove, Pulteney Gardens and Pulteney Avenue minor road junctions with the A36, as opposed to a single cordon point on Pulteney Gardens to the east at the canal bridge. Options for turning in these roads, which have significant on-street parking, are limited without reversing back. The proposed boundary location offers better facility for this for non-compliant vehicles.</p> <p>An amendment here is not proposed for this reason.</p>
<p>Widcombe Hill / Prior Park Road Junction /Claverton Street (including Widcombe Baptist Church)</p>	<p>The Widcombe Hill and Prior Park Road routes to/from the A36 need to be cordon controlled at some point. This is currently south of the White Hart junction. North of the White Hart junction the cordon control points (still two) would have to be on Widcombe Parade (exit only) and St Matthews Place. The only advantages of this would be that access to the Baptist Church car park could be achieved without entering the CAZ, whilst the double mini-roundabout at the White Hart junction would facilitate 'turn around' for non-compliant cars and LGVs. A potential disadvantage of this change would be retaining movement between Widcombe Hill and Prior Park Road at the zone edge, which together with The Tynning and Rosemount Lane/Forefield Rise could open up a 'rat-run' avoidance route between Horseshoe Walk and Greenway Lane.</p> <p>An amendment here is not proposed for this reason.</p>
<p>Wells Road</p>	<p>The zone as proposed in the scheme published for consultation extended along the Wells Road (A367) to the junction with Oldfield Road (B3111) but did not include the junction. This was proposed by the residents of Upper Oldfield Park to avoid rat-running on what is a minor road, and one which serves as a main point of access to Hayesfield School.</p> <p>If the boundary was moved further north (to exclude more of Wells Road), then Upper Oldfield Park would be likely to become a rat run.</p> <p>An exclusion is not proposed here for this reason. Note that other respondents called for more of Wells Road to be included in the zone and for the B3111 itself to also be included (see Table 3.2).</p> <p>See Figure 3.3, which shows a potential further extension of the boundary to include more of the Wells Road, under technical review.</p>

Streets suggested for exclusion from the zone via minor amendment to proposed Class D zone boundary	Notes on feasibility/issues to consider
<p>Pines Way gyratory to facilitate access to Sainsburys/Green Park</p>	<p>Removing Pines Way gyratory and moving cordon points to Midland Bridge Road and the A36 Lower Bristol Road to the east of the gyratory would by default remove the A36/Brougham Hayes junction from the CAZ. This would open up a potential avoidance route via the B3111 (Refer also to item below).</p> <p>An amendment here is not proposed for this reason.</p>
<p>Junction of the B3111 Brougham Hayes with the A36 Lower Bristol Road (or other means of allowing a left turn onto the A36 without entering the zone)</p>	<p>The inclusion of the A36/Brougham Hayes junction is primarily focussed on preventing the undesirable re-routing of non-compliant vehicle trips around the edge of the zone in both directions via the B3111 (so Brougham Hayes, Lower Oldfield Road, Junction Road and Oldfield Road) which might otherwise result in worse air quality in this area and/or undesirable congestion issues.</p> <p>An amendment here is not proposed for this reason.</p>
<p>Roads to the south of the A36 including Westmoreland Street</p>	<p>The proposed zone includes the area up to the railway bridge on Westmoreland Road, with the cordon point just north of the junction with Westmoreland Station Road/Lower Oldfield Park/Thornbank Place. This area is included as the junction is a clearer and more obvious turn-around point before entering the CAZ. HGVs would also have the opportunity to turn around here using the entrance area to Westmoreland Station where the carriageway area is quite wide. The inclusion also optimises the scheme for practicality reasons, removing the need for two cordon points to/from the A36 Lower Bristol Road at Westmoreland Road and Cheltenham Street.</p> <p>An amendment here is not proposed for this reason.</p>
<p>Victoria Park (general area, including Weston Road, Julian Road, Marlborough Lane and Cavendish Road)</p>	<p>This was originally included because of concerns about excess use of the Park for parking by non-compliant vehicles, given that the adjacent Charlotte Street car park would be inside the CAZ.</p> <p>Removing it from the zone is unlikely to have a big impact in achieving compliance. However, the Weston Road cordon point would have to be relocated to a point closer to the Cavendish Road junction (ideally just east of RVP access) and Marlborough Lane to the south of the Royal Avenue junction removed. Removal of Cavendish Road, and so too the Weston Road/Cavendish Road junction, would open-up a significant opportunity for avoidance routing between Weston Road and Lansdown Road via Cavendish Road, Winifreds Lane (NB only) and Sion Road.</p> <p>An amendment here is not proposed for this reason.</p>
<p>Cranhill Road</p>	<p>Cranhill Road could be omitted from the CAZ without issue. There would be an increase in ducting/cabling costs although not significant. Its inclusion in the published consultation scheme boundary simply enabled the Weston Road cordon point to be defined just east of the Weston Road/Park Lane mini-roundabout. If removed, Cranhill Road may become more prone to vehicles turning around within it or dropping off passengers outside the CAZ, but this risk is considered low.</p> <p>This amendment is included in the revised Class D CAZ boundary.</p>

Streets suggested for exclusion from the zone via minor amendment to proposed Class D zone boundary	Notes on feasibility/issues to consider
<p>Lansdown Road/Richmond Road Junction</p>	<p>Following an initial assessment and ongoing discussion with key stakeholders within the Council, a northwards extension of the boundary to St. Stephen's Church (Lansdown Road/Richmond Road junction) was incorporated into the CAZ at a previous stage in the project. It was considered that its inclusion was necessary to prevent travel routing around the zone boundary to avoid the charge, so increasing non-residential traffic whilst reducing air quality on local streets.</p> <p>However, moving the cordon to the south of this junction could be considered, with revised ANPR camera locations on Lansdown Road immediately south of the Richmond Road junction and on St Stephen's Road at its junction with Richmond Road. This would achieve the same objective and additionally allow the Lansdown Road/Richmond Road junction to be used for 'turn-back' manoeuvres.</p> <p>On balance, considering other feedback, an amendment here is not proposed at this time. This amendment could potentially be considered in the future.</p>
<p>St Stephen's Road, Rivers Road, Bella Vista Road, Mount Road, Lansdown Grove</p>	<p>The necessity for including this set of residential roads was the desired inclusion of the Lansdown Road/Richmond Road junction (see above). Most of this area could be excluded by moving the cordon here southwards and establishing revised cordon points as follows:</p> <ul style="list-style-type: none"> • Lansdown Road: just south of the junction with Lansdown Grove; and • St Stephen's Road: just south of the junction with Mount Road. <p>This change would remove the need for the cordon sites at the Lansdown Road/Richmond Road junction, or the alternative suggested earlier. It would also remove the need for bespoke cordon points at the Lansdown Crescent and Upper Lansdown Mews junctions with Lansdown Road. Making this change would not open-up any new opportunity for zone avoidance 'rat-running'. It would also reduce the need for ANPR camera coverage and have no impact in achieving compliance.</p> <p>At this stage, given the desire previously expressed for the Lansdown Road/Richmond Road junction to remain in the zone, an amendment here is not proposed.</p> <p>However, a minor amendment to the proposed boundary is carried forward to remove Rivers Road. This amendment is made following feedback from residents.</p>
<p>Camden Crescent, Camden Road and Belgrave Crescent</p>	<p>Camden Road/Camden Crescent already acts as a parallel 'rat-run' route to London Road so, with London Road cut by the zone it is essential that this route is also covered by the CAZ to deter increased rat-running. It is considered the cordon location chosen on Camden Road must allow some opportunity for a non-compliant vehicle to 'turn-back' should earlier warning signing be missed. This is not achievable with setting the cordon point at the Camden Crescent junction with Lansdown Road. Whilst Belgrave Crescent is accepted as 'not ideal' for 'turn-back' it does at least provide an opportunity where these are few. However, as this route is used primarily by 'local' traffic familiar with the road network, it is considered that the number of drivers 'caught out' and using Belgrave Crescent for this purpose will fall off sharply in the first few days of CAZ operation.</p> <p>Resetting the cordon point on this route just west of the junction with St Stephen's Road could be considered. However, this road is equally non-ideal for accepting turn-back 'avoidance' traffic. It would also require a re-establishment of the boundary to the south to link with that around the A4 London Road/Cleveland Place junction.</p> <p>An amendment here is not proposed for this reason. It is proposed that this situation should be monitored, and reassessed if necessary.</p>

Streets suggested for exclusion from the zone via minor amendment to proposed Class D zone boundary	Notes on feasibility/issues to consider
Charlotte Street car park	Removing this key car park from the CAZ would not align with the overall ambition to improve air quality and encourage behaviour change. It may also result in adverse impacts due to increased popularity of this car park in comparison to others within the zone. An amendment here is not proposed for this reason.
An area to enable drop offs for the bus or rail station	Drop-off/pick-up close to the bus and railway station is not precluded for compliant vehicles. Creating a specific area for non-compliant vehicles within an easy walk distance of Bath Spa railway station and the main bus station will encourage its use for general drop-off/pick-up for shopping/leisure trips to the City Centre as well. This would not be in keeping with the objective of encouraging behavioural change. An amendment here is not proposed for this reason.

3.5 Consideration of a larger zone

Within the consultation feedback there were various requests for the Class D zone to be made larger to include a wider area. These comments are set out in detail in Chapter 7 of OBC 25a – Report on Formal Consultation. Some of these requests were reflected in detailed responses from resident’s associations who expressed strong views about the need for their area to be included in the zone. In response to this feedback additional work was undertaken to consider the issues arising from potential inclusion of additional areas within the Class D zone in terms of:

- Whether extending the area is likely to further encourage behaviour change or deliver enhanced air quality benefits;
- The potential impact on alternative routing and potential further traffic displacement;
- Whether there may be other strategies for addressing the issues in the area; and
- The practical, economic and financial impacts of a bigger zone, including the costs of implementing and maintaining additional infrastructure.

The findings of this work are shown in Table 3.2 and supported by further detail presented in Appendix B. This work was undertaken in the context that the Class D CAZ boundary presented as the basis for the consultation was technically assessed and found to achieve compliance with air quality targets. On this basis, any further expansion of the zone is not required for air quality purposes. However, it is recognised that many respondents had concerns that the proposed boundary would result in adverse impacts, for example rat-running, turning back and increased demand for parking, that require consideration.

On the basis of the technical assessment set out in Table 3.2, and considering the nature of the consultation feedback provided, an amendment to the Class D CAZ boundary is identified to extend the zone to include the Pulteney Estate area. This extension is taken forward to the Class D CAZ option outlined in the revised OBC. This work has also identified possible additions to the zone at Bathwick and the A367. These are recommended for further consideration but do not form part of the core scheme presented in the revised OBC.

It is recommended that in other areas where there have been requests for the zone to be made larger, a programme of monitoring should be set out. It will be important to define how potential knock

on effects can be monitored and reviewed and how this can be captured through any monitoring and evaluation plan that will need to be provided to support the FBC.

It important to note that any amendments to the zone ultimately taken forward need to recognise that the zone may then affect residents who may not have commented through the formal consultation process, either because they were not aware that they would be affected or were happy with the boundary as proposed. That is, adding new areas into the zone will inevitably mean that more people will be affected. Some may not support inclusion, and would not have commented to this effect if they were not aware that their location would be impacted and changed in this way;

Table 3.2 – Consideration of requests for potential zone extensions within a Class D CAZ

Locations requested for inclusion in an expanded Class D CAZ	Notes on feasibility/issues to consider
More of London Road	<p>Most of the traffic passing along London Road continues through or comes from the Cleveland Place junction which is within the CAZ boundary. As such, the effect of improved vehicle compliance on air quality will be felt indirectly along the remainder of the London Road anyway. Including more of London Road would entail a need to include residential streets adjacent to it, particularly those with sole access to the A4, or create a need for multiple cordon points on streets adjoining London Road to the north for example Snow Hill and St Saviours Road. Turn-back opportunities from what in some cases are roads with a steep gradient would be difficult.</p> <p>An amendment here is not proposed for this reason.</p>
Pulteney Estate	<p>In the consultation feedback there were many requests to include a much larger area on the eastern boundary of the Class D CAZ within the zone (to include Great Pulteney Street, Sydney Place and Sydney Gardens) and various residents' associations supported this view. There were specific concerns that the CAZ could exacerbate existing issues with tourist and rugby coaches idling in the area by being attractive to non-compliant coaches seeking to avoid the charge while still getting close to the central area and the Recreation Ground. There are also concerns about general rat running and increased pressure for drop-off and parking of non-compliant vehicles.</p> <p>The issues around inclusion of this area are covered in a separate Technical Note, included in Appendix B. In summary, the additional work undertaken to consider these issues concludes that an extension of the CAZ zone is not needed to achieve compliance. The Technical Note discusses specific issues relating to coaches, parking and drop offs and concludes that these issues are unlikely to be significantly exacerbated by the CAZ, but it does recognise that these are existing issues of concern to many residents.</p> <p>For these reasons a zone extension to the extent advocated by the resident's associations is not recommended. However, in response to consultation feedback, a smaller extension of the zone to include the Pulteney Estate (that is to include Bathwick Street, Great Pulteney Street and roads to the west) is included in the revised Class D CAZ boundary shown on Figure 3.2. This is taken forward on the basis that it does not interfere with the turning opportunity via Sydney Gardens.</p>

Locations requested for inclusion in an expanded Class D CAZ	Notes on feasibility/issues to consider
<p>Bathwick</p>	<p>Similarly, many requests were received during the consultation period to extend the zone to include the wider Bathwick area.</p> <p>The difficulties of delivering a wider extension, including the Sydney Place gyratory and the wider Bathwick area is noted in Appendix B. A key constraint is that a larger zone here would have implications in providing suitable opportunity for 'turn-back' or re-routing of non-compliant vehicles, particularly HGVs entering the city on the A36(T)</p> <p>Further extension to cover a wider area of Bathwick might be considered at some point in the future if CAZ implementation is shown to introduce undesirable parking or rat-running effects which are not addressable with normal parking or traffic management controls. On this basis, inclusion of the wider area in the zone remains under technical review but does not form part of the core scheme presented in the revised OBC. Proposals for monitoring in this area are set out in document OBC-26 'Evaluation, Monitoring and Benefits Realisation Plan'. Section 3.7 provides further details.</p>
<p>Bathampton</p>	<p>To the east there are also concerns from residents in Bathampton about increased traffic on Bathampton Lane/Mill Lane due to its use as a potential avoidance route by non-compliant light vehicle traffic. This includes concern about increased delay on both approaches to the toll bridge and the risk of increased northbound queuing extending beyond the railway bridge into the northern part of Bathampton. On this basis there were requests for this area to be included potentially with the Class D CAZ.</p> <p>The issues around inclusion of this area are also covered in the same Technical Note contained within Appendix B. In summary, the additional work undertaken to consider the issues in Bathampton concludes that inclusion of this area is not required to deliver air quality compliance by 2021. Re-assessment of the traffic modelling results shows that the diversionary impacts expected are not high or severe, albeit there is a slight increase in expected usage. It is noted also that the ability for extra traffic to be accommodated on the toll bridge is heavily constrained by the capacity of the bridge itself. Extending the CAZ boundary out to Bathampton would not be practical via a continuous extension of the zone, as this would necessitate the inclusion of additional residential and business areas (meaning additional residents and businesses would be impacted). There are also issues with providing an adequate turn back opportunity. Therefore, if included, Bathampton would need to form a separate 'outlier' zone. This would likely set a precedent for the inclusion of other sub-zones.</p> <p>An amendment here is not proposed for this reason. However, it is recommended that this area be closely monitored and reviewed. This should include further data collection prior to CAZ implementation, in order to accurately assess current conditions. Proposals for monitoring in this area are set out in document OBC-26 'Evaluation, Monitoring and Benefits Realisation Plan'. Section 3.7 provides further details.</p>

Locations requested for inclusion in an expanded Class D CAZ	Notes on feasibility/issues to consider
<p>Horseshoe Walk</p>	<p>There is a small risk of some additional traffic using Sydney Buildings, Horseshoe Walk and The Tynning as a route between Bathwick Hill and Widcombe Hill. However, these two routes converge and meet to the east at Combe Down. As such, any additional usage would be limited to a few drivers trying to route north-south around this edge of the zone. Church Street, which would form the logical extension of this rat-run to Prior Park Road, is narrow, so would act as a significant deterrent.</p> <p>An amendment here is not proposed for this reason. However, it is recommended that this area be closely monitored and reviewed. Proposals for monitoring in this area are set out in document OBC-26 'Evaluation, Monitoring and Benefits Realisation Plan'. Section 3.7 provides further details.</p>
<p>More of Widcombe Hill, Prior Park Road. and Lyncombe Hill</p>	<p>The present inclusion of the White Hart junction will intercept and control non-compliant vehicle usage on Widcombe Hill and Prior Park Road. The proposed cordon point on Lyncombe Hill is sited at the A36 junction to allow some opportunity for non-compliant vehicles to turn-back using either St Marks Road or Calton Gardens. Whilst it is possible these streets might also be used by non-compliant drivers to drop-off/pick-up, re-siting the cordon point, say, north of Alexandra Road, would create no avoidance 'turning' opportunity for drivers using Lyncombe Hill (unless sited much further south and just north of the Rosemount Lane junction). If the latter was considered, the southern extension of the zone along Lyncombe Hill would encompass a number of other streets, whilst the position of the cordon point in Prior Park Road would have to be re-evaluated (so likely just north of the Lyncombe Vale junction (Rosemount Lane)).</p> <p>An amendment here is not proposed for this reason.</p>
<p>More of the A36</p>	<p>Proposed advance signing at the A36/Windsor Bridge Road junction will be used to direct non-compliant vehicles away from the section of the A36 Lower Bristol Road between Windsor Bridge Road and Brougham Hayes. Including this section would impact businesses along the north side for no reason, which will get an indirect air quality benefit anyway with the A36/Brougham Hayes junction included within the CAZ. In other words, there is no eastbound 'through' traffic route available other than via the A36/Brougham Hayes junction once drivers exit the Windsor Bridge Road junction. In addition, other consultees were keen to see the A36 excluded from the zone, or as little included as possible.</p> <p>An amendment here is not proposed for this reason.</p>

