



Bath Clean Air Plan

Bath and North East Somerset Council

Options Assessment Report

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Acronyms and Abbreviations

AQMA	Air Quality Management Area
AQAP	Air Quality Action Plan
AQO	Air Quality Objective
B&NES	Bath and North East Somerset
CAF	Clean Air Fund
CAP	Clean Air Plan
CAZ	Clean Air Zone
CBTF	Clean Bus Technology Fund
CSF	Critical Success Factor
Defra	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DSP	Delivery and Servicing Plans
EFT	Emissions Factor Toolkit
EU	European Union
EV	Electric Vehicle
FBC	Full Business Case
GUL	Go Ultra Low
HGV	Heavy Goods Vehicle
JAQU	Joint Air Quality Unit
LA	Local Authority
LCWIP	Local Cycling and Walking Infrastructure Plan
LEV	Low Emissions Vehicle
LGV	Light Goods Vehicle
MaaS	Mobility as a Service
NO _x	Nitrogen Oxides
NO ₂	Nitrogen Dioxide
OBC	Outline Business Case
P&R	Park and Ride

PHV	Private Hire Vehicle
SOC	Strategic Outline Case
TRO	Traffic Regulation Order
ULEV	Ultra-Low Emissions Vehicle
VMS	Variable Message Sign
Class A CAZ	Charging pre-Euro 4 petrol and pre-Euro 6 diesel buses, coaches, taxis, private hire vehicles
Class B CAZ	Charging pre-Euro 4 petrol and pre-Euro 6 diesel buses, coaches, taxis, private hire vehicles and HGVs
Class C CAZ	Charging pre-Euro 4 petrol and pre-Euro 6 diesel buses, coaches, taxis, private hire vehicles, HGVs and LGVs
Class D CAZ	Charging pre-Euro 4 petrol and pre-Euro 6 diesel buses, coaches, taxis, private hire vehicles, HGVs, LGVs and cars

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 working towards 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) and Full Business Case (FBC) 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 assessed the shortlist of options set out in the Strategic Outline Case³ and proposed a preferred option including details of delivery. The FBC develops the preferred option set out in the OBC, detailing the commercial, financial and management requirements to implement and operate the scheme. The OBC and FBC form a bid to central government for funding to implement the CAP.

1.1 Purpose of This Report

This document is written to support the OBC and FBC and provides an overview of the option identification and selection process, both for charging and non-charging measures. It sets out the options being considered, their impact on NO₂ levels and the sources of funding that can be accessed to deliver them. It then describes the sifting process that was carried out to determine which options were selected and seeks to classify the options into groups defining how and when they will be implemented and funded.

1.2 Funding Sources

There are four main funding sources available for the implementation of CAZ. These are:

- **A £255 million Implementation Fund** - this is designed to support local authorities in the planning and delivery of targeted action to improve air quality.
- **An Early Measures Fund** - this is expected to support small, ambitious and good value early measures to improve air quality and pre-emptively start to reduce concentrations in the Clean Air Zone. A maximum of £3 million per local authority has been allocated for this funding which is part of the Clean Air Fund.
- **A £220 million Clean Air Fund** - an opportunity for local authorities to implement additional measures tailored to their area, which minimise the potential impact of local air quality plans - either by enabling the local authority to implement local plans that collectively impact on fewer people, or by providing direct support to those impacted.
- **Surplus Revenue from CAZ charges** - funding will become available from the charges that are applied to each CAZ.

The cost of the final measures included in the CAP is covered in FBC-21: 'Explanatory Note on CAZ System Cost Estimates' in Appendix I of the FBC.

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

² <https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution>

³ <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_annexes.pdf)

1.3 Strategic Outline Case Selection Process

An initial option identification and selection process was undertaken in the SOC³ which identified a shortlist of packages including both charging and non-charging measures. The shortlist was developed by assessing each of the potential options against a list of Critical Success Factors (CSFs), which were defined in accordance with the JAQU guidance. These are listed below:

Primary Critical Success Factor

- Deliver compliance with NO₂ air quality Limit Values and Air Quality Objectives in the shortest possible timescales

Secondary Critical Success Factors

- Strategic:
 - All trip purposes treated equitably
 - Compliance with Defra Draft CAZ framework, including minimum requirements
- Economic:
 - Mitigate financial impact on low income groups
 - Maximise health improvements for low income groups
 - Net economic benefit
 - Improve general public health
- Commercial:
 - Is the market able to supply in the time available?
- Financial:
 - Likelihood of revenue equating to implementation/operational costs⁴
 - Upfront capital required for scheme⁴
 - Risk of financial penalty to the Council/s
- Management:
 - Public acceptability
 - Local, regional and national political acceptability

1.3.1 Strategic Outline Case Final Options

After applying the CSFs the final shortlist presented in the SOC was:

- **Option 1** – Benchmark Option – Small Area Class C CAZ. In line with JAQU's Option Appraisal Guidance, the lowest class required to achieve compliance in the shortest possible timescales.
- **Option 2** – Small Area Class B CAZ with complementary non-charging interventions (including walking/cycling priority schemes, cycle parking, public transport route improvements, increased use of variable message signs, targeted traffic management, some sunset periods, promotion of low emission vehicles).
- **Option 3** – Small Area Class C CAZ with complementary non-charging interventions (as listed above).
- **Option 4** – Small Area Class D CAZ with complementary non-charging interventions (as listed above, plus expanded Go Ultra Low packages, car sharing priority parking, car club expansion)

⁴ Complying with the legal test which was set out by the High Court in November 2016 in R (ClientEarth) (NO₂) V Secretary of State for Environment Food and Rural Affairs [2016] EWHC 2740 (Admin), only shortlisted options which achieve compliance with the NO₂ Limit Value in the shortest possible time, are appraised across this criterion. The relevant analysis is presented in the Financial Case chapter.

The full shortlist of complementary non-charging measures included:

- Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking
- Extend walking and cycling priority schemes and encourage greater modal shift. Provide a safer environment for cycling and walking
- Implement reduced residents' parking permit cost for low emission vehicles
- Promote low emission vehicles for Hackney carriages/private hire through review of taxi licensing policy
- Implement public transport route improvements including bus priority, passenger information and waiting facilities (target particular routes and/or demographic areas)
- Use variable message signs to promote air quality improvement messages. Potentially mobile and real-time responsive signs
- Increase the number and/or usage of existing VMS signs to provide information about parking and reduce unnecessary trips into the city centre
- Targeted traffic management or improved bus priority on A367 Wells Road
- Sunset period to exempt Euro 5 diesel vehicles to enable longer for upgrades
- Replace experimental Traffic Regulation Order (TRO) for bus lane on London Road with permanent TRO
- Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city
- Pilot car sharing priority parking areas
- Expansion of car club network in Bath

Since the SOC was published a number of areas of the project have progressed in more detail, which requires the longlist of options and the shortlisting process to be re-evaluated as follows:

- More detailed modelling has been undertaken to enable a better understanding of the impact on air quality from the proposed schemes;
- JAQU have published additional guidance on the Clean Air Fund (CAF), which sets out the criteria that proposed mitigation measures must meet;
- B&NES have progressed a number of the shortlisted schemes in advance of the CAP being implemented and ongoing engagement activities have identified a number of additional non-charging measures; and
- A draft OBC has been consulted upon based on a Class D CAZ, including a previous revision of this report.

This report sets out the revised assessment of all potential measures and provides a final preferred package for the CAP, which the OBC and FBC seek funding from JAQU to implement.

2. Options Assessment Process

2.1 Summary

The options assessment process from SOC through to FBC, including key stages and options, is summarised in Figure 2.1. Further details are presented in Sections 3 to 5.

At each stage the options have been assessed and tested against the CSFs, and developed based on more detailed and sophisticated modelling, in order to determine the preferred option. Insight has been gained through feedback from consultation and engagement activities, which has also helped to shape the CAP through each stage.

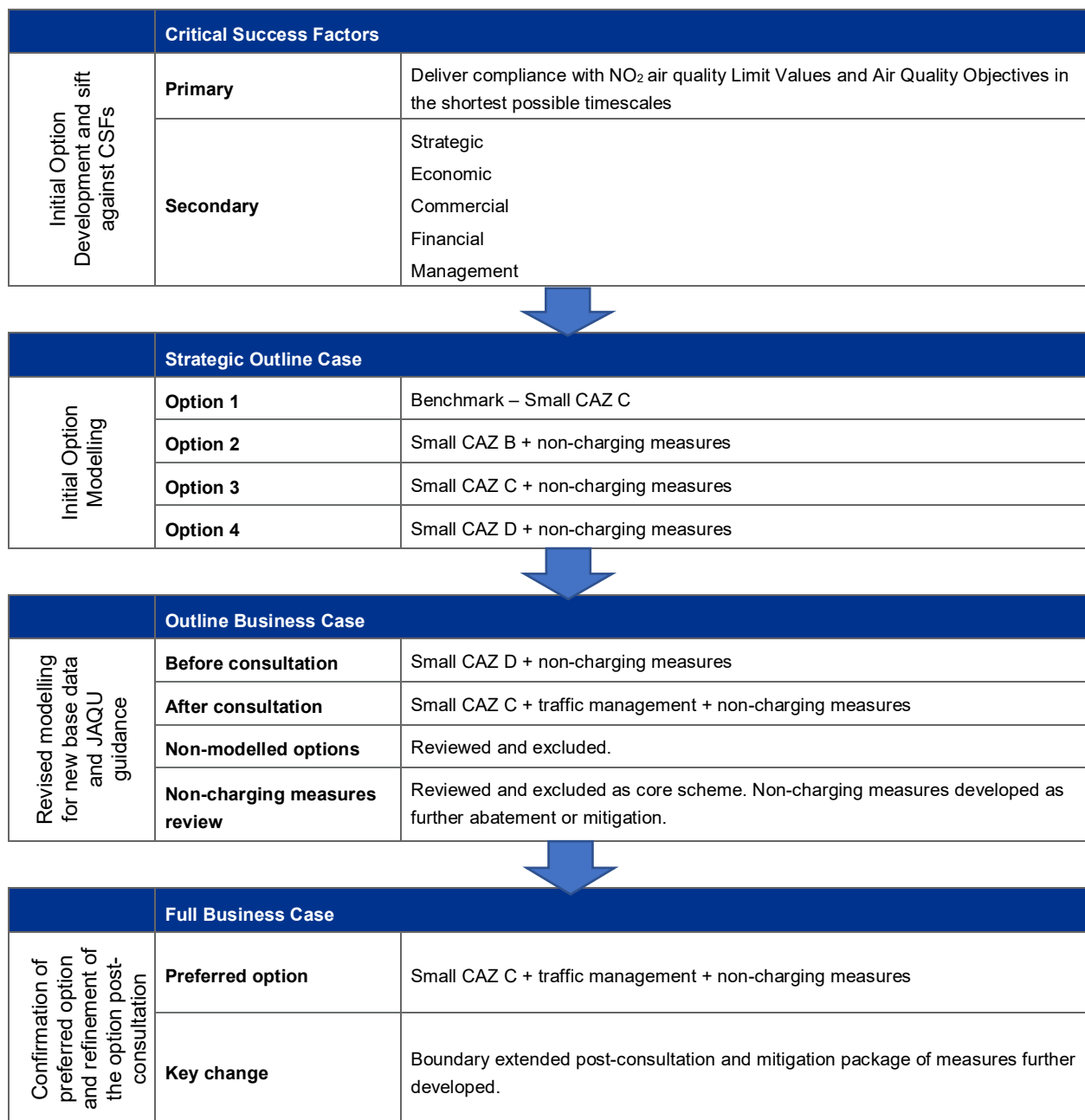


Figure 2.1: Options Assessment Process

3. Charging CAZ Options

3.1 Strategic Outline Case Shortlist

The SOC identified three possible charging CAZ measures which should be further assessed at the Outline Business Case stage to determine whether they could achieve compliance by 2021. These measures were:

- Small Class B CAZ (charging higher emissions buses, coaches, taxis and HGVs)
- Small Class C CAZ (charging higher emissions buses, coaches, taxis, HGVs and LGVs)
- Small Class D CAZ (charging higher emissions buses, coaches, taxis, HGVs, LGVs and cars)

The small zone boundary proposed within the SOC is shown in Figure 3.1.

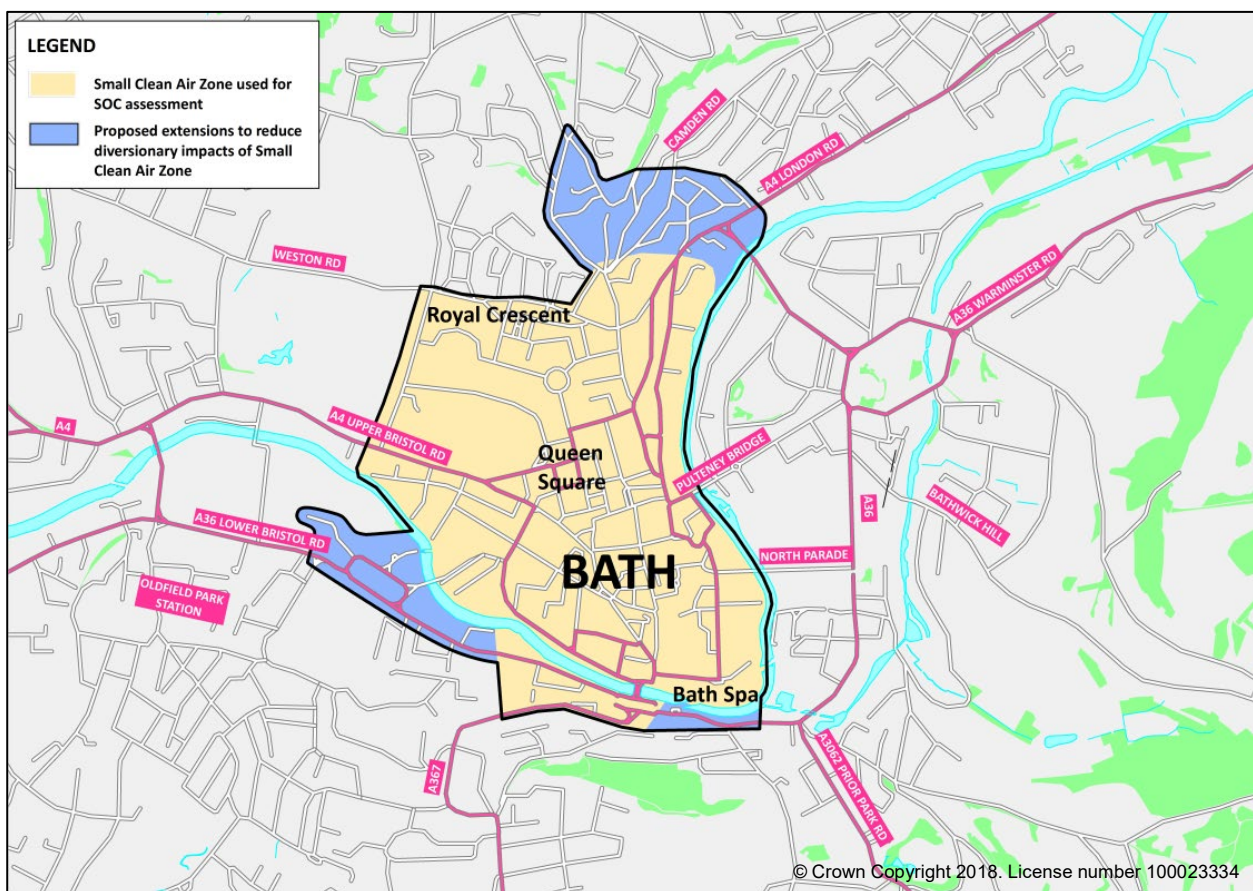


Figure 3.1: Small Zone Boundary in SOC

3.2 Outline Business Case Assessment

3.2.1 Boundary

During the development of the OBC a number of changes were made to the boundary for the following reasons:

- To reduce the potential impact of rat-running
- To provide safe opportunities for vehicles to turn-around before they enter the CAZ
- To rationalise the boundary in order to minimise the impact of additional street clutter (primarily signage and cameras)

- In response to other concerns raised during the public consultation process, where alterations could be accommodated to improve the acceptability of the measures proposed.

Full details of these boundary changes are provided in FBC-04 'Technical Note on Boundary Changes' in Appendix A of the FBC. The revised boundary is shown in Figure 3.2.