Locations requested for inclusion in an expanded Class D CAZ	Notes on feasibility/issues to consider
<p>More of the A367 - A367/B3111 Oldfield Road junction</p>	<p>There were a number of requests to include the junction of the A367 and the B3111 Oldfield Road, or a longer stretch of the A367 Wells Road.</p> <p>A significant extension to the zone in this direction would not be required for compliance and would disadvantage additional residents. Extending the zone boundary, for example to Hatfield Road, would provide no opportunity for inbound A367 non-compliant traffic reaching the dual carriageway section to turn-back.</p> <p>In respect of the junction of the A367 and the B3111 Oldfield Road there is an easy diversion route via Bloomfield Avenue to the south that could be used to route around this junction if it were included in the zone. As such, if there was a desire to include this junction it would therefore be necessary to consider inclusion of the length of the B3111 Oldfield Road to its junction with Junction Road. Turn-back for non-compliant vehicles seeking to avoid the zone on reaching Bear Flat would then be required to use residential roads in 'Poets Corner' on the east side of Wellsway, or Bloomfield Avenue.</p> <p>The inclusion of the B3111 Oldfield Road and its junction with Wells Road will undoubtedly reduce the risk of risk of drivers trying to avoid the CAZ by using this route to enter/leave Oldfield Park. Whilst noting that the A36/B3111 Brougham Hayes junction at the other end of this route is already included, there are other routes across Oldfield Park to the A36 possible via Oldfield Road. However, targeting this length of Oldfield Road could result in use of the other residential roads to the south of the 'Linear Park' to access Oldfield Park.</p> <p>Inclusion of this area in the zone is under technical review but does not form part of the core scheme presented in the revised OBC. Proposals for monitoring in this area are set out in document OBC-26 'Evaluation, Monitoring and Benefits Realisation Plan'. Section 3.7 provides further details.</p>
<p>Oldfield Park</p>	<p>Oldfield Park was identified by respondents as an area that may be particularly at risk of increased traffic and parking as a result of the CAZ. There were various calls to include this area within the zone. Doing so could however conceivably involve the inclusion of a very large residential area. If the zone boundary was to be aligned with the 'Linear Park' or 'Two Tunnels Greenway' route, it could simply displace non-compliant vehicle routing into the area to the south.</p> <p>An amendment to include Oldfield Park is therefore not taken forward for this reason. However, it is recommended that this area be closely monitored and reviewed. Proposals for monitoring in this area are set out in document OBC-26 'Evaluation, Monitoring and Benefits Realisation Plan'. Section 3.7 provides further details.</p> <p>A minor extension to the zone to include the B3111 Oldfield Road may help alleviate some of the issues for Oldfield Park. However, as noted above this requires further consideration as it could result in similar re-rerouting via less suitable residential roads to the south.</p>
<p>Weston/Lansdown</p>	<p>The inclusion of Cavendish Road within the CAZ will prevent any non-compliant vehicle routing through the Sion Hill area. Lansdown Lane through Weston to the west is too remote from the western edge of the proposed CAZ to be sensibly linked.</p> <p>An amendment here is not proposed for this reason.</p>

Locations requested for inclusion in an expanded Class D CAZ	Notes on feasibility/issues to consider
<p>Camden (with particular reference to possible inclusion of Belgrave Crescent)</p>	<p>Respondents requested for Camden Road to be included due to concerns that additional traffic would use this route to avoid the charging zone. There was particular concern that Belgrave Crescent (located adjacent to the proposed boundary off Camden Road) would be inappropriately used by traffic turning to avoid the zone. Including a wider length of Camden Road (say to the Tynning Lane junction) would inevitably require a need to include secondary roads served off of it to keep the number of necessary cordon points required on minor roads to a sensible level.</p> <p>Instead the perceived issue with turning around on Belgrave Crescent could be mitigated by comprehensive and timely advanced signage.</p> <p>An amendment here is not proposed for this reason. However, it is recommended that further advanced signage is provided.</p>

3.6 Revised Class D CAZ proposed boundary

The boundary of the proposed Class D CAZ has been amended as shown in Figure 3.2, based on consideration of the consultation feedback (as detailed above) and technical review. This differs from the consultation version by:

- Including the Pulteney Estate area (Area 1 in Figure 3.2);
- Excluding Rivers Road (Area 3 in Figure 3.2); and
- Excluding Cranhill Road (Area 2 in Figure 3.2).

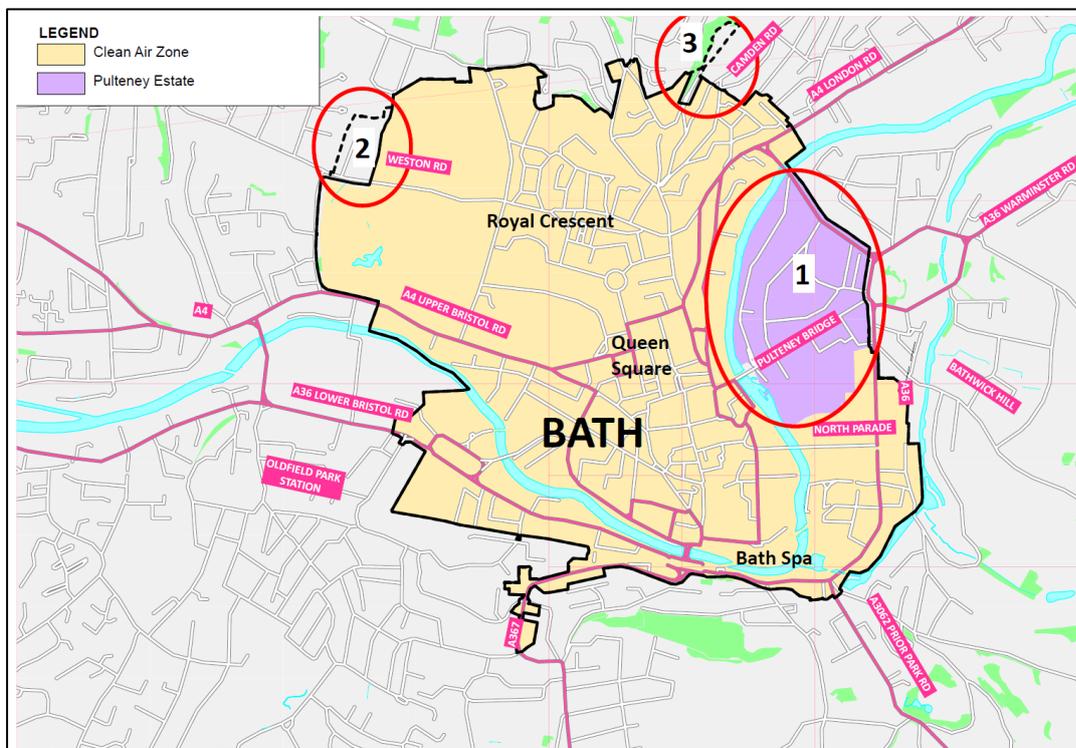


Figure 3.2 – Revised Class D CAZ boundary, following consultation

Additionally, other possible amendments highlighted in Figure 3.3, remain under technical review.

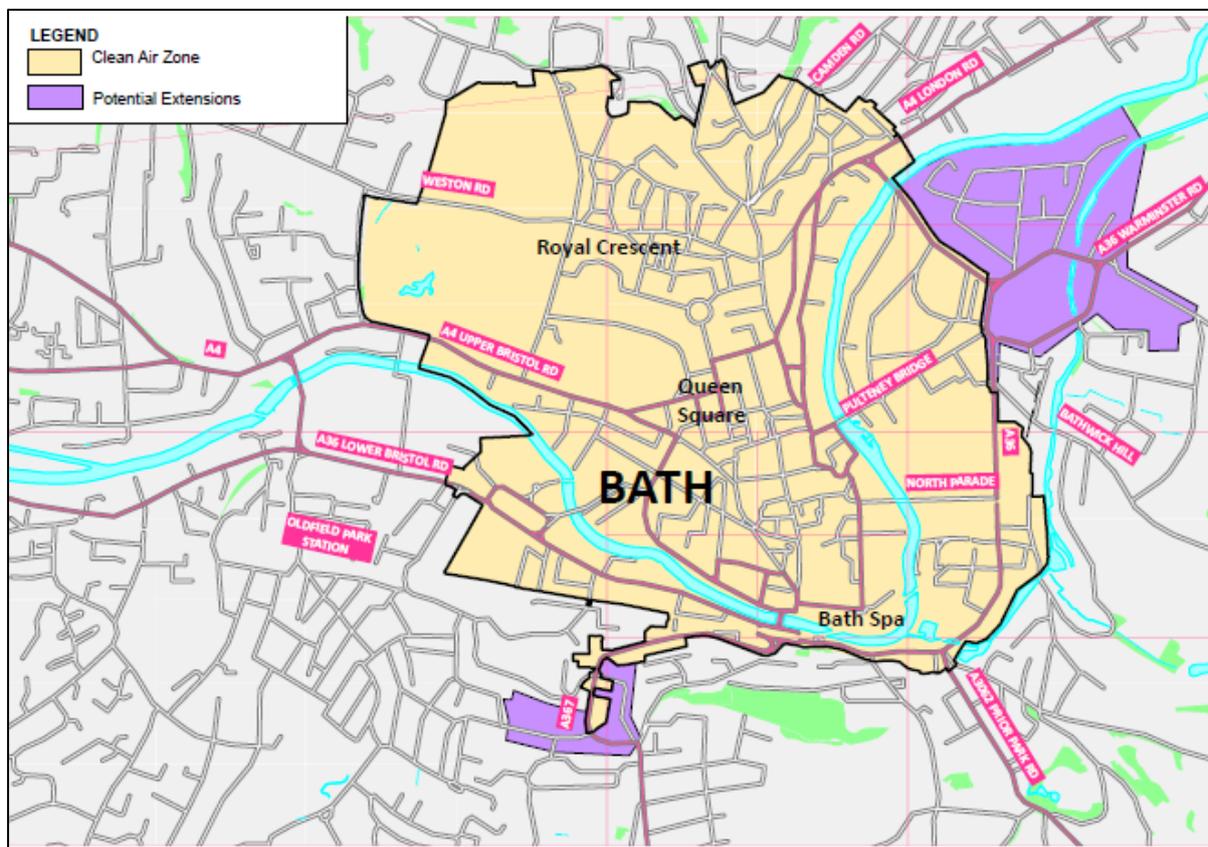


Figure 3.3 – Other possible boundary amendments under technical review

3.7 Monitoring and Evaluation Plan

As noted in Table 3.1 it will be important to monitor the impacts of the CAZ in the areas adjacent to the zone, particularly where residents expressed concerns about rerouting and rat-running in their consultation feedback.

An 'Evaluation, Monitoring and Benefits Realisation Plan' (document OBC-26) has been prepared as part of the OBC. This sets out how the impacts of the scheme will be monitored and details the specific measures that will be used to measure air quality, traffic flow and other indicators. The Plan recognises that a wide programme of monitoring will be required to monitor changes in traffic patterns outside the CAZ boundary. It identifies a number of specific locations where monitoring is required. This list of locations will continue to be reviewed and refined as the scheme progresses through the FBC stage.

3.8 Implications for other CAZ options

If a Class C CAZ is taken forward it is considered appropriate that this should adopt the same boundary as the Class D option. This is because:

- The boundary for a Class D CAZ, as adapted to reflect consultation feedback, is drawn to help avoid undesirable rat running. These issues remain an important consideration under a Class C CAZ in order to prevent LGVs and HGVs taking undesirable routes.
- Similarly, the boundary for the Class D CAZ has been identified in a way that allows opportunity for safe turn back. Again, this remains critically important in a Class C CAZ, particularly to give opportunity for heavy vehicles who do not want to enter the zone to turn safely.

4. Charges for a Class D CAZ

Action taken in response to consultation feedback

Many of the suggestions for alternative Class D CAZ charges or charging mechanisms put forward through the consultation would not be compatible with the objectives of the Clean Air Plan or Government Directive and therefore cannot be progressed. However, the CAZ proposals presented in the revised OBC indirectly address the feedback by including:

- Further details of the financial support schemes designed to assist with the transition to compliant vehicles. This would help support both individuals and commercial operators. Details of this scheme are included within OBC 08 – Options Assessment Report.
- A revised package of concessions and exemptions to support a Class D CAZ. See Chapter 5.
- A Class C CAZ supported by traffic management and signal timing changes as an alternative option which has potential to deliver the required air quality improvements.

4.1 Overview of feedback

The consultation sought feedback on the extent to which respondents felt that the proposed Class D CAZ charges would be effective in encouraging behaviour change. Feedback included both:

- Calls for a bolder approach based on higher charges; and
- Suggestions for a more lenient approach focused on charging fewer vehicles or charging lower amounts.

However, the majority of comments were suggestions for ways to lessen the impact of the proposal on individuals, particularly residents on low incomes and those who have no option but to drive in/through the city and businesses, specifically small and sole traders. Many respondents felt that a lower charge would be more appropriate and also called for a longer lead in period to help ease the transition to a compliant vehicle. Chapter 8 of OBC 25a – Report on Formal Consultation sets out the feedback in detail.

The feedback suggested that respondents may not have been aware that, at the time of the consultation, part of the Class D CAZ proposal was to offer financial support to assist both individuals and commercial vehicle users to change to compliant vehicles.

4.2 Context for consideration

In considering the range of suggestions put forward for alternative levels and mechanisms of charging it is important to note that:

- The proposed CAZ charges need to follow the principles of the CAZ Framework;
- The charges need to be set at a level sufficient to achieve the behavior change required to meet the requirements of the CAZ. The proposed charges were determined based on evidence that this was the lowest level which would result in the desired behavior change;
- The charging system needs to be simple enough to be clearly communicated and easily understood; and
- The charging system needs to be practically and legally implementable and capable of being processed by the back-office systems that will be used to manage the scheme.

4.3 Consideration of alternative options for charging

The main themes and types of suggestions made in respect of the proposed charges for the Class D CAZ are listed in Table 4.1, together with details of how these have been considered.

Table 4.1 – Consideration of suggestions for alternative approaches to the proposed Class D CAZ charges

Alternative charge suggested	Notes on feasibility/issues to consider in context of a Class D CAZ
Don't charge cars/implement a Class C CAZ	Further work has been undertaken to further consider a Class C CAZ and a Class D with additional concessions and this is reported in Chapter 3 of this report as well as in OBC 08 – Options Assessment Report.
Higher charge	<p>Some respondents felt that a higher charge would be more effective, or that a higher charge for larger vehicles would be more appropriate given the emissions levels of these vehicles (particularly for HGVs). The proposed £9 charge for cars under the Class D CAZ proposal was established taking account of the results of a Stated Preference Survey which examined how people would respond to various levels of charge. Various charging levels were examined and tested via the traffic and air quality models and £9 was shown to be the lowest charge which would bring air quality to within legal limits by 2021 at the latest. Further details are set out in document OBC 11 – AQ3 Air Quality Modelling Report. Raising the charge above this limit would not be necessary to achieve compliance and would increase the likelihood of adverse impacts in terms of affordability or wider economic impacts.</p> <p>HGVs and coaches are already subject to a significantly higher charge than smaller vehicles (private cars, taxis and LGVs). Raising this further would penalise these vehicles unnecessarily.</p> <p>For these reasons, higher charges have not been further considered.</p>
Lower charge	<p>A wide range of suggestions were made for lowering the proposed charge for a Class D CAZ. These ranged from suggestions that everyone should pay less, or that there should be a lower charge for vehicles driven by specific groups, for example by residents. There was particular concern that the Class D CAZ charge would disproportionately affect low income groups and businesses.</p> <p>As noted above, £9 was shown to be the lowest charge which would bring air quality to within legal limits, by 2021 at the latest, with a Class D CAZ.</p> <p>Providing discounts or concessions to large numbers of people would affect the ability of a Class D CAZ to achieve compliance in the shortest possible time. For further information refer to OBC-05 'Proposed System Design Features and Payment Exemptions'.</p> <p>Instead of applying a lower charge for affected groups:</p> <ul style="list-style-type: none"> • Schemes offering financial support to enable some users to change to a compliant vehicle is preferred and is incorporated as part of the revised Class D CAZ proposal. This has the benefit of helping to increase the fleet of compliant vehicles and have a greater impact on emissions. These schemes are described in Chapter 5, see Section 5.2.1 for further details. • Targeted concessions are also proposed. These are also detailed in Chapter 5.
Lower charge initially, increasing over time.	<p>Respondents suggested that consideration should be given to phasing in charges. This was suggested both for cars and other vehicles. It was noted that commercial vehicle operators particularly would appreciate charges being phased in more gradually to allow additional time to upgrade fleets, especially where specialist vehicles require significant investment and where lower emission alternatives are not widely available.</p> <p>Charges for a Class D CAZ were set at the lowest level to bring air quality to within legal limits in the shortest possible time. Reducing charges initially would not generate the desired behaviour changes in the required timescales.</p> <p>Instead, the financial support schemes both for individuals and commercial vehicles have been designed to help facilitate switching to compliant vehicles. This provides an alternative way to mitigate the impacts but still enables the air quality improvements needed to achieve compliance.</p>

Alternative charge suggested	Notes on feasibility/issues to consider in context of a Class D CAZ
<p>Give free passes to residents or other specific groups</p>	<p>As noted above, providing discounts, concessions or exemptions to large numbers of people would affect the ability of the Class D CAZ to achieve compliance in the shortest possible time and must be carefully considered.</p> <p>Instead, as above, a system of financial support is proposed, and this will support residents with pre-Euro 4 cars to change to compliant vehicles. See Section 6.</p>
<p>Alternative charging criteria</p>	<p>Respondents suggested a range of alternative criteria for setting the charges, including that higher emission vehicles pay more/higher Euro standards should pay less, that the charges should be based on measured emissions (rather than Euro standard) or mileage travelled. This was suggested for both cars and other vehicles, including HGVs.</p> <p>Defra's CAZ Framework sets out the minimum classes and standards for Clean Air Zones. These are defined by Euro Categories and standards to enable a consistent and clear system for determining whether a vehicle is compliant or not. The proposed Class D CAZ follows this Framework.</p> <p>Charging based on mileage would present practical and enforcement challenges and result in a more complex system that would be difficult to understand and implement. As such this option may not achieve the required behaviour change necessary to achieve compliance in the shortest possible time.</p> <p>For these reasons alternative charging criteria have not been considered further.</p>
<p>Operate the CAZ during peak hours/daytimes only/ charge on a rolling 24-hr period</p>	<p>A common suggestion in the consultation feedback was that consideration should be given to the CAZ operating in peak hours only. In addition, respondents commented that, if 24 hours, the CAZ should be a rolling 24-hour period or start after midnight.</p> <p>The principle of a peak hour / daytime / rolling CAZ has been previously considered:</p> <ul style="list-style-type: none"> • A peak hour only scheme may not be sufficient to encourage the necessary behaviour change or may lead to unfavourable behaviour change that is not complimentary to the critical success factors of the project. For example, this would be likely to lead to trips being undertaken during unsociable hours. There was particular concern regarding increases in HGVs making deliveries or passing through the zone during the night. • These options would add an enhanced level of complexity to the practical and enforcement aspects of the scheme and make the format of the charging zone more difficult to communicate and understand. <p>For these reasons alternative operating hours have not been considered further.</p>

4.4 Implications for other CAZ options

The feedback on the published Class D CAZ charge suggests that if a Class C CAZ with traffic management and traffic signal timing changes were taken forward:

- This would address the various requests made for a lower charge for cars and would negate other requests, for example relating to the need to address impacts on residents.
- It would remain important to offer financial support to businesses, in order to address concerns raised by LGV and HGV operators.
- Not charging cars at all would likely attract criticism from those who felt that the published Class D CAZ proposal was appropriate, or who wanted to see higher penalties for non-compliant vehicles.

5. Concessions, exemptions affected groups with a Class D CAZ

Action taken in response to consultation feedback

In response to the consultation feedback and further technical work, the following adjustments have been made to the package of concessions and exemptions put forward in the revised OBC for a Class D CAZ:

- There be an exemption for all hybrid cars (including taxis).
- The following concessions will now extend until 01/01/2023 as opposed to 2022 – Euro 4 and 5 diesel vehicles used by as accessible taxis (for use by disabled passengers) or used by blue badge holders, registered health and care providers and registered community transport providers.
- It is clarified that a concession for emergency service vehicles is offered until 2025, when it is expected that their vehicles would be compliant. This position is reflected in a draft memorandum of understanding between the Council and the emergency services, see OBC-46.
- Taxis not fitting into the above categories will no longer be given a concession but would be eligible for financial support.
- There will no longer be a concession for educational coach trips – these trips will now be supported through the financial support scheme.
- A proposal for financial support to help everyone move towards a lower emission vehicle has been worked up in detail. This scheme would offer grants to drivers of pre-Euro 4 cars and loans to users of pre-Euro 6 diesel commercial vehicles. This would help to support a wide range of drivers to switch to a compliant vehicle, removing the requirement for various concessions. Euro 4/5 diesel commercial vehicles will be given a concession until 01/01/2023, in cases where a loan application is unsuccessful, see below for further details.

Other exemptions and concessions remain as per the Class D CAZ scheme that was published for consultation.

Note that some concessions remain under consideration, subject to further assessment (rather than fixed elements of the scheme).

5.1 Overview of feedback

The consultation feedback highlighted some strong concerns about the impact of the proposed Scheme on certain groups (defined either as groups of the community or drivers of specific vehicle types). Respondents outlined a wide range of suggestions for ways in which these groups could be assisted, including offering additional concessions or exemptions that could apply to vehicle types, user groups or trip purposes. Frequently mentioned suggestions included support for residents, those on lower incomes or with specific issues, private cars (particularly newer diesels), key trips including for business travel, commuting or to the hospital. Additionally, some respondents did not feel that all of the proposed concessions were necessary, or expressed concern that too many concessions would impact the effectiveness of the proposed Class D CAZ. For further details on the feedback received, see Chapters 9 and 12 of OBC 25a -Report on Formal Consultation.

5.2 Context for consideration

Concessions and exemptions need to be considered in relation to the following constraints:

- The Government Directive, requires improvements to be delivered by 2021 and The CAZ Framework states that concessions should not slow down achievement of the overall objectives of the zone;
- Providing too many concessions increases administrative burden, implementation costs and the likelihood that loop holes are found, or the system is abused.
- Concessions should be targeted to the groups for whom alternative modes of transport are not possible or where groups are entirely reliant on their vehicle to make journeys, in order to give them more time to change their vehicle.
- Concessions and exemptions need to reflect the extent to which specific vehicles are polluting.

The technical work undertaken shows that within a Class D CAZ the predicted air quality levels would meet the legal limits by 2021 but only by a small margin. Concessions and exemptions would slow down the rate at which air quality improves. Therefore, a Class D CAZ package which includes a wide range of additional concessions or exemptions would be significantly less likely to achieve compliance with the legal limits in the required timeframe.

5.2.1 Financial support schemes

In this context, and in order to respond to the concerns raised in the consultation, it has been necessary to consider other options. In particular, further work has focused on establishing the extent and nature of financial support that can be offered, as an integral part of the Class D CAZ option, to help support drivers change to compliant vehicles.

Financial support was included as part of the package of measures at the consultation stage. However, the consultation feedback has highlighted the critical importance of this measure and, as such, it has been given increased attention in the post consultation phase. Indeed, The Clean Air Fund offers a unique opportunity to support drivers and encourage behaviour change.

Two financial support schemes have been developed and these are discussed in detail in OBC 08 – Options Assessment Report. These offer:

- Financial assistance for individuals in the form of a £2,000 grant to support owners of pre-Euro 4 vehicles to switch to a compliant vehicle. The scheme will prioritise B&NES residents and residents living in neighbouring authorities whose normal place of work is within the CAZ
- Interest free loans to support businesses with pre-Euro 6 diesel commercial vehicles (i.e. bus, coach, HGV, LGV/van, taxi) to change to a new or second hand compliant vehicle. Applicants with a Euro 4 or 5 commercial diesel vehicle who are unsuccessful in their loan application would be granted a concession until 01/01/2023.

This scheme would be supported by the provision of advice (via a personalised service) which would provide motorists with assistance to support a change of behavior. This would include advice on:

- Alternative modes of transport available including incentives to encourage, for example trial bus journeys.
- The most appropriate/well suited vehicle choice, to include options to switch from a Euro 4/5 diesel to a petrol equivalent or to upgrade to a Euro 6.

5.3 Reasons for alterations made to Class D package of concessions and exemptions

As noted above a range of adjustments have been made to the package of concessions and exemptions that would support a Class D CAZ. Table 5.1 provides an overview of the rationale for these changes.

Table 5.1 – Rationale for changes made to concessions and exemptions supporting a Class D CAZ

Concession or exemption added or changed	Detail of adjustment made in the context of a Class D CAZ
Hybrid cars	<p>The scheme that was put out to public consultation offered a time limited concession for Euro 5 diesel hybrids only, until 1 Jan 2022. Respondents felt that all hybrid vehicles should be exempt, regardless of their fuel type or year manufacture because these vehicles have the ability to run on a less polluting fuel source.</p> <p>The revised proposal includes an exemption for all hybrid cars, including taxis. This is considered possible because overall this vehicle group makes a minimal contribution to emissions therefore an exemption does not affect the year of compliance.</p>
Blue badge holders, health and care workers, community transport and accessible taxis	<p>The scheme that was put out to public consultation offered a time limited concession to Euro 4 and 5 diesel blue badge holders, health and care workers, community transport and accessible taxis, until 1 Jan 2022. Respondents suggested these concessions should be extended and these were identified as top priorities in the responses to the consultation questionnaire.</p> <p>The revised proposal includes for a concession for Euro 4 and 5 diesel vehicle users until 1 Jan 2023. These groups have limited alternative options therefore an extended concession is considered appropriate.</p> <p>The financial support schemes also offer an opportunity to assist these motorists, whilst continuing to support behaviour change.</p>
Emergency service vehicles	<p>There was concern amongst respondents that non-compliant emergency service vehicles would be charged beyond 2025. Throughout the project the Council has worked closely with representatives from the emergency services to understand the composition of their fleet and their future plans. These discussions suggest that the emergency services themselves typically plan to run compliant vehicles by 2025 so it is not envisaged that a Class D CAZ would affect their operations. Their position is captured in a memorandum of understanding, which can be found in OBC-46.</p>
Commercial Euro 4/5 diesel vehicles with an unsuccessful loan application	<p>There was concern from respondents that commercial vehicle operators invest significant amounts of capital in their vehicle(s). It was considered that for some, especially smaller businesses with limited available capital, switching their vehicles by 2021 would negatively impact their business operations due to financial implications.</p> <p>The revised proposals include a financial support package for pre-Euro 6 diesel commercial vehicle operators to apply for a loan to upgrade to compliant vehicles. It is proposed as part of the revised OBC for a Class D CAZ that those applicants with a Euro 4 or 5 diesel commercial vehicle that are unsuccessful in securing a loan would receive a concession until 1st January 2023.</p>
Taxis (including private hire vehicles) (excluding accessible taxis) - concession removed	<p>Consultation feedback on taxis was mixed. Some respondents considered that non-compliant taxis making multiple movements within the proposed CAZ should not be given a concession because their emissions levels are high. Others expressed concern that unless a concession were offered taxi fares may increase.</p> <p>Within the Class D proposals published for consultation a concession for taxis was proposed. This has been reviewed in light of the consultation feedback and the further developed loan scheme (which would allow taxi operators to apply for a loan to support a change to a compliant vehicle) and this concession has now been removed. Taxis undertaking multiple journeys within the city centre contribute more than other vehicles to emissions and overall there is a need to set a positive precedent. In addition, newly licensed taxis will be required to be compliant under the new taxi licensing policy which was adopted by Cabinet in December 2018.</p>
Vehicles with educational trip permits – concession removed	<p>In liaison with schools and operators, it has been established that the financial support scheme for commercial vehicles better addresses the needs of these vehicles. It is proposed that those applicants with a Euro 4 or 5 diesel educational vehicle that are unsuccessful in securing a loan would receive a concession until 2023.</p>

5.4 Consideration of other suggested concessions

In the consultation feedback there were a wide range of suggestions for vehicle types, journeys and groups that would benefit from additional concessions or exemptions from the Class D CAZ charges. As part of the post consultation assessment these requests have been considered in terms of their feasibility for inclusion with a Class D CAZ. Many are not possible to provide within the constraints of the project.

A summary of these reasons is provided in Table 5.2 below and further details are provided in document OBC 05 – Proposed System Design Features and Payment Exemptions.

Table 5.1 – Additional concessions and exemptions suggested

Concession or exemption suggested	Notes on feasibility/issues to consider in the context of a Class D CAZ
Residents living with the CAZ	<p>A frequent request in the consultation feedback was for residents, and in particular those on lower incomes, to be granted a concession.</p> <p>Offering a concession to all residents within the CAZ, under a Class D, would compromise the ability to reduce air quality to within legal limits in the required timescale. This is because the air quality levels predicted for a Class D CAZ leave little scope for additional concessions.</p> <p>As an alternative to concessions for residents, further work has been undertaken to develop the details of how a financial assistance scheme could work. The proposed financial assistance detailed in OBC 08 – Options Assessment would support residents within the CAZ to switch to a compliant vehicle.</p> <p>The majority of residents living within the CAZ have reasonable access to alternative modes and will benefit from the package of supporting measures delivered alongside the CAZ.</p>
Other people who need to travel into Bath, in particular for work	<p>Many respondents to the consultation requested that people living across the area should be granted a concession to allow them to travel to Bath as their local service centre or for work. There was particular concern for lower income groups and key workers.</p> <p>As above, this would imply allowing a large cohort of vehicles to freely access the zone and would significantly affect the rate at which emissions reduce. Again, the financial support schemes offer an opportunity to assist some of these motorists, whilst continuing to support behaviour change. See Section 5.2.1 for further details.</p>
Business with non-compliant commercial vehicles	<p>Non-compliant commercial vehicles contribute the largest proportion of the NO₂ emissions in Bath. As such allowing a concession or exemption for this group would delay the year of compliance and therefore not meet the legal directive. The financial support schemes offer an opportunity to assist businesses, whilst continuing to support behaviour change. Where a business is unsuccessful in securing a loan, a concession until 1st January 2023 would be offered to Euro 4/5 diesel commercial vehicles.</p>
Visits to hospitals/for medical appointments	<p>A concession for priority patients to visit hospitals/for medical purposes was requested frequently by respondents. At this stage this is not proposed for practical and enforcement reasons. However, discussions with the hospitals remains ongoing.</p> <p>The financial support schemes offer an opportunity to assist these motorists, whilst continuing to support behaviour change. See Section 5.2.1 for further details.</p>
Others – including	<p>A wide range of other requests were made for various concessions, including for informal carers, older people, charities, churches. For the reasons set out above these are not possible. However, the financial support schemes will assist some motorists within these groups in changing to compliant vehicles. See Section 5.2.1 for further details.</p>
Pre Euro-6 diesel cars	<p>Respondents to the consultation expressed concern that their relatively new diesel car would be subject to a charge under a Class D CAZ and requested additional time to adapt.</p> <p>As above, a concession for this group would represent a large proportion of vehicles and compromise the ability to meet the required air quality targets. In addition, a concession for pre-Euro 6 diesels (or subsections of) would not support behaviour change to remove the most polluting vehicles from the roads.</p> <p>The financial support scheme offers an opportunity to assist individuals with any pre-Euro 4 car to apply for a grant to upgrade to a compliant vehicle.</p>
Pre Euro-4 petrol cars	<p>A concession would be against the rationale for introducing a CAZ, and not support behaviour change to remove the most polluting vehicles from the roads.</p> <p>The financial support scheme offers an opportunity to assist these motorists, whilst continuing to support behaviour change. See Section 5.2.1 for further details.</p>

Concession or exemption suggested	Notes on feasibility/issues to consider in the context of a Class D CAZ
<p>Fewer concessions</p>	<p>Some respondents felt that the package of concessions put forward at consultation stage was too wide. Some felt that some categories of vehicles should not be granted a concession because they pollute in the same way as others and are not necessarily owned by individuals in need of specific support, examples included historic vehicles, blue badge holders (in some cases, albeit there were more calls for extended help for blue badges) and motorcycles. The package retains these various concessions because:</p> <ul style="list-style-type: none"> • The package aligns with the CAZ Framework which for example requires specialist vehicles which cannot be retrofitted to be exempt. • The package is intended to help minimise the social and equality impacts of the proposed CAZ. • Some concessions are required because there are practical limitations to including certain vehicles within the scheme. This is the case with motorbikes, where the cameras will be unable to read rear number plates.

5.5 Implications for other CAZ options

The feedback on the published Class D CAZ Scheme concessions and exemptions suggests that if a Class C CAZ with traffic management and traffic signal timing changes were taken forward there would:

- Overall, be a lesser need for concessions because cars would automatically be exempt. In this respect a Class C would address many of the consultation requests;
- Continue to be concern from those groups who were concerned that concessions would dilute the overall impact of the Scheme.
- Be a need, in any case, to ensure that the financial support scheme remains important to mitigate the impact on businesses.

6. Supporting measures to be delivered alongside a Class D CAZ

Action taken in response to consultation feedback

In response to the consultation feedback and based on further technical work, additional supporting measures have been identified to be delivered alongside the Class D CAZ, subject to funding. In addition, some of the originally proposed measures have been further expanded upon as part of the Class D CAZ package. This includes:

- Further details of the financial support schemes for residents and businesses to help facilitate a change to compliant vehicles.
- Provision of free park and ride journeys for regular commuters not already using the park and ride and low-income households and families with children for one year.
- Provision of travel advisors to support individuals in behaviour change.
- Funding to monitor/address parking issues that may arise as a result of a Class D CAZ.
- Funding to extend the monitoring of traffic and air quality in B&NES pre CAZ implementation to expand baseline data availability.
- Preparation of delivery and servicing plans for businesses.
- Enforcement of weight restrictions on roads neighbouring the proposed CAZ.
- Traffic signal optimisation, in particular to give advantage to buses.
- Other initiatives to encourage travel via sustainable modes.

6.1 Overview of feedback

The consultation asked for feedback on the measures that could be implemented alongside a CAZ. Many respondents urged the Council to consider more extensive supporting measures that would focus on offering additional incentives or alternative travel options. These ideas ranged in scale from small measures to large schemes. In particular, there were many comments relating to the importance of developing the CAZ proposals within an overall transport plan for Bath which should look at developing alternative routes, delivering a step change in public transport and improving the Park and Ride. These comments are set out in Chapter 11 of OBC 25a -Report on Formal Consultation.

Many of the ideas identified have been considered in previous phases of the project, are outside of the scope of this work, or are issues that are otherwise being considered by the Council under its regular work on transport and planning. This section therefore clarifies the Council's position on these issues, within the context of this project.

6.2 Context for consideration

The Class D CAZ option that formed the basis of the public consultation included a number of measures that could be delivered alongside the CAZ, either funded from Government funds or from revenue generated by the Scheme. These measures were identified based on the fact that they would:

- Contribute directly to making an air quality improvement.
- Be appropriate for funding, either from Government funds available to this project or the revenue generated by the Scheme.