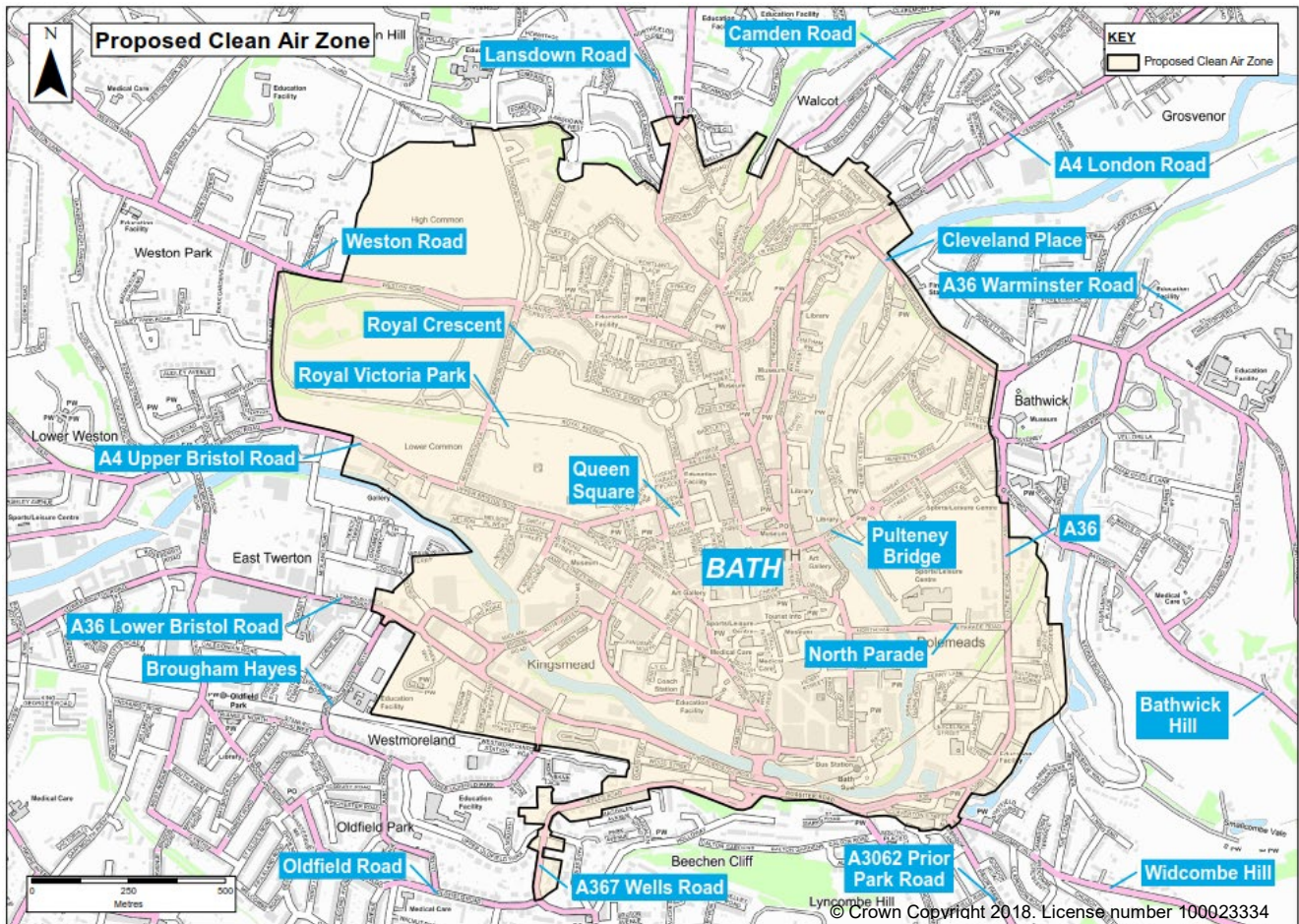


Figure 3.2: Revised Boundary in OBC

3.2.2 Options assessed

A detailed assessment of the impacts of these scheme proposals on air quality was undertaken within the OBC using traffic and air quality models. The options that were fully modelled are those which had been previously assessed as most likely to achieve the primary CSF (as listed in the SOC), along with variations of these as described below. For further clarity, the assessment process has been separated as 'options assessed prior to OBC consultation' and 'options assessed following OBC consultation'.

a) Options assessed prior to the OBC consultation

The assessment prior to consultation established that, of the schemes identified in the SOC, only a **Class D CAZ with a £9 charge for cars, taxis and LGVs**, achieved compliance by 2021. The assessment of this option also assumed a fully compliant bus fleet. This option was consulted upon in Autumn 2018.

Prior to consultation, a Class C CAZ with a £9 charge for cars, taxis and LGVs was found not to achieve compliance by 2021, with two exceedances remaining: Gay St, north of Queen Square, and London Road just to the west of the junction with Cleveland Place. It was found that, if additional traffic management measures were used to address these, there would be limited options available and it would be particularly challenging to implement a suitable scheme at London Road.

On London Road the likely change would be to remove the nearside westbound approach lane. This would both reduce traffic throughout and displace traffic away from the receptors (the ground floor/basement residences adjacent to the highway). This is a heavily used junction, and the reduced capacity at these signals could divert traffic around Camden Road and other rat runs through residential areas to the north. In addition, the reduced capacity is likely to cause an increase in congestion and queuing at this location as it currently forms part of a key route through the city. The signal control of this junction could be re-balanced to accommodate the reduced capacity on the western arm, but this would consequently increase queueing on both other arms, risking exceedances in these locations.

b) Options assessed after the OBC consultation

As part of the ongoing technical review process, refinements to the baseline air quality modelling to improve how gradients are represented were made during and after the public consultation on a Class D CAZ. Subsequently the revised assessment for a Class C CAZ indicated that a £9 charge for Taxis and LGVs now resulted in a single exceedance at Gay St ($42.0\mu\text{g}/\text{m}^3$, over the threshold of $40.0\mu\text{g}/\text{m}^3$) caused by localised traffic issues while the exceedance at London Road was no longer expected. It was therefore considered that traffic management measures at the Gay St location should be investigated further. This process resulted in a feasible scheme being developed for this location. When assessed, a new option comprising a **Class C CAZ with a £9 charge for Taxis and LGVs with a traffic management scheme** in place was found to also achieve the required compliance by 2021, the same year as the Class D CAZ option. The assessment of this option also assumed a fully compliant bus fleet. Full details of the traffic management proposals are presented in FBC-09 'Queen Square Traffic Management Scheme' in Appendix C of the FBC.

A further option was also assessed comprising **an alternative Class D CAZ, with the same traffic management measures as the Class C CAZ option, and offering a concession to Euro 4 and 5 diesel cars**. The rationale behind this is to ensure that the majority of cars are exempt from charge for an initial period, as this is not required to achieve compliance, yet allow the flexibility to remove or adjust the concession should air quality objectives not be achieved as predicted. This option has the potential to accelerate vehicle fleet composition improvements, and also drive behaviour change, by encouraging car owners to replace their higher emission cars with compliant, lower emission cars.

In response to feedback raised by the public consultation, assessment of a smaller zone with a Class D CAZ with a £9 charge for cars, taxis and LGVs was also undertaken and found to not achieve compliance by 2021. Full details of this are provided in FBC-25a 'OBC Consultation Response Report' located in Appendix Q of the FBC.

CAZ B options continued to be discarded as they have no potential to achieve compliance in the time required.

Full details of the air quality assessment results are provided in FBC-11 'AQ3 Air Quality Modelling Report' located in Appendix D of the FBC. It is noted that, whilst the modelling indicated that the options achieve compliance, the maximum concentration recorded for each option was between 39 and $40\mu\text{g}/\text{m}^3$. This is at, or very close to, the limit of compliance and thus uncertainty resulting from the modelling process or deviation from predicted responses to the proposed measures could adversely impact these results. In order to mitigate the effects of this, a comprehensive package of supporting complementary measures to further enhance the improvement in air quality was proposed to increase the likelihood of each option achieving compliance in the shortest possible time.

A number of potential exemptions/concessions have been considered for the charging schemes. A discussion of these is provided in FBC-05 'Technical Note on Scheme Design and Exemptions' in Appendix A of this FBC.

3.3 Discussion on Non-Modelled Options

3.3.1 Medium or Large Class C CAZ

Analysis of the Class C CAZ with a £9 charge for Taxis and LGVs, without any further traffic management measures, indicated that there is expected to be one exceedance within the small CAZ boundary at Gay St ($42.0\mu\text{g}/\text{m}^3$). As extending the boundary does not help to address this issue, expanding the CAZ boundary will not help to meet compliance by 2021 and as such this option was not considered further. Full detail of the development of the proposed boundary is provided in FBC-04 'Clean Air Zone Boundary Updates' in Appendix A of the FBC.

3.3.2 Class C CAZ with Further Increased Charge

Sensitivity testing indicated that a Class C CAZ with a higher charge might achieve compliance. Analysis of the responses would put a minimum level in the range of £15 to £20 for LGVs and Taxis, however, this may need to be much higher as there is significant uncertainty surrounding the response rates of LGVs and Taxis from the available data.

The stated preference survey data used to inform the LGV and Taxi response rates only considered charge levels up to £12.50. Thus, charging above this level requires extrapolation of the data. As such the sensitivity to charges close to and beyond this point is uncertain. There is particular concern that there would be a 'ceiling' in behavioural responses where, after a certain point, the vehicles that remain paying the charge are unlikely to be deterred by further increases in charges. This could be because they are either infrequent visitors (the automatic number plate recognition data showed that around two thirds of vehicle registration numbers were only seen on a single day of the fortnight in the inner cordon) or have the capacity to pass the charge on to others. An example is where LGV drivers are often employees, not owner drivers, so would not pay the charge directly, rather this would be borne by the business.

As well as the technical uncertainties about achieving compliance, there are also other concerns about such an approach, including the following:

- Reduced equity in levying a higher charge on LGVs and Taxis and not on buses, coaches or HGVs.
- Unlikely to achieve support for a scheme that charges considerably more for these vehicles than the £12.50 charge under the London ULEZ.
- A lack of data about the impacted groups, and the difficulty of drawing definitive conclusions from data where the vehicle owner and vehicle driver could well be different.
- Likely to be perceived as overly-restrictive on businesses, especially bearing in mind that businesses are already identified as being impacted by the proposals.

In conclusion there was a much lower confidence that this approach would be acceptable and therefore could deliver the required air quality compliance in the shortest possible time.

3.3.3 Non-Charging Measures Only

The reasons for dismissing the proposal to limit the scheme to non-charging measures were set out in full detail in Section 3.2.3 of the SOC, which was approved by JAQU in May 2018. The reasons are summarised in the following paragraphs.

Defra (in a report authored by Ricardo, May 2016)⁵ reviewed evidence of the effectiveness of road transport policy measures to improve air quality, to assist in the selection of measures and to estimate the future effects of such measures on air quality. Over 400 academic papers were reviewed to assess the impact of 72 policy measures on improving air quality. According to the study, the most effective measures were accelerating the uptake of Euro 6 cars, vans and HGVs, increasing the uptake of hybrid technology, greening taxi fleets, as well

as traffic management (such as discouraging zone peripheral parking) and access control measures (such as low emission zones)⁵.

The SOC assessed the maximum potential impact of non-charging measures, looking at the impact of Bath's Air Quality Action Plan since 2006 on traffic levels, mode share and air quality monitoring sites. It estimated that a 5% reduction could be applied to the outputs from the Emissions Forecasting Toolkit (EFT) for the reference case as a proxy to reflect an ambitious level of mode shift that might be produced by non-charging measures (excluding access restriction/prohibition measures). This matched the change in car mode share achieved across Bath between 2001 and 2011 (from the census Journey to Work data) and so is highly unlikely to deliver in the timescales required for this Plan.

Even with this reduction, the EFT forecasts suggested that it would only bring forward compliance by one year to 2024. The additional measures required to achieve compliance by 2021 are unlikely to be deliverable and would not achieve compliance ahead of a charging scheme.

The more detailed modelling for the OBC showed even greater levels of NO₂ exceedances in the baseline scenario than in the SOC, and so provides further justification of the earlier reasoning for dismissing this option. In summary the number and impact of non-charging measures that could be delivered would not achieve compliance within the timescales required.

3.4 Full Business Case

For the FBC, the preferred option of a **Class C CAZ with a £9 charge for Taxis and LGVs with a traffic management scheme** was further assessed for a proposed change to the boundary and found to still achieve the required compliance by 2021. As with the options identified in the OBC, the assessment of this option assumed a fully compliant bus fleet. No further abatement measures were identified to be required for compliance.

The changes to the boundary were made primarily for public and political acceptability of the scheme based on feedback from the public consultation at OBC stage.

The details of the final scheme were subject to further public consultation in September and October 2019.

The revised boundary is presented in Figure 3.3, and full details of these boundary changes are provided in FBC-04 'Technical Note on Boundary Changes' in Appendix A of this FBC.

⁵ Defra, Ricardo, 'Exploring and appraising proposed measures to tackle air quality' (May 2016).

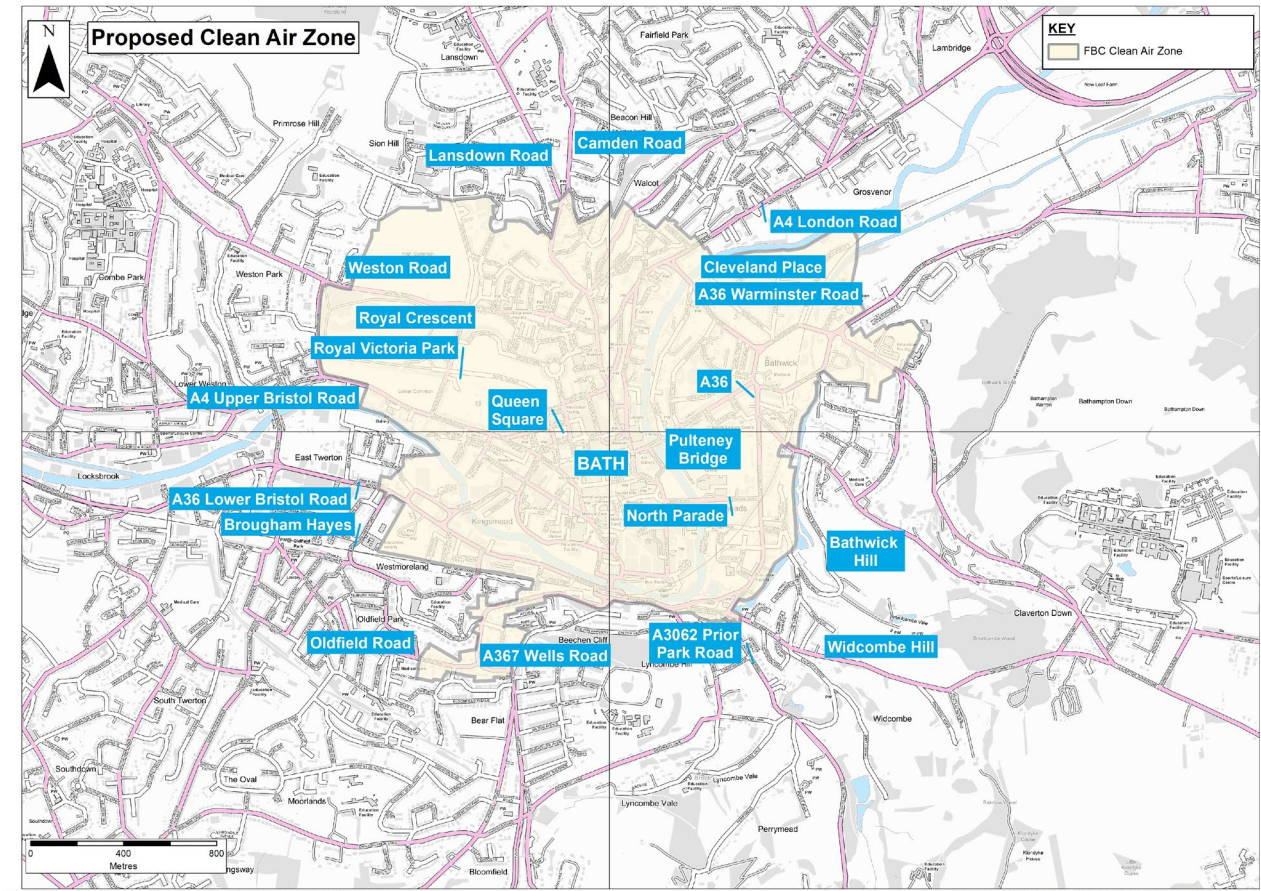


Figure 3.3: Revised Boundary in FBC

Full details of the air quality assessment results are provided in FBC-11 'AQ3 Air Quality Modelling Report' located in Appendix D of this FBC.

4. Non-Charging Measures Selection - OBC

4.1 Sifting Process

A long list of non-charging measures was created during the SOC stage of the project. The long list considered a broad range of options to both improve air quality and mitigate the negative impacts the CAP may have on certain groups.

With the CAF now targeted to mitigating the impact of any CAZ on those most affected, some of the criteria against which the measures should be assessed have been altered since the SOC. A number of additional measures were added to this list during the evolution of the project as a response to this and other factors, including the outcomes of the public consultation on a Class D CAZ and the Class C CAZ with traffic management option now under consideration. Therefore, the revised and expanded long list was re-evaluated against a set of revised feasibility criteria to establish which measures should be included in this project and to which funding source they are allocated.

The revised process for determining a shortlist is set out in Figure 4.1.

The revised long list of options is set out in **Appendix A** of this document.

Step 1 – Assessment of All Options: Each scheme on the long list was initially assessed for delivery timescales. If the measure could be delivered by 2021, (when compliance is required to be achieved), then it was assessed against the primary CSF (delivering air quality improvement) and then against the secondary CSFs. Measures scoring well on these criteria were considered necessary ‘abatement’ i.e. measures that would form part of the package needed to achieve compliance and progressed to the next stage.