- Mitigate the impacts of the Scheme, particularly for lower income households and businesses.
- Be deliverable within the timescale.
- Not otherwise being considered through other Council initiatives.

Other suggestions put forward through consultation have been considered against the same criteria.

6.3 Consideration of suggested supporting measures

The main suggestions for supporting measures to be delivered alongside the published Class D CAZ proposal, and the extent to which these are possible to address are summarised in Table 6.1. Many of the suggestions for supporting measures overlapped with ideas put forward as scheme alternatives. This section should therefore be read alongside Chapter 2 on alternative options.

Table 6.1 – Consideration of suggested supporting measures

Suggested supporting measure	Consideration in the context of a Class D CAZ
<p>Improved park and ride services (including suggestions for free park and ride)</p>	<p>Park and Ride improvements were frequently requested by respondents in the consultation feedback. Requests included longer hours, cheaper or free fares and additional routes.</p> <p>Proposals to extend the hours of operation of the Park and Ride, provide secure overnight parking and deliver smaller Park and Ride sites along existing bus routes are included as high priority measures alongside the Class D scheme.</p> <p>Within the consultation feedback there were many requests for cheaper or free Park and Ride. In response to this an additional supporting measure has been added to the package. This offers free park and ride to regular commuters, low income households and families with children for one year. This could also target LGV users.</p> <p>The Council intends to review the pricing strategy for Park and Ride when contracts are renewed</p>
<p>Improved bus services (including suggestions for free buses)</p>	<p>The consultation feedback indicated that public transport improvements, covering improved vehicles, reduced fares, additional routes and infrastructure, were a top priority for many respondents.</p> <p>The importance of delivering public transport improvements, alongside any CAZ is acknowledged. Traffic signal optimisation to prioritise public transport is a key supporting measure, added to the scheme proposals in response to consultation feedback. Additional improvements to key public transport routes could be funded from the CAZ revenue.</p> <p>The Council's public transport team continue to work to improve bus services across the city. The Council is working closely with bus operators to help them secure funding from the Government to upgrade their engines. It is anticipated that all buses will be compliant by the time a zone is introduced, and that operators will respond to any increased demand without price rises.</p>
<p>Improved traffic management</p>	<p>Respondents identified that air quality could be additionally improved through measures to keep traffic moving and manage the impact of heavy vehicles in the city centre.</p> <p>Traffic management options have been further considered as part of additional work on a possible Class C option. This work suggests that the introduction of a traffic management scheme at Queens Square, in addition to a Class C CAZ, could be sufficient to bring air quality levels to within legal limits in the required timescales. This approach has a range of complex pros and cons.</p> <p>Within the supporting measures identified for the revised Class D scheme the following have also been included:</p> <ul style="list-style-type: none"> • Optimisation of traffic signals. • Weight restriction enforcement.

Improved management of HGVs and deliveries	Respondents identified a range of opportunities to better manage deliveries in the city centre. As a separate initiative the Council is currently assessing options for trialling a last mile delivery scheme, which would aim to reduce the number of deliveries made by HGVs in central Bath. As part of the supporting measures identified post consultation, a scheme to provide businesses with advice on delivery and servicing plans is now proposed as part of the Class D CAZ package.
Improved management of parking, including residents parking zones (RPZ)	Across the various feedback on the Class D CAZ, respondents expressed concern that there may be additional pressure for parking in residential areas adjacent to the zone. The need to consider residents parking issues alongside the CAZ has previously been noted. The Council intends to undertake a review of the existing RPZ system and this will consider interaction with the proposed CAZ. This is included as a supporting measure in the revised Class D proposal.
Improvements to rail	Rail improvements cannot be delivered as part of this Scheme but conversations between rail providers and the Council continue.
Better management of coaches	The Council is separately progressing the development of a Coach Strategy. The Council will bid for funding during the implementation stage of this Scheme to enable enforcement of anti-idling and this will help to address some of the concerns associated with coaches in the city centre. Coaches will be able to apply for a loan to either retrofit their existing vehicle fleet or upgrade to complaint vehicles.
Other including, school traffic, walking, cycling, electric vehicles and car sharing	Respondents were keen to see additional measures to address these other modes. The package of supporting measures proposed would help to address some of these concerns through: <ul style="list-style-type: none"> • Walk/Scoot/Cycle to school initiatives. • Electric vehicle charging points. • Improved cycle parking. • Improved walking and cycling routes. • Expansion of car and van clubs. • Reducing the cost of parking permits for ultra-low emission vehicles.

6.4 Implications for other CAZ options

The feedback on the supporting measures to be delivered alongside the published Class D CAZ option highlights the importance of ensuring that alternative modes are available, affordable and desirable. Many of these suggestions would also be relevant alongside a Class C CAZ with traffic management and signal timing changes and should be included, (where funding allows) in order to deliver a package that proactively encourages use of other modes. It should be noted however, that there would be less revenue generated from the Class C option and this would limit the reach of revenue funded supporting measures.

Under a Class C CAZ, it would be important that supporting measures are tailored to better suit those most impacted including drivers and operators of commercial vehicles.

7. Other issues raised in feedback on a Class D CAZ

Action taken in response to consultation feedback

In response to the consultation feedback on the potential wider knock on impacts of a Class D CAZ, and in the context of evolving technical work the following are proposed:

- Ongoing monitoring of traffic and air quality levels, as well as parking demand, in areas immediately adjacent to the proposed CAZ boundary.
- Continued dialogue with adjoining authorities to jointly consider and monitor traffic levels on wider routes, in particular across Wiltshire.

7.1 Overview of feedback

A range of other issues were reflected in the consultation feedback, including concerns of local and wider rerouting of traffic and the potential secondary impacts associated with this, including availability of parking, worsening air quality in other areas outside of the CAZ and worse congestion. These comments are set out in Chapter 14 of OBC 25a -Report on Formal Consultation.

7.2 Context for consideration

The Class D CAZ proposals that were published for consultation were developed in line with the Government's CAZ Framework guidance, in accordance with JAQU advice and following the process required for the submission of a business case. This included the use of air quality and transport models, making the best use of available data. Comments on issues reported in this Chapter need to be considered in line with this guidance and process, as well as in the context of the stage of this project and the next steps. For example, a key part of the FBC stage will be to develop an evaluation plan which will guide how the impacts of the Scheme are monitored post implementation.

7.3 Consideration of local re-routing/displacement and parking issues

Within the consultation feedback respondents expressed concern that the introduction of a Class D CAZ would lead to rat running through areas adjacent to the boundary to avoid charging. A number of residents' associations commented on these concerns and, in some cases, concerns about increased traffic, led to specific requests for these areas to be included within the CAZ. Comments mainly related to concerns about the impact on the Pulteney Estate area, Bathwick, Batheaston and Bathampton, Oldfield Park and various other areas adjacent to the zone.

During the development of the preferred Scheme, consideration was given to rat running issues and the published CAZ D boundary incorporated a number of adjustments (compared to earlier versions) in order to minimise the likelihood of rat running. This stage of work is documented in OBC-04 Technical Note on Boundary Changes. The analysis undertaken based on the published boundary showed that any displacement of traffic would be relatively small. Post consultation this work has been revisited for key areas and similar conclusions are drawn. This work is reported in the Technical Note included as Appendix B. In addition, boundary changes suggested through the consultation have been considered in the context of their implications for re-routeing and this discussion is set out in Chapter 2.

Table 7.1 summarises the main issues in key areas.

Table 7.1 – Consideration of potential local re-routing

Location identified	Consideration
Pulteney Estate area	<p>The Technical Note included as Appendix B considers issues relating to coaches and parking, recognising that residents had concerns about this area being used specifically for drop offs.</p> <p>This area is now proposed for inclusion within an enlarged Class D CAZ, therefore these issues are addressed.</p>
Bathwick	<p>The Technical Note included as Appendix B considers issues relating to parking and suggests that, going forward, an extension to the existing residents parking zone could be considered, if required.</p> <p>Proposals for monitoring in this area are set out in document OBC-26 ‘Evaluation, Monitoring and Benefits Realisation Plan’.</p>
Batheaston and Bathampton	<p>The Technical Note included as Appendix B considers re-routing issues through Bathampton. This confirms that whilst it is accepted that increased traffic use of Bathampton Lane/Mill Lane will occur with the Type D CAZ as proposed, the expected level of increase is considered modest and within acceptable limits when considering the normal daily variation in traffic. It is suggested that this area is monitored and reviewed going forward.</p> <p>As noted above a programme of regular monitoring will be needed to establish changing traffic flows and potentially journey times on the Bathampton Lane/Mill Lane/Toll Bridge Road route in the pre-CAZ and post-CAZ scenarios. Pre-monitoring will be needed to establish the natural growth trend up to CAZ opening. Comparison of 2014 and 2018 flows has shown no appreciable change in two-way ‘peak’ weekday flows at the Toll Bridge, but a perceivable growth change in the average inter-peak hour flow over the period 2014-2018. Further data collection up to CAZ implementation will enable what appears to be an underlying growth trend to be established. In the post-CAZ scenario, this can then be accounted for in establishing any true ‘extra-over’ effects of the CAZ. If the outcome from future comparison analyses does reveal a net impact of significance, then a decision could be taken then to introduce an ‘outlier’ CAZ if required.</p> <p>Proposals for monitoring in this area are set out in document OBC-26 ‘Evaluation, Monitoring and Benefits Realisation Plan’.</p>
Oldfield Park	<p>Issues relating to Oldfield Park have been considered in terms of boundary amendments. A minor boundary change at Wells Road requires further consideration in this context.</p> <p>Oldfield Park would need to be monitored going forward, both in terms of traffic and parking.</p> <p>Proposals for monitoring in this area are set out in document OBC-26 ‘Evaluation, Monitoring and Benefits Realisation Plan’.</p>

7.4 Consideration of wider re-routing issues

Within the consultation feedback there was also concern about re-routing across a wider area and in particular through the Wiltshire towns, with a notable number of comments relating to concerns that traffic may increase through Bradford on Avon, and along the A350. In response to this feedback, meetings were held with Wiltshire County Council to discuss these issues and the modelling results were further interrogated.

This work, included as Appendix C, concluded that the forecast impact of the Class D CAZ on roads to the east of Bath is expected to be overall neutral with individual changes in traffic volumes making up at most 1% reductions or increases in daily volume. Importantly however, as part of the Clean Air Plan, B&NES is proposing to expand its network of traffic and air quality monitoring in order to

understand the impact of the CAZ. Future work on monitoring could be further extended to include analysis of similar monitoring data collected by Wiltshire Council. Analysis of the data collected in Wiltshire can then be used within the ongoing assessment of the Scheme performance and inform appropriate refinements should they be deemed necessary.

7.5 Implications

Overall, consideration of these issues highlights the importance of ensuring that the CAZ is supported by a robust Monitoring and Evaluation Plan. This document, which would be developed during the Full Business Case stage and is required as a pre-requisite of the release of funding, would set out a strategy for monitoring the impact of the changes made and would provide a mechanism for addressing the issues detailed above. It would require robust baseline data to ensure that impacts can be assessed on the basis of a good understanding of the 'pre-scheme' situation. This would be informed by various traffic counts and air quality monitoring data, which is already being collected.

7.6 Implications for other CAZ options

The feedback on the potential knock on effects of the published Class D CAZ applies, in part, to the re-routing of cars. Therefore, under a Class C CAZ with traffic management these concerns would be less applicable. However, within the feedback on a Class D there were significant concerns about the re-routing of heavy vehicles and these concerns would remain under other CAZ options.

8. Summary and next steps

The consultation feedback on the published Class D CAZ has enabled a broader understanding of the potential impacts and issues, as perceived by individuals, groups and businesses. Analysis of the feedback, and consideration of the key themes, alongside the evolving technical work, has led to a number of amendments being made to the Class D CAZ option. Importantly this work has highlighted that:

- A Class C zone with traffic management and traffic signal timing changes could offer potential to deliver compliance with air quality targets in the required timescales. This information therefore needs to be carefully considered, both on its own merit, and in comparison to the likely benefits of a Class D CAZ, with or without traffic management and wider concessions.
- Amendments to the proposed Class D CAZ boundary are not necessarily required for compliance. However, some amendments, in response to consultation comments are suggested, where technically feasible.
- Financial support schemes offer a mechanism to support vulnerable groups and those that otherwise may call for concessions, but still support behaviour change and are an important part of any CAZ package.
- A broad package of supporting measures is required alongside any CAZ.
- Ongoing monitoring and evaluation of any implemented scheme will be critical.

A decision on the next steps lies with elected Cabinet Members and with the Government (via the Joint Air Quality Unit who will scrutinise all proposals). Consideration of the consultation comments is only one of a wide variety of factors that will influence this decision and will need to be balanced against the findings of technical work, issues relating to funding and deliverability, and overall ability to comply with the legal directive.

Appendix A. Technical note on a smaller Class D CAZ boundary



Bath Clean Air Plan

Bath & North East Somerset

Potential Reductions to the CAZ Boundary - Main Routes

| Final

March 2019

Document history and status

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1. Introduction

In 2017 the government published a UK Air Quality Plan for Nitrogen Dioxide (NO₂) setting out how compliance with the EU Limit Value for annual mean NO₂ will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, B&NES, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how B&NES will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance, B&NES is considering implementation of a Clean Air Zone (CAZ) including both charging and non-charging measures to achieve sufficient improvement in air quality and public health.

Figure 1.1 below shows the extent of the proposed CAZ in the draft Outline Business Case issued for formal public consultation in October 2018.

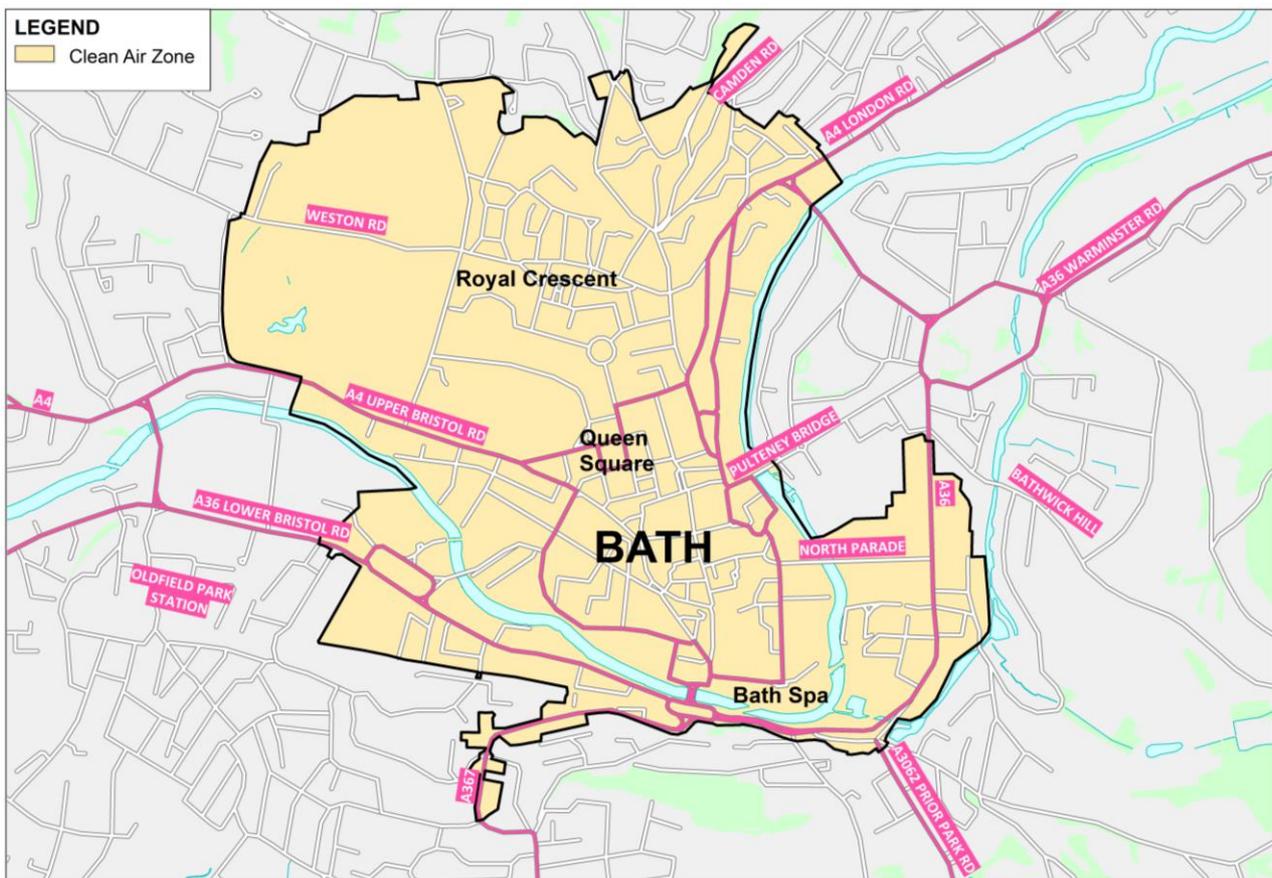


Figure 1.1 Proposed Clean Air Zone (CAZ) Extents - draft Outline Business Case

The public consultation on the scheme undertaken in October and November 2018 resulted in a range of feedback on the definition of the CAZ boundary. Specific concerns were highlighted about the proposed size of the Class D CAZ and the extent to which this was necessary to achieve air quality compliance. Commentary on the viability of small alterations having no impact on removing ‘key’ traffic circulation routes from the zone is included in the main text of OBC-25a ‘Consultation Response Report’. This note deals with those consultation comments that requested consideration of more significant changes to the zone to reduce its size and exclude some of main routes. Specifically this note deals with the comments set out below. This table is replicated from Table 7.2 of OBC-25 ‘Report on Formal Consultation’.