For the remaining measures, a high-level assessment in two areas was undertaken:

- Potential to mitigate the impacts of a CAZ on:
 - Lower income households and individuals
 - Local Businesses
- Potential as a lower priority abatement option
 - These are measures that were not deemed as primary abatement necessary to achieve compliance but would still provide an air quality benefit as they incentivise changes to other modes or to compliant vehicles and are able to be scaled and therefore could be used to enhance the likelihood of achieving compliance.

Measures with potential in at least one of these areas were also progressed to the next stage. The remaining measures with no potential as either abatement or mitigation were classed as either rejected, postponed or reallocated based on the general benefits of the measure and any potential overlap with existing work. For example, some measures are already listed in other policy documents and are likely to progress or be further considered in the future on their own merits as separate projects.

The analysis of each of the options in the long list following this process can be seen in Appendix A of this document, sheet “Step 1 - Evaluation of Non-Charging Measures”.

Step 2 – Assessment of All Feasible Options: This stage collates the feasible options from the previous stage.

Schemes identified as having mitigation potential were scored accordingly against a second set of criteria, defined in accordance with the JAQU CAF guidance, and informed by the Distributional and Equalities Impact Assessment (see FBC-19 ‘Distributional and Equalities Impact Analysis’ in Appendix G of this FBC) The criteria for this are:

- Ability for a measure to mitigate impacts on low income households;

- Ability for a measure to mitigate impacts on local businesses;
- Value for money; and,
- Public acceptability.

Considering this, and the earlier scoring on the abatement criteria the measures were then considered within the contexts of both a Class C and a Class D CAZ and a decision reached for both on the classification of the measure and the funding stream:

- **Necessary Abatement**
 - Measure required to achieve compliance as part of the Clean Air Plan for the Class of CAZ considered (Implementation Fund)
- **Scalable Abatement**
 - Measure is scalable and would contribute to air quality improvements and increase the likelihood of achieving compliance in the shortest time possible (Implementation Fund and/or Clean Air Fund)
- **Mitigation**
 - Measure scores well on the mitigation criteria (Clean Air Fund and/or Revenue dependent on timescales).
- **Progressing**
 - Measure already being progressed (Early Measures Fund)
- **Reject**
 - Measure does not score highly.

Measures were classified differently within the context of the class of CAZ considered. For example, a measure that helps non-compliant car users to switch vehicles or modes would be considered as mitigation under a Class D and as scalable abatement under a Class C, in recognition of the contribution to air quality improvement and increasing the likelihood of achieving compliance in the shortest time possible.

4.1.1 Final Sifting Outputs

The possible outcomes of the sifting process for each measure are:

- **Reject:** Schemes with little potential to satisfy either scoring criteria or with significant deliverability issues.
- **Postpone\Reallocate:** Schemes and measures to be, or that are already being, considered as part of other funded work in the region.
- **Progressing:** Schemes already being implemented.
- **Necessary Abatement:** Schemes that will improve air quality. They are part of the set of measures being taken to achieve compliance in the shortest time possible and will therefore be implemented as part of the clean air plan.
- **Scalable Abatement:** Schemes that are scalable and would contribute to air quality improvement. These are measures that would increase the likelihood of achieving compliance in the shortest time possible.
- **Mitigation: CAF:** Schemes that will mitigate the impact of the CAZ and can be delivered as part of the CAP by 2021.
- **Mitigation: Revenue:** Schemes that will mitigate the impact of the CAZ but will be delivered after 2021.

The assessment and scoring of feasible options can be seen in Appendix A of this document, sheet "Step 2 - All Feasible". The final list of options under each of the categories mentioned above can be seen in Appendix A of this document, under the sheets with their respective names for both Class C and D clean air zones.

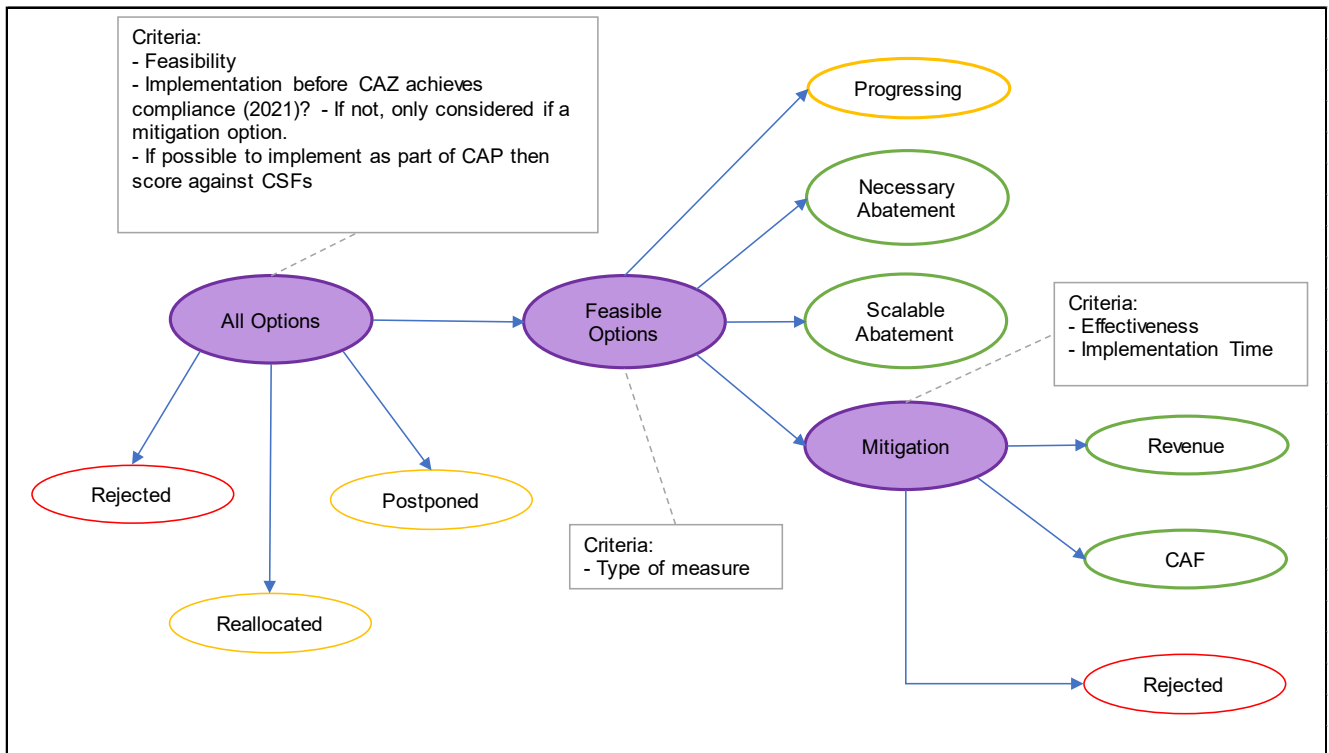


Figure 4.1: Shortlisting Process

4.2 Selected Measures

The measures in the tables below were selected for final inclusion in the CAP for each option and grouped as follows:

- Progressing – Measures already progressing.
- Abatement (necessary) – Measures required as part of the CAP option in order to achieve the necessary improvement in air quality (bid for under the Implementation Fund).
- Abatement (scalable) – Measures recommended as part of the CAP option in order to increase the likelihood of air quality compliance (bid for under the Implementation Fund).
- CAF – Measures required as part of the CAP in order to mitigate the adverse impacts of the charging scheme (bid for under the CAF).
- Revenue – Measures to provide additional mitigation of the adverse impacts of the charging scheme, however are either not expected to be deliverable by 2021 or are scalable schemes that could be expanded. These measures have potential to be funded from any surplus revenue that may be generated by the charging CAZ.

Table 4-1: Selected Non-Charging Measures – CAZ D schemes OBC stage

Progressing	BA-3: Reduced residents' parking permit cost for low emission vehicles.
	BA-14: Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO
	BA-27: Promote low emission vehicles for Hackney carriages/private hire through licensing.
Abatement (necessary)	BA-18: Retrofit funding for registered, local Euro 3/4/5 buses.
	BA-21: Anti-idling enforcement/publicity of impacts; school zig zag enforcement.
	BA-33: Weight restriction enforcement
CAF	BA-1: Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking
	BA-2: Options to improve cycling and walking experience, aimed at encouraging modal shift.
	BA-6: Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy
	BA-19b: Provide 24hr secure parking at all three Park and Ride sites to encourage overnight use and facilitate extended operating hours
	BA-20: Scoot/cycle to school initiative
	BA-23: Financial support (grants) for replacing pre-Euro 4 cars with compliant ones, including a Mobility as a Service pilot
	BA-28: Financial support (interest-free loans) for pre-Euro 6 diesel commercial vehicles, including loans for electric charging points on private land
	BA-29: Free Park and Ride concession.
	BA-32: Delivery and servicing plans for businesses
	BA-34: Bus priority measures at traffic signals
Revenue	BA-1: Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking
	BA-2: Options to improve cycling and walking experience, aimed at encouraging modal shift.
	BA-4: Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city
	BA-6: Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy
	BA-8: Increased utilisation of car/van club network in Bath.
	BA-9: Implement public transport route improvements both on key corridors in/out of the city and within the CAZ
	BA-19a: Expand size of existing Park and Ride sites. Provide additional Park and Ride capacity at the university sites at weekends and during holiday periods.
	BA-22: Retrofit funding for registered, local Euro 4/5 HGVs, once the technology becomes available
	BA-25: Smaller Park and Ride sites on existing bus routes.
	BA-31: Credits for use in Mobility as a Service Scheme

Table 4-2: Selected Non-Charging Measures – CAZ C schemes OBC stage

Progressing	BA-3: Reduced residents' parking permit cost for low emission vehicles.
	BA-14: Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO
	BA-27: Promote low emission vehicles for Hackney carriages/private hire through licensing.
Abatement (Necessary)	BA-18: Retrofit funding for registered, local Euro 3/4/5 buses.
	BA-21: Anti-idling enforcement/publicity of impacts; school zig zag enforcement.
	BA-33: Weight restriction enforcement
	BA-35: Queen Square Traffic Management
Abatement (Scalable)	BA-1: Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking
	BA-2: Options to improve cycling and walking experience, aimed at encouraging modal shift.
	BA-6: Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy
	BA-19b: Provide 24 hr secure parking at all three Park and Ride sites to encourage overnight use and facilitate extended operating hours
	BA-20: Scoot/cycle to school initiative
	BA-23: Financial support (grants) for replacing pre-Euro 4 cars with compliant ones, including a Mobility as a Service pilot
	BA-29: Free Park and Ride concession.
	BA-34: Bus priority measures at traffic signals
CAF	BA-28: Financial support (interest-free loans) for pre-Euro 6 diesel commercial vehicles, including loans for electric charging points on private land
	BA-32: Delivery and servicing plans for businesses
Revenue	BA-1: Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking
	BA-2: Options to improve cycling and walking experience, aimed at encouraging modal shift.
	BA-4: Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city
	BA-6: Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy
	BA-8: Increased utilisation of car/van club network in Bath.
	BA-9: Implement public transport route improvements both on key corridors in/out of the city and within the CAZ
	BA-19a: Expand size of existing Park and Ride sites. Provide additional Park and Ride capacity at the university sites at weekends and during holiday periods.
	BA-22: Retrofit funding for registered, local Euro 4/5 HGVs, once the technology becomes available
	BA-25: Smaller Park and Ride sites on existing bus routes.
	BA-31: Credits for use in Mobility as a Service Scheme

A summary description of the non-charging measures considered in the long list of options in Table 4-1 and Table 4-2 above, is provided below:

BA-1: Provide additional cycle parking across the city centre in visible locations, secure cycle parking and pilot a management scheme to improve proper usage of cycle parking

Existing bike racks in central Bath are very busy and have very limited spare capacity. As further modal shift away from cars is encouraged, partly through the CAP, additional good quality facilities will be required. The

new parking racks would provide more options for parking bicycles, thus providing a potential alternative mode of transport to those affected by the CAZ charge.

The plan would include additional parking space at 10 locations on the footway, and at 6 locations on the carriageway. Each location would have 8 new bicycle parking hoops, for a total of 128 new cycle hoops.

It is also proposed to provide secure cycle parking and electric cycle charging in Manvers Street car park (lower level) and at the Park and Ride (P&R) sites.

Further cycle parking schemes could be delivered through any resulting revenue raised by the Clean Air Zone charges.

BA-2: Options to improve cycling and walking experience, aimed at encouraging modal shift

This would improve the attractiveness and practicality of alternative modes for those affected by the CAZ charge.

Schemes would include:

- Extending walking and cycling priority schemes;
- Introducing park and pedal schemes; and
- Providing a safer environment for cycling and walking and an improved public realm.

Three initial schemes were identified:

- a) Green Park Cycle Track
- b) Westmoreland Toucan Cycle Crossing
- c) Bathwick Towpath Improvements

Further routes have been considered as part of the Local Cycling and Walking Infrastructure Plan (LCWIP) work and are at various stages of design. However, none are sufficiently advanced to deliver as part of the Clean Air Fund. Instead it is anticipated that revenue funding can be used to support and enhance further routes.

BA-3: Reduced residents' parking permit cost for low emission vehicles

Residents and businesses changing their current vehicle for a ULEV vehicle would be eligible for a rebate on the annual cost of their parking permit. The scheme will be in place for three years. This measure will incentivise permit holders to choose ULEV vehicles, which do not emit NO₂, therefore, reducing overall levels of NO₂ pollution within Bath. A bid for this scheme was successful through the Early Measures Fund.

BA-4: Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city

This would provide an alternative to those affected by the CAZ to travel in the area, and further encourage the uptake of cycling as a mean of transportation.

BA-6: Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy

Go Ultra Low (GUL) funding has been awarded to the West of England authorities to promote the uptake of electric vehicles (EVs). This funding will be used to procure new charging points across the region, nine of which would be in the Bath area. This measure would seek to expand the GUL proposal by adding 120 charging points including rapid and fast charging.

Six locations have been identified so far. Five of these would be upgrades of the GUL charge points to enable rapid charging, with an additional rapid charging point to be installed in Widcombe. The remaining charging points would be installed across the city, mainly within Council owned car parks. New charging points could

make acquiring an electric vehicle a viable option to some residents and local businesses affected by the CAZ charge. It would also encourage the uptake of EVs, which would have a positive impact on air quality.

A policy document on the location of and management of on street charging sites would be produced.

BA-8: Increased utilisation of car/van club network in Bath.

This would provide CAZ compliant alternatives to residents, primarily for ad hoc travel purposes such as shopping and other personal business.

BA-9: Implement public transport route improvements both on key corridors in/out of the city and within the CAZ

Adopting these changes to the bus system would improve the travel experience and encourage its use, thus providing a better alternative for those currently driving into the city. The following measures were considered:

- Bus stop upgrades, involving improvements such as raised kerbs, shelters, RTI units, hard standings, access paths and crossing points. These are planned for the following corridors:
 - Bath – Corsham – Chippenham
 - Bath – Midford – Frome
- New bus lane on A4/A46 roundabout consisting of a by-pass slip road from Batheaston Bypass into London Road.
- Opening the pedestrian bridge behind the bus station to buses, thus reducing travel times and congestion around the bus station.
- More bus priority lanes along key routes such as the A36, A4 and A367.

BA-14: Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO

A bus lane replaced one of the inbound lanes on London Road in 2017, thus both reducing general vehicle movements along London Road to one lane in each direction and moving the majority of the vehicles farther from the footways and residential properties alongside the road (with only buses using the lane adjacent to the footway). This has caused a significant reduction in concentrations at this site with the annual mean NO₂ concentration dropping from 60 µg/m³ in 2016 to 46 µg/m³ in 2017, a 14 µg/m³ reduction. This is primarily due to the change in road layout providing more space for produced pollutants to disperse farther from the footways and properties. This change has now been made permanent ensuring the air pollution concentrations do not rise again.

BA-18: Retrofit funding for registered, local Euro 3/4/5 buses

Upgrading local buses and coaches is key in achieving compliance on air pollution levels. Retrofitting the vehicles allows for this to be achieved at both a lower cost and environmental impact than fully replacing buses. This is particularly relevant for newer buses which have a significant remaining useful life.

Detailed discussions have been held with local bus operators to understand the existing bus fleet and how many of those vehicles the operators could reasonably manage to upgrade. This measure would provide the funds required for the local bus operators to complete final upgrades so that the entire fleet is compliant with the CAZ framework standards.

BA-19a: Expand existing Park and Ride site sizes. Provide additional Park and Ride capacity at the university sites at weekends and during holiday periods.

This would provide an alternative for drivers affected by the CAZ charge, particularly those who commute in from rural areas of B&NES. The current P&R sites are not currently at full capacity, but this may change in the future, particularly if a D Class CAZ is implemented.

This option cannot be implemented by 2021 since suitable land needs to be identified and planning permission obtained.

BA-19b: Provide 24hr secure parking at all three Park and Ride sites to encourage overnight use and facilitate extended operating hours

The extended opening hours of the P&R sites to 24-hour would help mitigate the impact the CAZ may have on local businesses and those working in/visiting the city by providing an option to park outside the city and avoid paying the charge. All day opening hours should widen the range of drivers for which P&R could be a viable alternative to driving into the city. Provision of secure parking (for example, CCTV & lighting) would further encourage use of P&R as a viable mode choice, increasing confidence in leaving cars parked overnight.