Location suggested for EXCLUSION or where concern expressed about inclusion	Reasons given by respondents
<p><i>A4 London Road/A36 Cleveland Place Junction</i></p>	<ul style="list-style-type: none"> - Respondents identified the junction of London Road and Cleveland Place as an area they would like to see removed from the zone, or an area that they felt caused issues through its inclusion. The reasons for this view included the following: - To allow traffic to get around/out of the city, to the motorway and to the A36 Warminster Road or the A4/A46. Respondents expressed concern about the inclusion of the A4, the A36 and the A367 – all the through routes – given that there is no bypass/alternative route. - To allow traffic to get from the east of Bath to the University and other destinations such as the fire and ambulance station as well as schools south of Bath and the hospital. - This is one of very few river crossings and there are no alternative routes (other than the Batheaston toll bridge). - Inclusion of this junction will encourage more traffic to use routes through Batheaston and Bathampton, including the toll bridge and this will have knock on effects for residents in this area. - Traffic would seek alternative unsuitable routes through local towns, for example; Bradford on Avon, Winsley and Limpley Stoke or via unclassified roads. - It would be unsafe if drivers decided to make a last-minute change of route to avoid the CAZ. There is no space to turn. - Some drivers would incur the charge just for using this corner. Respondents felt strongly that drivers using this junction to get out of the city should not be penalised and emphasised that many vehicles using this junction are not entering the city centre. - Concern that the inclusion of this junction is generated by a desire to make money/collect additional charges. - Respondents felt that the above issues could be addressed by a small change to the boundary at the junction. - Without a A46/A36 bypass this corner is unavoidable for many trips. - Concern that including this corner restricts access to Morrisons. - This junction is on an important route to the hospital, especially from Wiltshire. - <u>Hilperton Parish Council, Heywood Parish Council and Westbury Town Council</u> all support exclusion of this junction.
<p>A36 section including:</p> <ul style="list-style-type: none"> - Lower Bristol Road - Claverton Street - Rossiter Road - Pulteney Road 	<ul style="list-style-type: none"> - Respondents felt that the A36 should not be included in the zone because it is a main road, it is the main route around Bath, main east/west route, a key route to the motorway and there is no alternative route. - There needs to be a way for traffic to get around the perimeter of the city. There should be at least one through route. - There were various suggestions about where the zone should end. Typically, respondents suggested that this route should be excluded up to the Churchill Bridge roundabout/the A36/A367 junction or from Westmoreland Road and Midland Bridge.

	<ul style="list-style-type: none"> - <u>The Road Haulage Association</u> expressed a strong view that the A36 should be excluded from the zone. - <u>Trowbridge Town Council</u> and others requested for the A36 to be excluded from the CAZ. - <u>The British and Vehicle Licensing Association</u> noted concern about inclusion of A36, due to the impact on freight movement. - HGVs need to use this route and there are not suitable alternatives for HGVs. - The A36 is not part of the city centre (respondents felt the CAZ should only cover the city centre). - No need to include routes south of the river/the CAZ should only cover the area of the city to the north of the river, they also argued that the river would be a more logical southern boundary, <u>Heywood Parish Council</u> support this. - This route is important to access supermarkets and retail outlets (Sainsburys, Homebase and Lidl) and petrol stations (see below). - Including the A36 will encourage more traffic to rat run through residential areas, particularly Oldfield Park, Combe Down, Claverton Down and Twerton and between Newton St Loe and Hinton Charterhouse and Bradford on Avon. Particular concern about HGVs taking alternative, inappropriate routes. - Including this route will affect many people's frequent journeys, for example to work, to the motorway and to the Royal United Hospital (RUH). It is an important route for commuters. - Many of those who requested the exclusion of the A36 specifically highlighted the need to exclude the junction of the A36 and the A4 London Road (see below). - It was noted that the A36 is sometimes used as a diversion route and questions asked about how this would work if it were in the CAZ. - Churchill Bridge and Midland Bridge should not be included. - Including the A36 affects lower income families in Twerton, Newbridge and Weston. - There was concern that inclusion of the A36 was driven by a desire to raise additional revenue. - As well as asking for the part of the A36 currently included in the zone to be excluded, respondents asked that the section currently not included (Bathwick Street) should not be included, as this is part of the through route. - Businesses located off the Lower Bristol Road, such as in the Midland Bridge area, should not be in the zone. - The A36 is an important route to the hospital from the east/south of Bath. - <u>Foxhill Residents Association</u> requested that Rossiter Road and the Widcombe area be removed from the CAZ.
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These concerns relate to the inclusion of the A36, the A4/Cleveland Place junction or both, with a wide variety of reasons being stated. These are in the main about vehicular accessibility around the zone for internal trips within Bath to/from key destinations, such as the Royal United Hospital (RUH). However, there is also concern about the cutting of the strategic A46(T) to A36(T) route via London Road and Bathwick Street with the inclusion of the A4/Cleveland Place junction.

This Technical Report therefore covers the impact of two potential zone reductions as follows:

- Removal of all sections of the A36 corridor included in the CAZ to the south and east of the City Centre. In addition, the removal of the A4 London/Cleveland Place junction, so preventing the strategic A46(T) to A36(T) route via the A4 London Road and Bathwick Street from being 'cut' by the CAZ; and
- The removal of the A4 London/Cleveland Place junction only.

As noted above, these changes re-open 'key' circulation routes around a 'reduced' CAZ. As such, it has been necessary to undertake further traffic and air quality modelling work to understand whether doing so would still allow air quality compliance to be achieved. This is because there are current exceedances on the A4 London

Road, the A36 Lower Bristol Road just west of Brougham Hayes and the A367 Wells Road on the approach to the Churchill Gyratory.

2. Analysis of Potential Zone Reductions

2.1 A36 Corridor and A4 London Road/Cleveland Place Junction

2.1.1 Assessed Boundary Change and Potential Issues

Figure 2.1 below shows the reduction to the CAZ specifically tested in this scenario. The whole of the A36 corridor presently included between the Brougham Hayes junction and Bathwick Roundabout is removed. This also removes the included northern part of the A367 Wells Road between Oldfield Road and Churchill Gyratory where, as noted earlier, there is an existing air quality exceedance. To the north of the A36 Pines Way, the Sainsbury's store and other developments served off Ivo Peters Road are also removed from the zone, which would otherwise require a new CAZ cordon point to be established here.

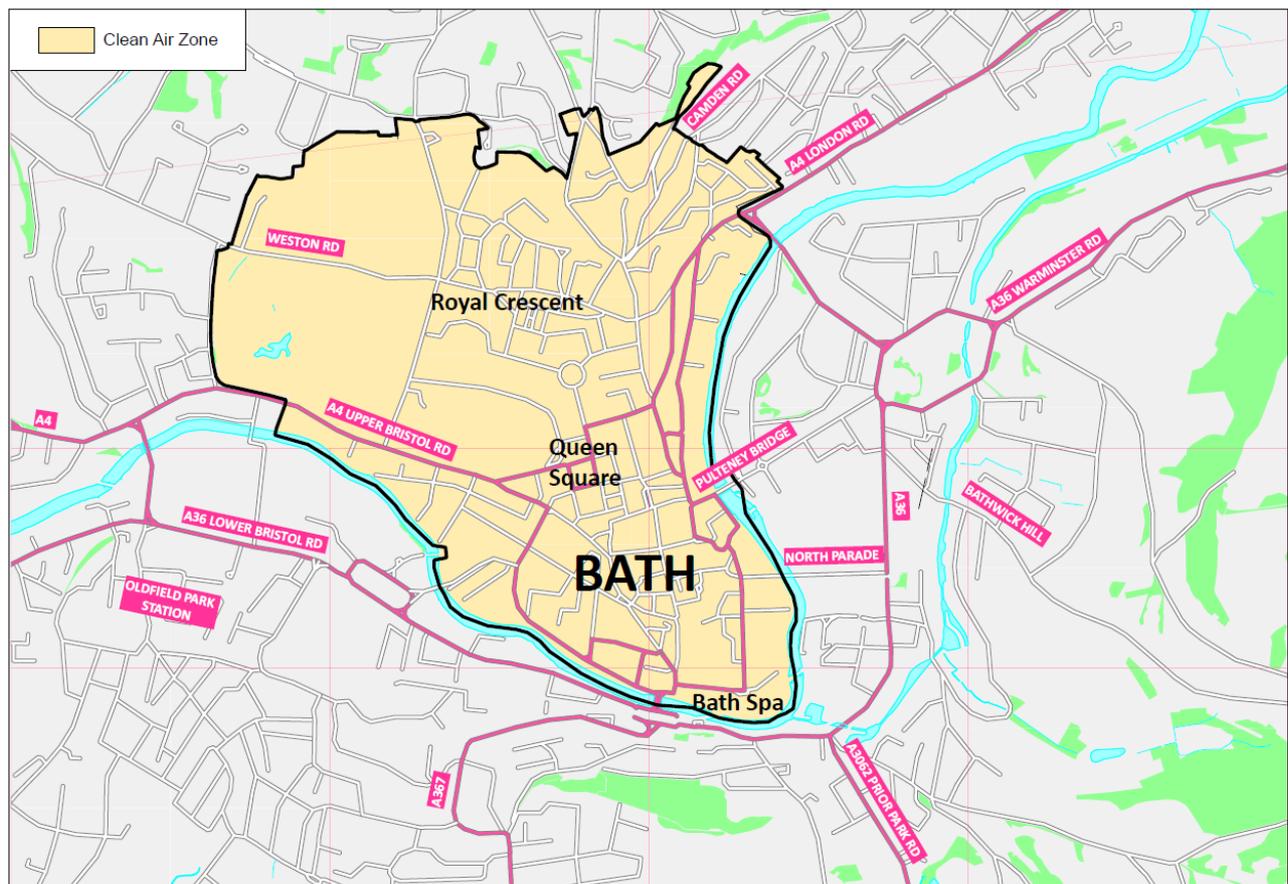


Figure 2.1 Reduced Clean Air Zone (CAZ) Extent - Removing the A36 and the A4/Cleveland Place Junction

It is accepted that 'tucking in' the zone to the south, so maintaining the A36 route through Bath 'outside' of the CAZ, would assist in addressing 'rat-running' or 'avoidance' concerns, particularly to residents in Upper Oldfield Park/Oldfield Park. The original small CAZ considered at 'Strategic Outline Business Case (SOBC) Stage included just the A36/A367 Churchill Gyratory, but this still severed the east-west A36 route and the A367 radial route into/out of Bath to the south. As a result, the extent of the A36 included in the CAZ was necessarily increased to cover the potential 'rat-runs' via the White Hart junction (Widcombe) and the B Class route between the A367 and the A36/Brougham Hayes junction (Oldfield Park). As a result, it presently now encompasses Sainsbury's, the filling station in this location and the Esso filling station on the A36 Lower Bristol Road just west of the Churchill Gyratory. To the north of Widcombe, the A36 Pulteney Road was included to prevent non-compliant vehicles from using unsuitable roads to turn around and avoid zone entry, with 'U' turns possible at Bathwick Roundabout for all vehicles, including HGV's.

The concern with excluding the A36 east-west route but keeping the alternative east-west routes to the north in (A4 and Weston Lane/Julian Road), was that non-compliant vehicle traffic could be 'channelled' onto the A36. In highway capacity terms it was accepted that this may not have an impact. This is because any increase in congestion on the A36 would most likely lead to compliant vehicle drivers switching to use of the other alternative routes as appropriate. However, even assuming overall volumes on the three routes remained roughly the same due to re-routing effects, it was deemed possible that the air quality impact on the A36 could be greater due to its use by a greater proportion of non-compliant fleet. As such, bespoke modelling was undertaken to confirm the view about relative volume impacts, but more expressly to understand how emission levels on the A36 could change. As noted earlier, there are already predicted to be exceedances on both the A36 Lower Bristol Road and the A367 Wells Road in the 'base-line' case.

Exclusion of the A4 London Road/Cleveland Place junction was in fact the original position with the small zone considered at SOBC Stage. However, this was subsequently added in the 3 April revision to the zone (as set out in OBC-04). This is because it would retain the main route for HGVs through Bath (A46(T) to A36(T)) outside of the CAZ, with these vehicles a significant contributor to air pollution levels in London Road where there are existing exceedances. On the positive side, removal of this junction from the CAZ would serve to reduce the risk of traffic diversion to the Bathampton Lane-Mill Lane route via the Toll Bridge, which would be the only other route available on the east side of the city for non-compliant drivers to cross the River Avon. Whilst the traffic modelling suggests that diversion to the toll bridge route is low, and certainly not 'excess' or 'severe', it nevertheless remains a potential risk or issue with the Cleveland Bridge route cut by the CAZ as proposed.

2.1.2 Air Quality Modelling Results

The detailed air quality modelling results emerging from this scenario test are included in **Appendix A**. In summary, this highlighted that these changes to the proposed CAZ resulting a much smaller zone would result in five exceedances of the air quality limit values. Specifically, these were identified at:

- A4 London Road, east end in Lambridge;
- A4 London Road, east of Cleveland Place;
- A367 Wells Road, near Oldfield Road;
- A36 Lower Bristol Road, between Pines Way and Windsor Bridge Road; and
- A4 Upper Bristol Road, between Windsor Bridge Road and Newbridge Hill.

The maximum predicted concentration was 47 µg/m³.

In view of the earlier discussion these results are not surprising. The exclusion of the A36 but retained inclusion of the A4 Upper Bristol Road and Weston Road/Julian Road east-west routes through Bath will inevitably attract a higher proportion of non-compliant vehicle fleet to the A36 corridor. This would thus exacerbate a situation where there are 'base-line' exceedances on the A36 Lower Bristol Road (just west of Brougham Hayes) and the A367 Wells Road. In conclusion, whilst accepting the concerns about the difficulty of non-compliant vehicles routing around the zone with the A36 and Bathwick Street routes cut, the removal of these routes is not predicted to achieve air quality compliance over the entirety of the central area by 2021.

2.2 A4 London Road/Cleveland Place Junction Only

2.2.1 Assessed Boundary Change and Potential Issues

Whilst the removal of the A4/Cleveland Place junction was included in the above scenario, it was decided to test the removal of this junction independently. In the earlier SOBC work it was felt that solely targeting vehicle traffic on the A4 London Road routing into/out the City Centre (so into/out of a 'reduced' CAZ) may be sufficient to bring the air quality concentrations here within the legal limit. In other words, whether it was necessary for the CAZ to 'cut' the strategic A46(T) to A36(T) route via Bathwick Street. Whilst the above scenario test suggested that the A4 London Road/Cleveland Place needed to be included, there was a concern that predicted air quality conditions here might be affected by the removal of the whole of the A36 as well. In other words, the removal of

both could result in London Road, Bathwick Street and the A36 being used by an increased volume of non-compliant traffic routing between the northeast and south parts of the city. Examination of Figure 2.1 shows that the only other viable route avoiding the CAZ would be a quite circuitous route via Lansdown Lane through Upper Weston.

2.2.2 Air Quality Modelling Results

The traffic and air quality models were duly run with just the A4 London Road/Cleveland Place junction removed from the proposed CAZ area. The results showed a maximum concentration is $40.8 \mu\text{g}/\text{m}^3$, with three PCM-equivalent receptors in exceedance. This scenario is thus still non-compliant, albeit the difference with the Type D CAZ as proposed is marginal. The detailed air quality modelling results emerging from this scenario test are again included in **Appendix A**.

3. Conclusions

This Technical Report forms a response to concerns expressed from the public consultation about its currently proposed size and the need for it to be so large to achieve air quality compliance. Commentary on the viability of small alterations having no impact on removing 'key' traffic circulation routes from the zone is included in the main text of the 'Consultation Response' report. However, some comments concerning zone reductions requested consideration be given to exclusion of some main routes.

These concerns relate to the inclusion of the A36, the A4/Cleveland Place junction or both, with a wide variety of reasons being stated. These are in the main about vehicular accessibility around the zone for internal trips within Bath to/from key destinations, such as the RUH. However, there is also concern about the cutting of the strategic A46(T) to A36(T) route via London Road and Bathwick Street with the inclusion of the A4/Cleveland Place junction.

This Technical Report has therefore assessed the impact of two potential zone reductions as follows:

- Removal of all sections of the A36 corridor included in the CAZ to the south and east of the City Centre. In addition, the removal of the A4 London/Cleveland Place junction, so preventing the strategic A46(T) to A36(T) route via the A4 London Road and Bathwick Street from being 'cut' by the CAZ; and
- The removal of the A4 London/Cleveland Place junction only.

Bespoke traffic and air quality modelling (2021) predicts that removal of the A36 and the A4 London Road/Cleveland Place junction from the CAZ would result in five exceedances of air quality. Specifically, these were identified at:

- A4 London Road, east end in Lambridge;
- A4 London Road, east of Cleveland Place;
- A367 Wells Road, near Oldfield Road;
- A36 Lower Bristol Road, between Pines Way and Windsor Bridge Road; and
- A4 Upper Bristol Road, between Windsor Bridge Road and Newbridge Hill.

The maximum predicted concentration was 47 $\mu\text{g}/\text{m}^3$.

A key reason for this is that exclusion of the A36 but retained inclusion of the A4 Upper Bristol Road and Weston Road/Julian Road east-west routes through Bath will inevitably attract a higher proportion of non-compliant vehicle fleet to the A36 corridor. This would thus exacerbate a situation where there are 'base-line' exceedances on the A36 Lower Bristol Road (just west of Brougham Hayes) and the A367 Wells Road. In conclusion, whilst accepting the concerns about the difficulty of non-compliant vehicles routing around the zone with the A36 and Bathwick Street routes cut, the removal of these routes is not predicted to achieve air quality compliance over the entirety of the central area by 2021.

The removal of the A4 London Road/Cleveland Place junction has also been assessed independently. In the earlier SOBC work it was felt that solely targeting vehicle traffic on the A4 London Road routing into/out the City Centre (so into/out of a 'reduced' CAZ) may be sufficient to bring the air quality concentrations here within the legal limit. In other words, whether it was necessary for the CAZ to 'cut' the strategic A46(T) to A36(T) route via Bathwick Street. Whilst the above scenario test suggested that the A4 London Road/Cleveland Place needed to be included, there was a concern that predicted air quality conditions here might be affected by the removal of the whole of the A36 as well. However, these results still showed a maximum concentration is 40.8 $\mu\text{g}/\text{m}^3$, with three PCM-equivalent receptors in exceedance. This scenario is thus still non-compliant, albeit the difference when compared with the Type D CAZ area as proposed is marginal.

In overall conclusion, neither of these reduced CAZ scenarios removing 'key' circulation routes from coverage would achieve the required air quality compliance levels in 2021. However, it is evident that removing just the

A4 London Road/Cleveland Place junction creates only a marginal change when compared to the currently proposed CAZ extent.

Appendix A.

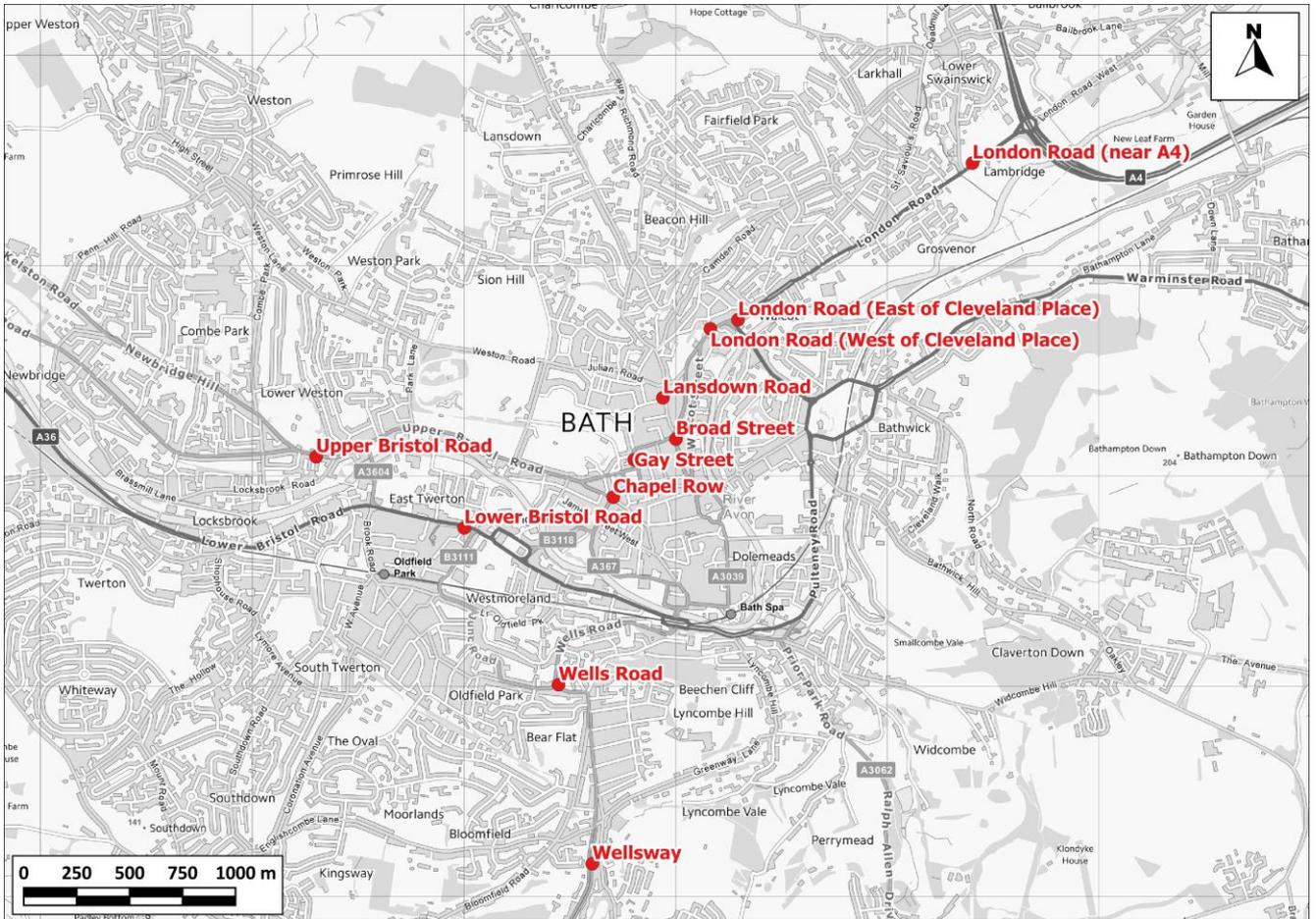
Table A1: Air Quality Modelling Results: Comparison

Location	2017 Base	2021 Base	2021 CAZ C £9.00	2021 CAZ C £9.00 with TM	2021 CAZ D £7.50	2021 CAZ D £9.00	2021 CAZ D £9.00 Smaller	2021 CAZ D £9.00 CPR
Gay Street	60.1	50.9	42.0	36.9	40.8	40.4	39.5	40.8
London Road (West of Cleveland Place)	70.2	57.6	38.5	38.2	36.7	36.4	36.6	36.5
London Road (East of Cleveland Place)	61.9	52.2	39.6	39.5	37.1	36.9	41.7	37.8
London Road (near A4)	64.4	50.8	31.4	31.3	31.0	30.9	41.6	31.5
Wells Road	69.1	57.5	31.0	30.9	30.2	29.9	42.4	30.1
Wellsway	58.6	47.8	25.1	25.1	24.5	24.5	36.7	24.5
Upper Bristol Road	75.4	61.9	36.4	36.3	35.6	35.5	46.9	35.6
Chapel Row	53.7	45.7	38.3	35.4	37.1	36.8	36.2	36.7
Lansdown Road	62.4	51.9	38.0	37.9	36.1	35.9	35.5	35.9
Broad Street	58.1	49.8	35.2	35.0	34.7	34.6	34.3	34.6
Lower Bristol Road	51.0	44.5	36.7	36.7	34.4	34.2	40.9	34.0
Maximum Value	75.4	61.9	42.0	39.5	40.8	40.4	46.9	40.8

Notes

- 1: CPR = Cleveland Place Removed
2. Yellow shading indicates scenarios achieving full air quality compliance

Table A2: Plan showing Locations Compared



Appendix B. Technical note on potential extensions to the proposed Class D CAZ boundary



Bath Clean Air Plan

Bath & North East Somerset

Potential Eastern Extensions to CAZ Boundary

| Final

March 2019

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1. Introduction

In 2017 the government published a UK Air Quality Plan for Nitrogen Dioxide (NO₂) setting out how compliance with the EU Limit Value for annual mean NO₂ will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, B&NES, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how B&NES will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance, B&NES is considering implementation of a Clean Air Zone (CAZ) including both charging and non-charging measures to achieve sufficient improvement in air quality and public health. **Figure 1.1** below shows the extent of the proposed CAZ in the Outline Business Case issued for formal public consultation in October 2018.

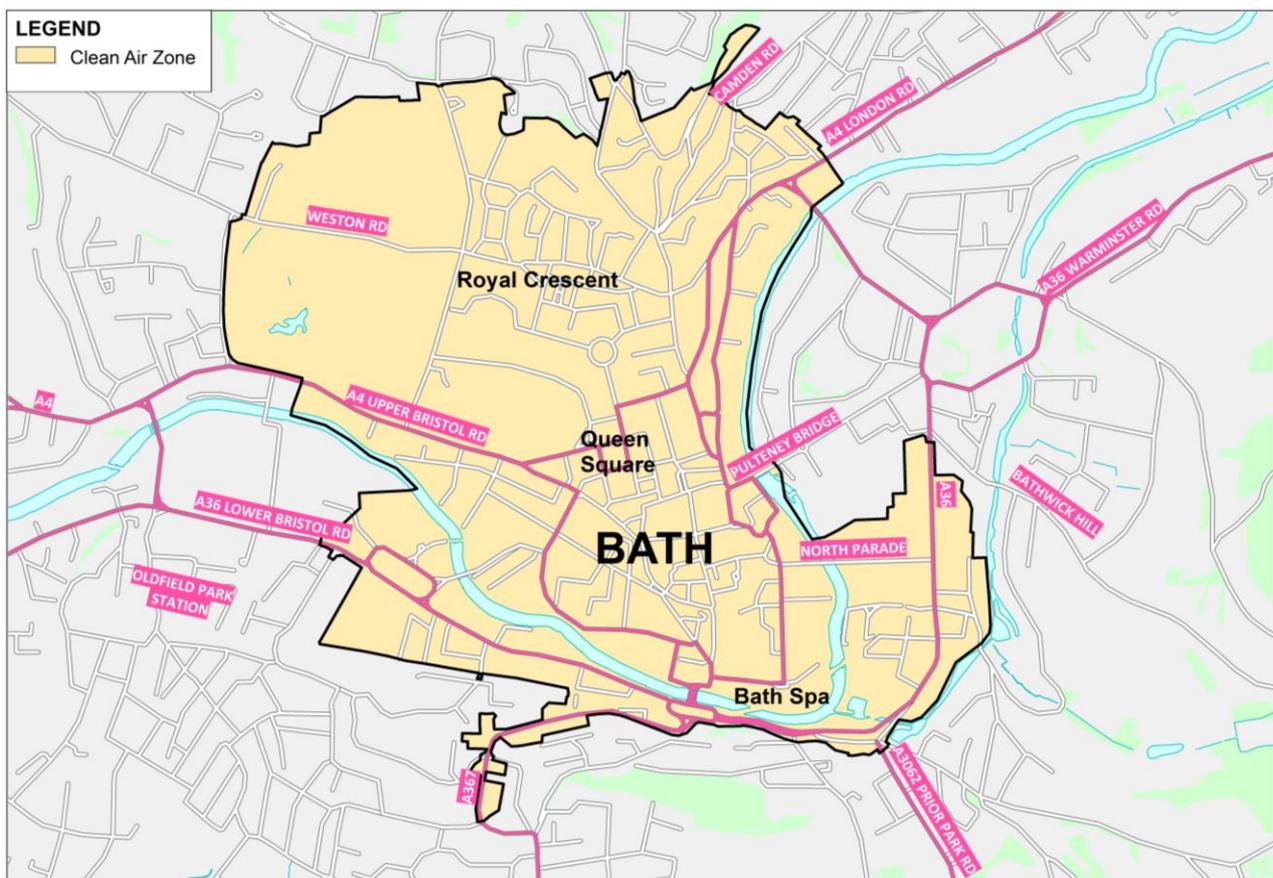


Figure 1.1 Proposed Clean Air Zone (CAZ) Extents - Outline Business Case

The public consultation on the scheme included in the Outline Business Case (OBC) has established that there is concern over the definition of the CAZ boundary on the eastern side of Bath. There are specific concerns from some residents in the Pulteney Estate area that the CAZ could exacerbate existing issues with tourist and rugby coaches idling in the area because it would be seen as an attractive location for non-compliant coaches seeking to avoid the charge while still getting close to the central area and the Recreation Ground. There are also concerns from both the Pulteney and Bathwick areas about drop-off and also parking of non-compliant vehicles.

Further to the east there are also concerns from residents in Bathampton about increased traffic use of Bathampton Lane/Mill Lane due to its use as an avoidance route by non-compliant light vehicle traffic. This includes concerns about increased delay on both approaches to the toll bridge and the risk of increased northbound queuing extending beyond the railway bridge into the northern part of Bathampton.

This Technical Report therefore covers three elements in response as follows:

- A summary of the technical work on the CAZ zone to date from the perspective of the eastern Bath area;
- An investigation of available data to assess the potential impact of the zone; and
- A consideration of the technical feasibility and implications of eastern zone extensions covering the Pulteney Estate, parts of Bathwick and Bathampton village.

2. Analysis of Potential Eastern Extensions

2.1 Air Quality in the East Bath Area and Expected Changes

2.1.1 Pulteney Estate and Bathwick

In the Baseline scenario (i.e. no Clean Air Plan and Zone) there are two exceedances expected in this area. These are both LAQM receptors on Bathwick Hill, one on the corner of Sydney Buildings ($44\mu\text{g}\text{m}^{-3}$ annual mean NO_2) and one further up at house number 11 ($41\mu\text{g}\text{m}^{-3}$). Within the Pulteney Estate area the highest predicted NO_2 levels are $36\mu\text{g}\text{m}^{-3}$ on the PCM link representing the south side of Bathwick Street between Henrietta Rd and Daniel St. All other receptors show values of $30\mu\text{g}\text{m}^{-3}$ or less and the LAQM receptors at the north end of Great Pulteney Street show values between 21 and $22\mu\text{g}\text{m}^{-3}$.

With the proposed Type D CAZ in place the above values are predicted to reduce, even though these areas are outside of the zone. This is because baseline traffic flows at these locations are affected by the zone, insofar as the boundary cuts the A36 route between Bathwick Roundabout and Brougham Hayes and the A46(T) to A36(T) route via Bathwick Street. The exceedances on Bathwick Hill are expected to see reductions of around $20\mu\text{g}\text{m}^{-3}$ to $24\mu\text{g}\text{m}^{-3}$ and $22\mu\text{g}\text{m}^{-3}$ respectively. Meanwhile, the already compliant areas of Pulteney and Bathwick are expected to see reductions of up to $10\mu\text{g}\text{m}^{-3}$. Specifically, the highest PCM link on Bathwick Street is predicted to reduce to $27\mu\text{g}\text{m}^{-3}$, whilst the LAQM receptors on Great Pulteney Street are forecast to fall to between 17 and $18\mu\text{g}\text{m}^{-3}$. In keeping with the JAQU Framework that '*any charging zone should be as small as possible*', there is no immediate evidence or need from an air quality perspective to include these areas in the zone because of existing exceedances, or exceedances created by traffic changes resulting from the CAZ as proposed in the OBC. Indeed, as noted, base concentrations are expected to fall.

2.1.2 Bathampton

The Baseline air quality is predicted to be well within legal limits. The section of the A36(T) Warminster Road through Bathampton, which is the most heavily trafficked road, does not exceed $15\mu\text{g}\text{m}^{-3}$ in 2021.

With the proposed Type D CAZ in place the section of the A36(T) Warminster Rd past Bathampton is predicted to experience a $1\text{-}3\mu\text{g}\text{m}^{-3}$ reduction in NO_2 . The reason for this is the same as that explained for the adjacent Bathwick area, in that a section of the A36 route to the south of the City Centre is within the CAZ, whilst the inclusion of the A4/Cleveland Place junction will also deter the use of the A36(T) to A4 London Road (and A46) route via Bathwick Street by non-compliant vehicles. The introduction of the CAZ is expected to result in a small daily increase in the use of the toll bridge route via Bathampton Lane and Mill Lane as explained later. However, this is not predicted to result in any local exceedances, notably on the approaches to the toll bridge where queuing in the weekday peak periods already occurs now.

2.2 Traffic Impact of the Proposed CAZ in the East Bath Area

2.2.1 Pulteney Estate and Bathwick

Although the traffic model handles the main responses that are expected in response to the Type D CAZ, it is not sophisticated enough to handle detailed concerns raised by residents in this area about increased coach access, or indeed any potential for increased use of this part of the city as a drop-off/pick-up zone for non-compliant car drivers. However, it has been possible to extract data from the two-week ANPR surveys which were undertaken to obtain an estimate of the magnitude of any possible impact associated with coaches. Increased drop-off/pick-up by non-compliant cars will also depend on how easy it is to route around the zone from other areas of the city or radial routes to/from the Pulteney Estate area. In other words, the convoluted and lengthy diversion route is unlikely to make this attractive.

To understand the potential coach access implications the ANPR data was processed into trip chains, allowing classifications, time periods and other data to be extracted. For coaches, two specific time periods were investigated as follows:

- An average weekend day which was comprised of the observed Saturdays and Sundays (4th, 5th, 11th and 12th of November 2017); and
- A Bath rugby match on Friday evening on the 10th November 2017.

For the weekend period, the daily average number of observed origins of coaches between 09:00 and 21:00 is shown in **Table 2 1**. These numbers only include coaches that ‘stopped’ in the city. This is because the data included coaches on some inbound routes (External Cordon) which were seen to depart the city in a short period of time at another site on the External Cordon (outbound). It was therefore assumed that these were not tourist coaches but ‘through’ movements. For coaches that did stop in the city, it was not possible to infer much about their internal route and where they did stop, as the bulk of the tourist attractions lay within the inner cordon of ANPR sites.

Table 2 1: Average Weekend Daily Coach Origins (09:00-21:00)

Origin	Compliant	Non-Compliant	Diversion Cost
A46(T) North	4.25	4.75	High
A4 East	1.75	5.75	Moderate
A36(T) South	3.25	2.75	None
A3062 South	0.25	1	Low
A367 South	2.75	2.5	Low
A4 & A36 West	3	3.5	Moderate to High
Lansdown Rd	2	1.75	High

For each origin route a relative ‘cost’ of diversion is assumed in the rightmost column. This is based on the difficulty and convenience in altering or adapting the approach route to arrive on the A36(T). At the low end, coaches from the A36(T) are already arriving in Bathwick, so there is little diversion cost should these choose to stop short and drop-off/pick-up in Great Pulteney Street, as opposed to continuing into the City Centre. At the high end are coaches approaching from the opposite side of Bath. For these, the diversion required is substantial to get around the zone to the A36(T), particularly coaches from the north and northwest. These coaches would have to add as many as 20-30 miles to their journey length and over half an hour of time (each way) to adapt the final part of their route to arrive/depart via the A36(T). Given this fact, it is considered that diversion from these inbound routes is highly unlikely, as it would not be cost effective to do so. Coaches typically have fuel consumption figures around 5mpg, meaning that the total 40-60 mile diversion for the round trip would cost £40-60. Half the savings made by not paying the charge would thus be spent avoiding it in fuel alone and, in addition, coach operators will consider non-fuel costs of additional mileage and driver time.