Extending the P&R opening times would provide great access for shift workers or those who start/end work outside of current opening time, giving them another option and encouraging mode shift. It will also give further option to those coming into Bath for evening entertainment, there were many comments during the consultation process saying the opening times of the P&R were prohibitive to some who would use it in the evening. The provision of secure parking would also encourage evening use and for night shift workers who would have increased confidence in leaving cars during the night. This measure would also improve air quality in Bath by reducing the number of vehicles in the city centre.

Under a CAZ C this measure would be a further abatement measure and would be primarily used to encourage modal shift to more people using the P&R, further driving improvements in air quality and ensuring compliance.

It is intended that this would be implemented at all three existing P&R sites.

BA-20: Scoot/cycle to school initiative

This initiative would encourage cycling, scooting and walking to schools through the following measures:

- Formalised Walking buses – school staff supported by parent volunteers who would pick pupils up at various locations on the journey to school.
- Bicycle/scooter storage units at schools.
- Cycle training package.

The scheme would be applied at schools considered to be significantly affected by the CAZ, which are those primary schools within 0.5 miles of the zone and secondary schools within 1 mile. This would provide parents with a viable alternative to driving into the CAZ for the school run. This measure would aim to increase the number of parents taking their children, or students travelling to school via active mode transport methods. This would have a double benefit; firstly removing cars from the road, especially during the congested AM peak hour, resulting in improved air quality, and also encouraging more families to travel by active modes, hence improving the health of the families.

Under a CAZ C, this would be a further abatement measure that would look to encourage a modal shift from personal vehicles to greater use of active transport modes. It would improve the health of families switching to these modes and help to further improve air quality in Bath by removing cars from the road, especially during the AM peak.

BA-21: Anti-idling enforcement/publicity of impacts; school zig zag enforcement.

Enforcement of anti-idling and school zig-zags would be undertaken by parking enforcement officers. Air quality hot spots and school entrances would be prioritised to reduce emissions at these locations. However, the locations may be altered depending on the progression of NO₂ concentrations towards the legal limits.

Enforcing anti-idling would have a direct impact on air quality levels. It would therefore be applied as part of the Clean Air Plan and contribute towards achieving compliance with the air quality legal levels.

BA-22: Retrofit funding for registered, local Euro 4/5 HGVs, once the technology become available

This would provide an alternative for HGVs to upgrade their vehicles without funding the cost of an entirely new vehicle. This would be considerably cheaper than buying a new vehicle and would have a smaller environmental impact, since vehicles with remaining useful life could still be utilised. Unfortunately, there are no approved technologies for retrofitting HGVs available at this time, but should they become available within the life of the project then surplus revenue could be used to provide funding to operators.

BA-23: Financial support (grants) for replacing pre-Euro 4 cars with compliant ones, including a Mobility as a Service pilot

Financial support was proposed to support socio-economic groups suffering from adverse affordability impacts associated with the cost of replacing vehicles with compliant ones. Support would be provided to people living and/or working in Bath, with a focus on low-income households (i.e. those receiving income support, child benefit, pension credit, etc.). The measure intended to make replacing vehicles with a compliant one more affordable. Upgrading vehicles would also have a positive impact on air quality, ensuring compliance.

Due to the scale and high costs of these schemes, a separate detailed assessment was made in order to exhibit how the impact on the most affected groups will be mitigated by the scheme. It also shows how the total figure for the funding bid has been obtained and how the scheme would be implemented. This can be found in the “Pre-Euro 4 Household Assistance Scheme” note appended to this OAR.

As part of this measure B&NES would engage with travel advisors to create a targeted promotional campaign to ensure that all people eligible for the scheme are notified. They will also be available to provide advice to those wishing to take up the scheme on the options available to them.

To encourage increased use of public transport, as part of this measure, B&NES seek to run a Mobility as a Service (MaaS) pilot scheme. This would be used to test the viability of offering mobility credits in place of a compliant vehicle. Depending on the results of the pilot, MaaS credits would be sought through the revenue raised by the CAZ as detailed in (BA-35).

BA-25: Smaller Park and Ride sites on existing bus routes

This would provide alternative to drivers affected by the CAZ charge, particularly those who commute in from rural areas of B&NES. It would further reduce air pollution and congestion in Bath. This option is at an early stage of development and no sites have been identified yet.

BA-27: Promote low emission vehicles for Hackney carriages/private hire through licensing

A revised taxi licensing policy was adopted in December 2018 to ensure that all licensed vehicles will be compliant with the CAZ scheme when it is introduced and the policy actively encourages the ownership of alternative fuelled vehicles.

BA-28: Financial support (interest-free loans) for pre-Euro 6 diesel commercial vehicles, including loans for electric charging points on private land

Financial support was proposed to support businesses to assist with the cost of replacing vehicles with compliant ones. Support would be provided to local business with a focus on taxi/private hire firms and businesses with a reliance on HGVs and LGVs. The upgraded vehicles would also have a positive impact on air quality, ensuring compliance.

Due to the scale and potentially high costs of these schemes, a detailed assessment was made in order to exhibit how the impact on affected businesses will be mitigated by the scheme. This would also demonstrate the approach to determining uptake and costs, along with how the scheme will be implemented. This can be found in the ‘Pre-Euro 6 Business Assistance Scheme’ note appended to this OAR.

Financial support for electric charging points was proposed to mitigate against the cost of replacing vehicles with electric ones. Support will be provided to businesses to allow for the installation of electric charging points on private land, making this option more affordable.

BA-29: Free Park and Ride concession

It is proposed that a free P&R concession would be available on application, lasting for an initial 12 months. It would be targeted at regular commuters, driving non-compliant vehicles, not already using the P&R sites in the AM peak, low-income households and families with children. The aim of the concession is to encourage modal shift to Park & Ride at peak times. Encouraging drivers away from driving into the city centre will also have a positive impact on air quality, ensuring compliance.

Feedback from the consultation revealed that many people were discouraged from using the P&R sites due to their relative high cost. This was particularly highlighted by families with children, for whom it could often be cheaper to park in the city centre.

Furthermore, the scheme could be targeted towards LGV users, particularly trade workers with jobs in the city centre, who might drive in once a week to drop off equipment and then P&R for rest of week. This could take more of some of the highest polluting vehicles away from Bath city centre and would be the primary focus of the measure under a CAZ C. Under a CAZ C this could be used as an abatement measure to encourage mode shift and further drive air quality improvements.

BA-31: Credits for use in Mobility as a Service Scheme

This measure would build upon the MaaS pilot scheme undertaken as part of measure BA-23. The MaaS Credits would be provided in place of a grant for new compliant vehicle to help encourage mode shift to public transport and reduce private car ownership.

This measure will drive a mode shift change from private cars to public transport, therefore, reducing the number of vehicles entering Bath city centre and leading to an improvement in air quality, thereby ensuring compliance.

BA-32: Delivery and servicing plans for businesses

There is currently an absence of infrastructure, such as consolidation services, which can help businesses to avoid the charges incurred by entering into the CAZ with non-compliant vehicles. There is evidence to demonstrate that specialist, sustainability-focused fleet and operations services, supported by Delivering and Servicing Plans (DSP), which may be likened to workplace travel plans for freight and servicing activities at businesses, can help businesses to adapt to the CAZ.

These plans could mitigate the impact of the CAZ on business by reducing and, in some cases, avoiding incurring charges as a result of more efficient operating practices and compliance with the zone requirements. An initial pilot would be carried out at FBC stage, with the scheme then being rolled out subject to the outcome of the pilot.

BA-33: Weight restriction enforcement

Enforcement of weight restrictions would be undertaken by the Council's Trading Standards Team. Enforcement at air quality hot spots would be prioritised with a view to reducing emissions at these key locations.

Enforcing weight restrictions would have a direct positive impact on air quality levels. It is therefore proposed as part of the CAP and will contribute towards achieving compliance.

BA-34: Bus priority measures at traffic signals

An exercise in traffic signal control optimisation would be undertaken to prioritise public transport. This would make use of public transport more attractive and encourage car users to change mode. As such this should also help to support air quality improvement, thereby ensuring compliance.

BA-35: Queen Square traffic management scheme (Class C CAZ only)

In order to provide a compliant CAP with a Class C CAZ, a traffic management scheme has been developed for the area around Queen Square. The scheme will be capable of limiting the flow of traffic into those areas that would otherwise exceed the legally permitted threshold during busy times of the day.

To achieve this outcome, two new traffic light junctions are required. These are proposed at the Queen Square junctions with the A367 Chapel Row/Princes Street and Queen Square Place. Where possible the scheme also proposes to provide enhanced public space and will provide new traffic light crossings for people using the area.