It is accepted that diversion and/or stopping short is more likely from the south eastern direction (A36(T)), but even here it should be noted that tourists may not wish to be stopped short. Also, for a coach of 50 visitors, the £100 CAZ charge amounts to only £2 extra per passenger. It is also expected that the number of compliant coaches will increase as fleets are replaced. The background turnover rates set out in the EFT spreadsheet from JAQU indicate around half of non-compliant coaches will have been replaced by 2021. It is therefore concluded that the presence of the CAZ as presently proposed is unlikely to significantly exacerbate any existing problem of idling tourist coaches in the Pulteney Estate area on a typical weekend when tourist coach demand is highest.

The ANPR survey data also captured one home rugby match, the second round Anglo-Welsh Cup match against Leicester Tigers with a near sell-out attendance of 14,354. Match kick-off was at 19:45. Inbound coach observations and paths were therefore extracted for this day, which were seen between 16:00 and 20:00 and are shown in **Table 2.2** below.

Table 2 2: Friday Rugby Match Coach Origins (16:00-20:00)

Origin	Compliant	Non-Compliant
A46(T) North	1	0
A4 East	6	2
A36(T) South	2	2
A3062 South	1	1
A367 South	4	0
A4 & A36 West	1	0
Lansdown Rd	3	0

It is noted that the observed rate of compliance is higher, with only a minority of coaches, 5 of the 18, being non-compliant. When considered against the background fleet turnover, plus the more significant diversion that the two coaches from the A4 East would have to make, it suggests that the exclusion of the Pulteney Estate area from the CAZ is unlikely to make a significant difference. However, it also shows that including the Pulteney Estate area within the CAZ would not unduly affect coaches associated with Bath home rugby matches, accepting this was only a 'snap-shot' of one game.

While it is acknowledged that coach idling in this area is a current concern, it is considered that it is not likely to be significantly exacerbated by the introduction of a CAZ with the Pulteney Estate area excluded. This is due to the limited numbers of non-compliant coaches by 2021, with diversion for most rather than just paying the charge, a non-efficient cost option. Extending the CAZ would not address this problem during Bath Rugby home matches either, as available ANPR data indicates that most supporter coaches are likely to be compliant anyway, which will increase over time. It should also be noted that part of the complementary measures to be included with the Charging Zone is dedicated funding for anti-idling enforcement officers. It is anticipated that this will be a far more effective way to address issues of idling coaches, as they will be able to target vehicles regardless of compliance.

As noted earlier, increased drop-off/pick-up by non-compliant cars will also depend on how easy it is to route around the zone from other areas of the city or radial routes to/from the Pulteney Estate area. An examination of the proposed boundary in Figure 1.1 shows that accessing the Pulteney Estate area from large parts of Bath would involve a very circuitous route to avoid the proposed CAZ. This is particularly the case for all areas north of the river, but also the southwest part of the city. It is accepted that non-compliant drivers with easy access to the A36(T) or North Road and Bathwick Hill (Combe Down) might choose to use Great Pulteney Street/Laura Place as a preferred location of drop-off/pick-up. However, it is not inconceivable that drivers from the southeast part of the city wouldn't be doing this now. With respect to an increase in on-street parking risk, it is noted that the whole of the Pulteney Estate is covered by Residents Parking Zone (RPZ) 1, whilst parts of Bathwick are included in RPZ Zones 8 and 10. As such, the parking supply is already actively managed for the most part, and zone extensions could be considered in line with the B&NES RPZ guidelines to address any additional nuisance parking created in Bathwick by non-compliant vehicle owners. In other words, it does not require the extension of the CAZ boundary to cover the whole of Bathwick to achieve this.

2.2.2 Bathampton

As with other areas outside of the CAZ, the traffic diversionary impacts have been assessed using the GBATH SATURN model. This was developed to a calibrated/validated base of 2014 by Mott MacDonald in 2015 following extensive Roadside Interview Surveys (RSI), traffic counts (both MCC and ATC) and journey time surveys done at this time. The highway models were developed in SATURN to represent the AM peak hour (08:00 - 09:00), an average hour in the inter-peak (10:00 - 16:00) and the PM peak hour (17:00 - 18:00) for an average Monday to Friday weekday in October 2014. With respect to Bathampton it is important to note that the Mill Lane toll bridge was expressly calibrated and checked for 'goodness of fit' given its importance to any consideration of transport measures in the 'East of Bath' area; which was the driver at the time for the model update. The results in the Local Model Validation Report (LMVR), dated June 2015, showed the following:

- AM Peak Hour: Counted NB and SB flows of 167 and 327 vehicles were satisfactorily replicated by modelled flows of 173 and 352 vehicles;
- IP 'Average' Hour: Counted NB and SB flows of 123 and 140 vehicles were satisfactorily replicated by modelled flows of 118 and 137 vehicles; and
- PM Peak Hour: Counted NB and SB flows of 280 and 172 vehicles were satisfactorily replicated by modelled flows of 289 and 167 vehicles.

Whilst it is accepted that all 'wide area' models can incorporate some inaccuracy, this is not the case with GBATH at Mill Lane. The 'fit' and flow 'tidality' in the two weekday peak hours is accurately represented. The effect of the long one-way 'shuttle' section on the bridge, and the toll operation, serves to constrain the maximum two-way flow capacity which can be achieved along this route, with queuing on both approaches in the peak hours a regular occurrence now. It is notable that the two-way flows in both peak hours are circa 450-500 vehicles, which is the proxy for its ultimate throughput. Based on this, the potential for diversionary growth in traffic usage with the CAZ in place will be confined to the inter-peak period, when capacity to accommodate it exists.

This view is supported by ATC data collected on Toll Bridge Road in November-2018. This is very consistent with the 2014 counts used for the GBATH calibration/validation. Looking at the two-way flows, these 'peak' at about 440-460vph in the two weekday peak hours, so not much different to the situation with 2014 data as reported above. The average two-way flow in the weekday inter-peak (10 am-4 pm) has risen to 305 vph in this data, so is clearly the period in which growth over the 2014-2018 has occurred. With Enterprise Area (EA) development related growth in the City Centre expected to add traffic pressure to the road network on the eastern side of Bath by 2021, increased use of the Mill Lane/Bathampton Lane route in the inter-peak period is highly likely to occur irrespective of the CAZ.

For the purposes of the current CAZ work a 2-week ANPR survey was used to obtain information to split the 2014 matrices into finer detail on vehicle types, as required for the traffic and air quality modelling. This included the fuel and euro class splits to determine compliance and emissions of vehicles, as well as splitting out classes such as coaches and taxis. Traffic demand in the model was then increased according to DfT forecasts to 2021. The change in compliance of vehicles between the observed 2017 data and 2021 was obtained using the Defra Emissions Factors Toolkit (EFT). Note that the traffic origin-destination patterns implicit in the calibrated 2014 matrices were not changed.

When factoring flows to 12-hour and then AADT, the 9-10 am and 4-5 pm hours were accounted for in the factoring of the 8-9 am and 5-6 pm 'peak' hour flows (GBATH) to the 7-10 am and 4-7 pm 'peak' periods. Local area ATC data has been used to establish these factors. In short:

- A global factor was derived from local ATC data to convert AM peak hour flows (8:00-9:00) to AM peak period flows (7:00-10:00);
- A global factor was derived from local ATC data to convert the average inter peak hour flow to the total inter peak period flow (10:00-16:00);
- A global factor was derived from local ATC data to convert PM peak hour flows (17:00-18:00) to PM peak period flows (16:00-19:00);
- A global factor was derived from local ATC data to convert the 12-hour flows calculated above to 24-hour Annual Average Weekday Traffic (AAWT) flows; and
- A global factor was derived from local ATC data to convert the 24-hour flows calculated above to 24-hour Annual Average Daily Traffic (AADT), which includes weekend trips and is adjusted for seasonality. This process was necessary as AADT forecasts are the ones necessary for air quality emission modelling.

Based on the above, the modelling with a Class D CAZ shows a small increase in the daily (AADT) flow on Mill Lane of around 100 vehicles/day, which compares with a projected 2021 baseline daily flow of ~6500 vehicles/day. This equates to diversion induced growth of +1.5% which, as noted above, is likely to occur in the inter-peak period when the capacity at the toll bridge allows. So, whilst it is accepted that increased traffic use of Bathampton Lane/Mill Lane will occur with the Class D CAZ as proposed, the expected level of increase is considered modest and within acceptable limits when considering normal daily variation in traffic. It should be

noted that a Stated Preference Survey (SPS) was undertaken to understand the likely behavioural change to a CAZ, with this applied to the local model to replicate responses by owners of non-compliant vehicles. The survey was undertaken through an independent market research panel and issued to a representative sample of people in Bath and the surrounding area. For non-compliant car owners, the proportion advising they would re-route to avoid the zone was only 19.6%. This compares with 57.2% stating that they would upgrade/replace the vehicle and 18.3% advising they would change mode or cancel the journey. So, the potential for traffic change in Mill Lane also needs to be considered in the light of these SPS findings, which is reflected in the GBATH modelling as noted.

Based on the 2021 modelling results, and the quality of the 2014 base model 'fit' at Mill Lane, it is considered there is no justification to extend the CAZ to include Bathampton village and the toll bridge as part of the initial CAZ scheme. Including the Bathampton toll bridge would also mean there would be no available crossing point over the River Avon on the east side of the city for non-compliant car drivers to use, with the alternative option well south of Bath at Winsley (B3108).

3. Technical Considerations

3.1 Pulteney Estate and Bathwick

Comments received from the Pulteney Estate Residents Association stated that “PERA believes that the CAZ should extend to include the city sections of the A36 from Beckford Road/Sydney Road to Pulteney Road. This would extend the CAZ to encompass many important parts of the heritage centre of Bath such as Great Pulteney Street, Sydney Place and Sydney Gardens”. By implication this would include the whole of the Pulteney Estate, Bathwick Street and Sydney Gardens. It would also by necessity include the part of Bathwick to the north of Sydney Gardens, which has sole access to the A36 Beckford Road via Forrester Road and Beckford Gardens. South of Sydney Road, the eastern boundary would then logically follow the line of the Avon and Kennet Canal to ‘tie-in’ with the existing proposed boundary to the south of Bathwick Hill. An extension of this size would, however, have implications in providing suitable opportunity for ‘turn-back’ or re-routing of non-compliant vehicles, particularly HGVs entering the city on the A36(T). These are as follows:

- Non-compliant vehicles entering Bath on the A36(T) would be forced to turn left into North Road to avoid entry into the CAZ via either Beckford Road or Sydney Road. This is unsuitable for HGV’s, so an ‘entrapment’ issue would be created as vehicles would be forced to enter the CAZ. Therefore, the only suitable ‘turn-back’ opportunities for these large vehicles via the Sydney Gardens ‘loop’ (Beckford Road/Sydney Place/Sydney Road) or a ‘U’ turn at Bathwick Roundabout would be lost; and
- ‘Turn-back’ for non-compliant light vehicles would, as stated above, increase traffic in North Road and so past the front of King Edwards School. These drivers would have to continue along North Road to Claverton Down Road, or expedite a turn using residential roads to the south of North Road (Cleveland Walk-Sham Castle Lane) to return to the A36 via North Road. Roads in the new Holburne Park development (former MOD site) might also be used for turning to avoid zone entry, or Minster Way. The existing A36 Beckford Road/Sydney Road junction is signal controlled with the junction layout having quite a large ‘foot-print’. Whilst converting this junction to a small roundabout might be possible to allow a ‘U’ turning avoidance manoeuvre for non-compliant vehicles, it is important to note that the current signal layout includes controlled crossings over both Beckford Road and Sydney Road to assist pedestrian/cyclist movements in this location, which is on the ‘key’ route to/from King Edwards School. This could not be conveniently replicated with a roundabout design, whilst even a small island design would represent a tight ‘U’ turn for HGV’s.

For the reasons stated above a zone extension to the extent advocated by PERA is not recommended, because it is not needed to achieve compliance. However, a smaller extension covering the Pulteney Estate could be considered, provided it does not interfere with the turning opportunities via Sydney Gardens or Bathwick Roundabout. Under this extension scenario four new cordon entry/exit points would be created as follows:

- Bathwick Street: At the junction with Beckford Road and Sydney Place;
- Sutton Street: At the junction with the A36;
- Great Pulteney Street: At the junction with the A36; and
- Vane Street: At Bathwick Roundabout.

This extension would result in the currently proposed cordon entry/exit points on Bathwick Street (at Cleveland Bridge) and Pulteney Bridge being removed. The ‘net’ change would be two additional cordon points requiring signing and ANPR camera enforcement. However, it is important to note that, whilst technically feasible without traffic management implications, it will offer little or no additional air quality benefit albeit having a direct impact on more residents through inclusion within the zone. As such, it will impact negatively on an Outline Business Case (OBC) which is already negative. It also assumes that all the residents of the Pulteney Estate would support inclusion as advocated by PERA.

Further extension to cover a wider area of Bathwick might be considered at some point in the future if CAZ implementation is shown to introduce undesirable parking or rat-running effects which are not addressable with normal parking or traffic management controls. If so, the A36/North Road junction and the section of North Road as far as Cleveland Walk may need to be included as an addition to the area suggested by PERA to prevent an undesirable increase in ‘avoidance’ traffic past King Edward’s School. As noted however, this will create an entrapment issue for non-compliant HGV’s, as any proceeding northbound beyond the A36(T)/B3108 Lower

Stoke junction at Winsley will have no suitable opportunity to avoid zone entry. In contrast, non-compliant HGVs entering Bath on the A46(T) will have signed turn-back opportunities much closer to the CAZ entry point on the A4 London Road at either Lambridge Interchange or the Gloucester Road junction.

3.2 Bathampton

The inclusion of Bathampton village would create a need for an 'outlier' CAZ unless it could be linked with a feasible extension of the main zone through the Pulteney Estate and Bathwick. It would also be highly desirable to avoid any inclusion of the A36(T) within the CAZ, which is separately managed by Highways England. To facilitate possible 'link-up' as a single zone the Pulteney Estate area described earlier would have to be included in addition to:

- The area of Bathwick to the north of the A36 Beckford Road served off the accesses with Forrester Road and Beckford Gardens;
- Darlington Road, including Bathwick St Mary C of E Primary School; and
- The new Holburne Park development off the A36 access junction with Inglis Court.

However, between Holburne Park and Bathampton Lane there are several large properties with direct frontage access to the A36 Warminster Road. Noting the need to avoid any direct inclusion of the A36(T), it would not be possible or viable to include these properties within the CAZ. As such, any proposal to include Bathampton will in effect create the need for a remote sub-zone covering the whole of its extent to the north of the A36(T), and south of the A4 Batheaston Bypass (Mill Lane Bridge).

The position of the sub-zone entry/exit point on Mill Lane would, however, need careful consideration to ensure there is an adequate 'turn-back' opportunity for southbound non-compliant vehicles reaching and crossing the toll bridge. Locating the zone entry/exit point at the London Road West/Toll Bridge Road junction could be considered, but this would then incorporate within the zone all properties served off Toll Bridge Road and Mill Lane. This would then additionally impact on several businesses including The Old Mill and Bathampton Mill, as well as residential properties served off The Willowfalls. Avoiding this would be highly desirable, so a suitable turning point for light vehicles would ideally need to be established between Bathampton Mill and Mill Lane Bridge, which could be difficult to achieve due to limited available highway width. In the absence of this it is probable that the existing access junctions to Bathampton Mill or New Leaf Farm will be used by southbound non-compliant drivers to make 'U' turns to avoid zone entry, which is less than ideal. Advance signing at the London Road West/Toll Bridge Road could, however, be installed to reduce or mitigate this risk.

In summary the inclusion of Bathampton will create a need for an 'outlier' zone with four entry/exit points as follows:

- Bathampton Lane: at the junction with the A36(T);
- Devonshire Road: at the junction with the A36(T);
- Down Lane: at the junction with the A36(T); and
- Mill Lane, or alternatively Toll Bridge Road.

The creation of an 'outlier' CAZ (in addition to the main zone covering the central area) is considered to create a precedent for inclusion of other sub-zones. As noted earlier, there is no case for its inclusion to achieve air quality compliance by 2021. Furthermore, whilst some increased traffic use of Bathampton Lane and Mill Lane is predicted, the level of this expected increase is not excessive. The ability for 'growth' to be accommodated in the weekday peak hours is also already heavily constrained by the capacity available at the toll bridge, a fact that will be well known to local drivers.

4. Conclusions

4.1 General

This Technical Report is a response to concerns over the definition of the CAZ boundary on the eastern side of Bath. There are specific concerns from some residents in the Pulteney Estate area that the CAZ could exacerbate existing issues with tourist and rugby coaches idling in the area. There are also concerns from both the Pulteney and Bathwick areas about drop-off and parking of non-compliant vehicles. To the east there are also concerns from residents in Bathampton about increased traffic use of Bathampton Lane/Mill Lane due to its use as an avoidance route by non-compliant light vehicle traffic. This includes concern about increased delay on both approaches to the toll bridge and the risk of increased northbound queuing extending beyond the railway bridge into the northern part of Bathampton.

4.2 Pulteney Estate and Bathwick

The traffic and air quality modelling undertaken to date shows that the inclusion of the Pulteney Estate/Bathwick area advocated by PERA, and/or further inclusion of Bathampton, is not necessary to achieve air quality compliance by 2021. Furthermore, substantively increasing the overall CAZ extents to include these areas will increase the overall direct impact on residents, so would serve to erode an economic case which is already shown to be negative with the zone as proposed (OBC).

With respect to the Pulteney Estate/Bathwick area there are potential traffic management issues with including the whole of the area proposed by PERA. These are related to maintaining satisfactory 'turn-back' provision for non-compliant drivers reaching Bathwick on the A36(T). Specific issues would include:

- Non-compliant vehicles entering Bath on the A36(T) being forced to turn left into North Road to avoid entry into the CAZ via either Beckford Road or Sydney Road. This is unsuitable for HGV's, so an 'entrapment' issue would be created as these would be forced to enter the CAZ. In short, the only suitable 'turn-back' opportunities for these large vehicles via the Sydney Gardens 'loop' (Beckford Road/ Sydney Place/Sydney Road) or a 'U' turn at Bathwick Roundabout would be lost; and
- 'Turn-back' for non-compliant light vehicles would, as stated above, increase traffic in North Road and so past the front of King Edwards School. These drivers would have to continue along North Road to Claverton Down Road, or expedite a turn using residential roads to the south of North Road (Cleveland Walk-Sham Castle Lane) to return to the A36 via North Road. Roads in the new Holburne Park development (former MOD site) might also be used for turning to avoid zone entry, or Minster Way.

An identified 'fall back' position would be to include the Pulteney Estate only, so with a revised boundary incorporating four new cordon points as follows:

- Bathwick Street: At the junction with Beckford Road and Sydney Place;
- Sutton Street: At the junction with the A36;
- Great Pulteney Street: At the junction with the A36; and
- Vane Street: At Bathwick Roundabout.

This would remove the need for the currently proposed cordon points on Bathwick Street at Cleveland Bridge, and on Pulteney Bridge. It should be re-iterated, however, that this partial change is not needed for compliance. As such, it can be expected to worsen the economic case, although this is not expected to be to a significant degree.

The part of Bathwick to the north of Beckford Road, so the part accessed off Forrester Road and Beckford Gardens, could be included as part of the extension noted above. However, this is not considered necessary as on-street parking in this area is already wholly controlled by RPZ 10. However, further extension including this and to cover a much wider area of Bathwick might be considered at some point in the future if subsequent CAZ implementation is shown to introduce undesirable parking or rat-running effects which are not addressable with normal parking or traffic management controls. If so, the A36/North Road junction and the section of North Road as far as Cleveland Walk may need to be included as an addition to the area suggested by PERA to prevent an

undesirable increase in 'avoidance' traffic past King Edward's School. As noted however, this will create an entrapment issue for non-compliant HGV's, as any proceeding northbound beyond the A36(T)/B3108 Lower Stoke junction at Winsley will have no suitable opportunity to avoid zone entry. In contrast, non-compliant HGVs entering Bath on the A46(T) will have signed turn-back opportunities much closer to the CAZ entry point on the A4 London Road at either Lambridge Interchange or the Gloucester Road junction.

4.3 Bathampton

Including Bathampton would create the need for an 'outlier' sub-zone. This is because there is no logical way of 'linking' this 'outlier' through Bathwick to form an extension of the main zone. The creation of an 'outlier' CAZ in addition to the main zone covering the central area is considered to create a possible precedent for inclusion of other 'requested' sub-zones in Bath. As noted earlier, there is no case for the inclusion of Bathampton to achieve air quality compliance by 2021. Furthermore, whilst some increased traffic use of Bathampton Lane and Mill Lane is predicted, the level of this expected increase is not excessive.

The ability for 'growth' to be accommodated in the weekday peak hours is already heavily constrained by the capacity available at the toll bridge, a fact that will be well known to local drivers. As such, the potential for diversionary growth in traffic usage with the CAZ in place will be confined to the inter-peak period, when capacity to accommodate it exists. This view is supported by ATC data collected on Toll Bridge Road in November-2018. This is very consistent with the 2014 counts used for the GBATH calibration/validation. Looking at the two-way flows, these 'peak' at about 440-460vph in the two weekday peak hours, so not much different to the situation with 2014 data. However, the average two-way flow in the weekday inter-peak (10 am-4 pm) has risen to 305 vph in this data, so is clearly the period in which growth over the 2014-2018 has occurred. With Enterprise Area (EA) development related growth in the City Centre expected to add traffic pressure to the road network on the eastern side of Bath by 2021, increased use of the Mill Lane/Bathampton Lane route in the inter-peak period is highly likely to occur irrespective of the CAZ. This will need to be taken on board in any post-CAZ monitoring of this route, insofar as an increase in inter-peak traffic usage over time will not necessarily be the sole result of the CAZ, but equally likely to be a 'growth' impact resulting in diversionary re-routing away from already congested highway operating conditions at the A4/Cleveland Place junction and Bathwick Street (NB) throughout the working day.

Another concern in including Bathampton is that encompassing the toll bridge would leave no available crossing point over the River Avon on the east side of the city for non-compliant car drivers to use, with the alternative option well south of Bath at Winsley (B3108). It is accepted that a higher proportion of non-compliant traffic using Bathampton Lane and Mill Lane as an avoidance route is undesirable, but the effect of this and the net increase in traffic predicted is not shown to result in any air quality exceedances in Bathampton with a Class D CAZ as proposed in place. In view of all these considerations, it is considered there is no case for including Bathampton in the CAZ at outset, which as stated would need to be treated as a sub-zone.

Notwithstanding the above there will be a need for a programme of regular monitoring to establish changing traffic flows and potentially journey times on the Bathampton Lane/Mill Lane/Toll Bridge Road route in the pre-CAZ and post-CAZ scenarios. Pre-monitoring will be needed to establish the natural growth trend up to the CAZ launch. Comparison of 2014 and 2018 flows set out in this Note has shown no appreciable change in two-way 'peak' weekday flows at the Toll Bridge, but a perceivable growth change in the average inter-peak hour flow over the period 2014-2018. Further data collection up to CAZ implementation will enable what appears to be an underlying growth trend to be established. In the post-CAZ scenario, this can then be accounted for in establishing any true 'extra-over' effects of the CAZ. If the outcome from future comparison analyses does reveal a net impact of significance, then a decision could be taken then to introduce an 'outlier' CAZ if required, subject of course to a full public consultation. As the route is already subject to a 4-ton weight restriction and has traffic calming and a 20mph speed restriction in parts, it is considered that little could be achieved using further formal traffic management measures to deter vehicle usage. Increasing charges on the Toll Bridge is also outside of the control of B&NES.

Appendix C. Technical note on wider displacement

Subject	CAZ Diversion Impact to East of Bath	Project Name	Bath Clean Air Plan
Attention	B&NES Council	Project No.	674726.BR.42
Author	JB		
Checked by	BL		
Date	March 2019		

1. Introduction

In 2017 the government published a UK Air Quality Plan for Nitrogen Dioxide¹ setting out how compliance with the EU Limit Value for annual mean NO₂ will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, B&NES, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how B&NES will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance B&NES is considering implementation of a Clean Air Zone (CAZ), including both charging and non-charging measures, in order to achieve sufficient improvement in air quality and public health.

This note provides a high-level analysis of the potential impact of a Class D Charging Clean Air Zone (CAZ) in terms of diversion of A36 North-South through trips onto routes to the east of the city. For reference, the proposed CAZ boundary (as per the October 2018 draft OBC) is shown in

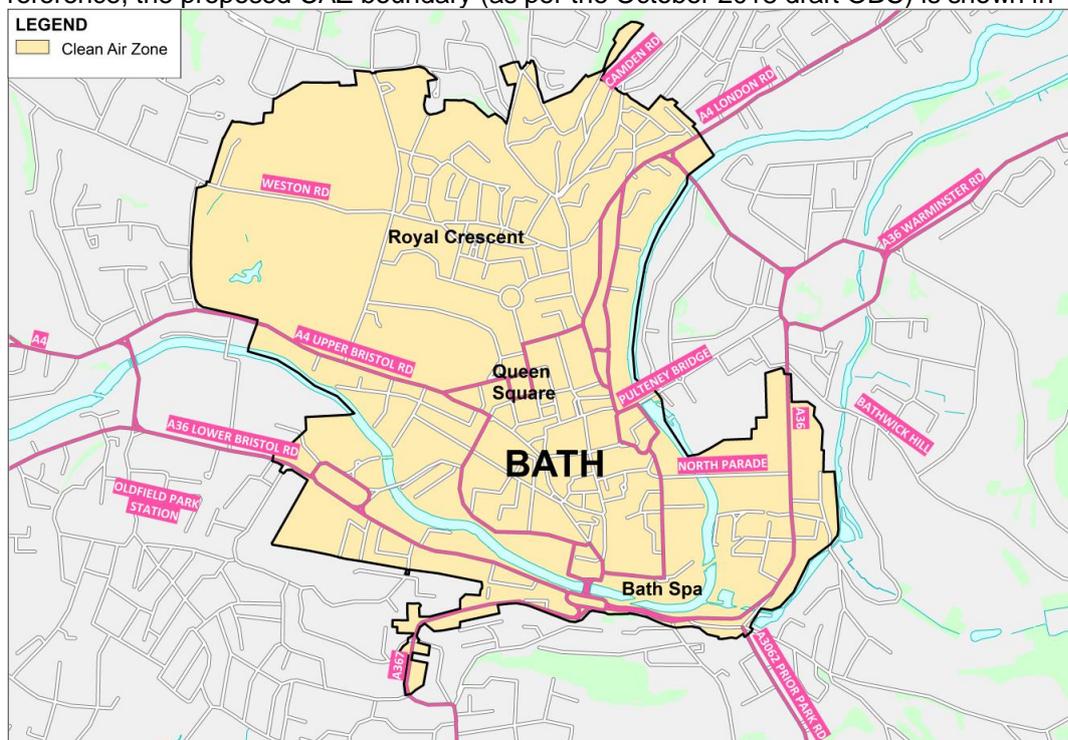


Figure 1 below.

¹ <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

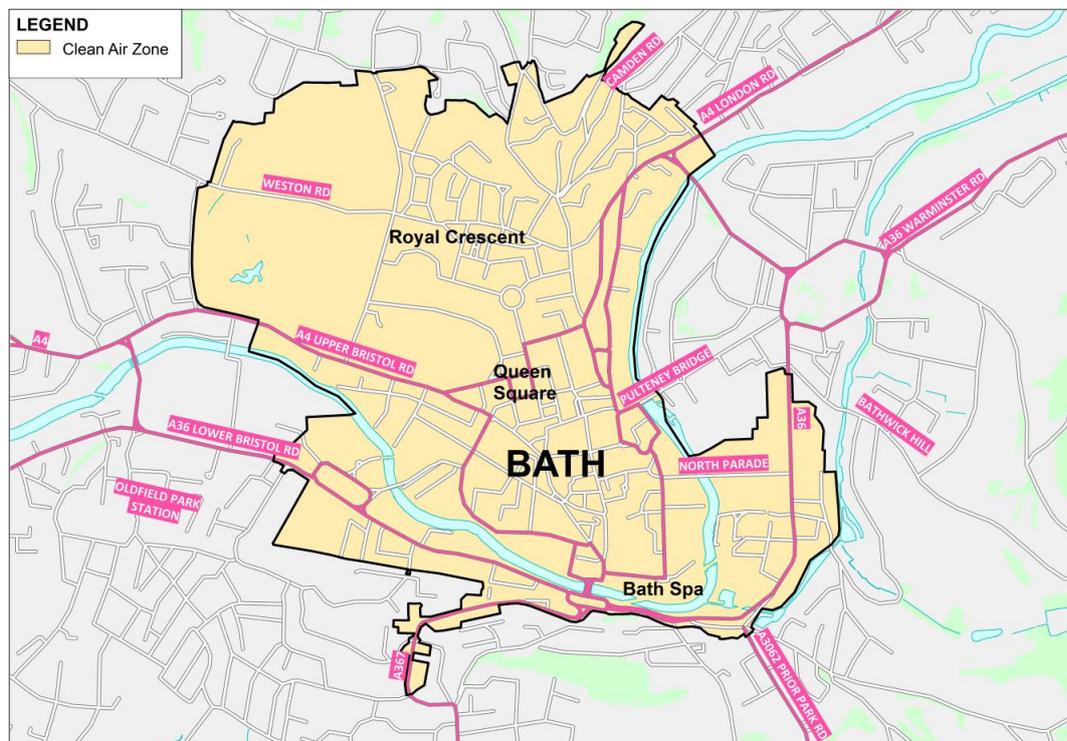


Figure 1: Proposed Boundary in draft OBC

This note provides a summary of the analysis undertaken during the assessment of the Bath CAP.

2. Trips Impacted by CAZ

2.1 Availability of Modelling and Data

Modelling of the CAZ work was undertaken in the latest iteration of the GBATH model. The study area and validation of this model is focused on the City of Bath itself and as such towns to the east are in the 'external' area of the model and, while flows between them and Bath would be expected to be accurate, flows within them may not be.

A 32 site two-week ANPR survey in November 2017 was undertaken in Bath to support the analysis of the CAP. This covered an outer cordon around the edge of the city, an inner cordon covering the central 2km diameter of Bath and also camera sites at the major car park entrances and exits. DVLA data for each number plate was obtained, providing full information on the vehicle including the type, size, fuel and euro standard allowing the compliancy with the Defra CAZ Framework² criteria to be assessed.

Wiltshire County Council has provided some further data consisting of a number of ATC sites across south west Wiltshire and a 5 site ANPR survey cordon of the town of Westbury.

² Defra & DfT (May 2017) *Clean Air Zone Framework: Principles for setting up Clean Air Zones in England.*
<https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england>

2.2 Analysis of ANPR Data

A maximum level of potentially impacted, and therefore diverted, traffic can be established from the Bath ANPR survey. Specifically, the survey had sites on the A46 to the north of Bath, on London Rd, just to the east of the Cleveland Place junction and either side of Bathampton on the A36 providing an accurate picture of the quantity of traffic using the strategic route and how much of this is non-compliant.

Analysis of the trip chains of the ANPR data indicates there were an average of 2,300 daily movements making that strategic route of which approximately 450 were HGVs. Filtering down to traffic that is non-compliant with CAZ standards and would have to pay any charge indicates around 1,200 daily vehicles, of which 175 were HGVs.

By the time any CAZ is implemented by 2021 the numbers of non-compliant vehicles are already expected to have reduced significantly due to the ongoing replacement of vehicles. Projections used in the modelling were provided by Defra via their Emissions Factor Toolkit indicate that the number of non-compliant cars and LGVs is expected to have halved by 2021, while the number of non-compliant HGVs is expected to have reduced by over 60%.

Taking that into account would put an upper limit on the number of non-compliant through trips at 565 on a typical weekday, with 65 of those being HGVs.

2.3 Data from Wiltshire Council

The counts provided by Wiltshire Council indicate typical daily two-way volumes of 7,000 vehicles on the B3108 north of Winsley, 12,000 (12hr 07:00-19:00) on the A350 to on the northern edge of Westbury and 12,500 on the A363 between Bradford on Avon and Farleigh Wick.

2.4 Analysis of Traffic Model Outputs

It is expected that a high number of the uncompliant trips in 2021 would replace their vehicle with a compliant one in response to the proposed CAZ. This behaviour is particularly anticipated for HGVs as a large proportion of the HGV fleet is national, and 27 other local authorities are considering implementing a charging CAZ as part of their CAP, including Bristol. Under the Defra CAZ Framework, HGVs are charged under all but one class of CAZ.

The detailed assessment work undertaken suggests that around 50% of non-compliant cars, 65% of non-compliant LGVs and 80% of non-compliant HGVs will replace their vehicle in response to the proposed CAZ.

The actual response of vehicles will vary somewhat based on the trips they are undertaking, for instance a trip travelling through Bath may have an option to avoid the zone, whilst a trip travelling into the zone does not. The outputs from the highway models will therefore provide an estimation on the final impact of the CAZ.

Looking at the differences between the baseline model (2021 scenario without CAP) and the proposed CAZ model shows a small increase in traffic on the B3109 of around 80 PCU (passenger car units) a day north of Bradford on Avon and 30 south of it. There is also a slight increase in traffic of around 30 PCU a day on the B3108 to the west of Bradford-on-Avon. However, there are reductions of around 100 PCU on the A363 between Bradford-on-Avon and Bathford and 70 on the route between Bradford-on-Avon and Holt. In Bradford-on-Avon there are both small increases and decreases in traffic, but the overall change is a slight reduction. The model shows no significant impact upon Westbury.

A number of select link analyses were also performed on the A36, A46 and A350 to establish the level of diversion induced by the CAZ. It was found that the diversion to the A350 was less than 1 PCU in the AM and PM peaks. There was also minimal impact found on the B3109 suggesting that traffic changes on the B3109 are from traffic rerouting locally rather than in the wider region. Despite the overall traffic drop on the A363, there was some use of this as a diversion by traffic on the A46 north of bath however the change was a maximum of 6 pcu in any modelled hour.

It should be considered that the responses to the CAZ are complex and interconnected. The CAZ removes some traffic from the network entirely through trips that change mode or no longer travel at all, this in turn reduces delay within Bath which attracts back trips that may have been diverting around the city already. Considerable numbers of trips from towns like Bradford on Avon also commute to Bath and changes to their behaviour will impact along the length of the trip including within the town of origin.

3. Summary

The total number of non-compliant through trips forecast to be affected by the proposed CAZ in Bath in 2021 would represent, at most, 5% of the traffic already using roads such as the A363 and A350. It is expected that only a small proportion will avoid the zone and those would not all divert along the same route. Traffic travelling to and from the east of Bath will also respond to the CAZ in a number of interconnected ways and the vast majority of the countries HGV fleet is expected to be compliant as a result of the implementation of CAZs in a number of cities.

The forecast impact of the CAZ on roads to the east of Bath therefore is expected to be overall neutral with individual changes in volumes making up at most 1% reductions or increases in daily volume.

As part of the Clean Air Plan, B&NES is proposing to expand its network of traffic and air quality monitoring in order to understand the impact of the CAZ. This could be further extended to include analysis of similar monitoring data collected by Wiltshire Council. The analysis of the data collected in Wiltshire can then be used within the ongoing assessment of the scheme performance and inform appropriate refinements should they be deemed necessary by B&NES.