Further information is provided in the “Bath CAZ: Additional Traffic Management-Impacts” technical note.

5. Non-Charging Measures Selection - FBC

The compliant Class C CAZ scheme taken forward as the preferred option was achieved by the core charging scheme combined with traffic management measures at Queen Square, and a compliant bus fleet. It was subsequently recognised for the purposes of the FBC and the final CAF bid that it would be challenging to accurately and reliably model the additional abatement measures for cars in order that the air quality improvement in relation to value for money could be fully demonstrated.

Further research, development and detailed consideration of the options has resulted in a more targeted package of mitigation measures based on the impacted socio-economic groups, comprising predominantly of businesses. A series of measures have been identified from a long list of options. The full assessment and bid for funding are presented in FBC-46 Clean Air Fund Report in Appendix Y of this FBC.

The shortlisted items are:

- Expanding the existing Clean Bus Technology Fund (CBTF) programme by providing additional funding for retrofitting registered, local Euro 3/4/5 buses
- Financial support for replacing pre-Euro 6 diesel and pre-Euro 4 petrol non-compliant vehicles with compliant ones. This combines:
 - Financial support (grants) for replacing pre-Euro 6 diesel and pre-Euro 4 petrol vehicles and taxis/PHVs with compliant ones
 - Financial support (interest-free finance) for replacing pre-Euro 6 diesel and pre-Euro 4 petrol vehicles and taxis/PHVs with compliant ones
 - Complementary financial support for electric charging points on private land in order to encourage the uptake of electric vehicles
 - Complementary financial support for retrofitting in order to allow cheaper, non-compliant vehicles to be made compliant
- Provide support and facilities for alternative delivery and servicing options for businesses. This combines:
 - Delivery and servicing plans for businesses
 - Increased utilisation of the car/van club in Bath, with an emphasis on increasing the number of LGVs/vans available to businesses
 - Expanding the proposal (included in GUL package) to introduce 'last mile' electric cargo bike hire to the city
- Provide additional travel advisors to facilitate the use of the mitigation schemes by the impacted groups and ensure uptake

6. Summary

6.1 Strategic Outline Case

The assessment at SOC stage demonstrated that the most successful charging measures across both primary and secondary CSFs were the small Class B, C and D CAZ options. Further, the options assessment process enhanced the performance of the charging measures by supplementing these options with relevant non-charging measures. Based on this approach, the SOC recommended that the following four options should be taken forward in the OBC for more detailed assessment:

- **Option 1** – Benchmark Option – Small Class C CAZ. In line with JAQU's' Option Appraisal Guidance, the benchmark option is defined as the lowest class required to achieve compliance in the shortest possible timescales.
- **Option 2** – Small Class B CAZ (charging higher emissions buses, coaches, taxis and HGVs) with complementary non-charging interventions including walking/cycling priority schemes, cycle parking, public transport route improvements, increased use of variable message signage (VMS), targeted traffic management, some sunset periods, promotion of low emissions vehicles (LEVs).
- **Option 3** – Small Class C CAZ (charging higher emissions buses, coaches, taxis, PHVs, HGVs and LGVs) with complementary non-charging interventions (as listed above).
- **Option 4** – Small Class D CAZ (charging higher emissions buses, coaches, taxis, HGVs, LGVs and cars) with complementary non-charging interventions (as listed above, plus expanded GUL packages, car sharing priority parking, car club expansion)

6.2 Outline Business Case

For the OBC, a combination of charging and non-charging measures was taken forward as the preferred option in the CAP. The charging options were:

- Class D CAZ, charging higher emissions buses, coaches, taxis, HGVs, LGVs and cars or;
- Class C CAZ with traffic management at Queen Square, charging higher emissions buses, coaches, taxis, HGVs and LGVs
- It was also recognised that a variation on these options, comprising an alternative Class D CAZ with traffic management measures at Queen Square and a concession to Euro 4 and 5 diesel cars, could also achieve compliance.

The zone was as shown in Figure 3.2 for all options. The assessment of all options assumed a fully compliant bus fleet.

The non-charging measures were to either contribute to improving air quality in addition to the CAZ or mitigate the potential negative impacts of the charging scheme. Each of the non-charging options was assigned to one of four sources of funding and, where necessary, further classified based on the CAZ option under consideration. Table 6-1 presents a summary of the non-charging measures.

Table 6-1: Summary of non-charging measures

Class D CAZ	Class C CAZ with traffic management
Abatement Schemes - currently progressing Reduced residents' parking permit cost for low emission vehicles (Early Measures Fund) Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO Promote low emission vehicles for Hackney carriages/private hire through licensing	Abatement Schemes - currently progressing Reduced residents' parking permit cost for low emission vehicles (Early Measures Fund) Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO Promote low emission vehicles for Hackney carriages/private hire through licensing

<p>Abatement (necessary) – Implementation Fund</p> <p>Retrofit funding for registered, local Euro 4/5 buses.</p> <p>Anti-idling enforcement/publicity of impacts; school zig zag enforcement.</p> <p>Weight restriction enforcement</p> <p>Mitigation Schemes - Clean Air Fund</p> <p>Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking</p> <p>Options to improve cycling and walking experience, aimed at encouraging modal shift.</p> <p>Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy</p> <p>Provide 24hr secure parking at all three P&R sites to encourage overnight use and facilitate extended operating hours</p> <p>Scoot/cycle to school initiative</p> <p>Financial support (grants) for replacing pre-Euro 4 cars with compliant ones, including a Mobility as a Service pilot</p> <p>Financial support (interest-free loans) for pre-Euro 6 diesel commercial vehicles, including loans for electric charging points on private land</p> <p>Free P&R targeted at low-income households and families.</p> <p>Delivery and servicing plans for businesses</p> <p>Bus priority measures at traffic signals</p> <p>Mitigation Schemes - Revenue from CAZ charges</p> <p>Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking</p> <p>Options to improve cycling and walking experience, aimed at encouraging modal shift.</p> <p>Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city</p> <p>Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network</p> <p>Increased utilisation of car/van club network in Bath.</p> <p>Implement public transport route improvements both on key corridors in/out of the city and within the CAZ</p> <p>Expand size of existing P&R sites. Provide additional P&R capacity at the university sites at weekends and during holiday periods.</p> <p>Retrofit funding for registered, local Euro 4/5 HGVs, once the technology becomes available</p> <p>Smaller P&R sites on existing bus routes.</p> <p>Credits for use in Mobility as a Service Scheme</p>	<p>Abatement (necessary) – Implementation Fund</p> <p>Retrofit funding for registered, local Euro 4/5 buses.</p> <p>Anti-idling enforcement/publicity of impacts; school zig zag enforcement.</p> <p>Weight restriction enforcement</p> <p>Queen's Square Traffic Management</p> <p>Abatement (scalable) – Implementation Fund</p> <p>Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking</p> <p>Options to improve cycling and walking experience, aimed at encouraging modal shift.</p> <p>Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy</p> <p>Provide 24 hr secure parking at all three P&R sites to encourage overnight use and facilitate extended operating hours</p> <p>Scoot/cycle to school initiative</p> <p>Financial support (grants) for replacing pre-Euro 4 cars with compliant ones, including a Mobility as a Service pilot</p> <p>Free P&R concession</p> <p>Bus priority measures at traffic signals</p> <p>Mitigation Schemes - Clean Air Fund</p> <p>Financial support (interest-free loans) for pre-Euro 6 diesel commercial vehicles, including loans for electric charging points on private land</p> <p>Delivery and servicing plans for businesses</p> <p>Mitigation Schemes - Revenue from CAZ charges</p> <p>Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking</p> <p>Options to improve cycling and walking experience, aimed at encouraging modal shift.</p> <p>Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city</p> <p>Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network</p> <p>Increased utilisation of car/van club network in Bath.</p> <p>Implement public transport route improvements both on key corridors in/out of the city and within the CAZ</p> <p>Expand size of existing P&R sites. Provide additional P&R capacity at the university sites at weekends and during holiday periods.</p> <p>Retrofit funding for registered, local Euro 4/5 HGVs, once the technology becomes available</p> <p>Smaller P&R sites on existing bus routes.</p> <p>Credits for use in Mobility as a Service Scheme</p>
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6.3 Full Business Case

For the FBC, the preferred option of a Class C CAZ with a £9 charge for Taxis and LGVs with a traffic management scheme was further assessed for a proposed change to the boundary and was found to achieve the required compliance by 2021. The assessment for this option also assumed a fully compliant bus fleet.

The package of non-charging measures was fully revisited to develop a comprehensive mitigation package for the preferred option. This assessment is presented in the separate report FBC-46 'Clean Air Fund Report' in Appendix Y of this FBC.

The shortlisted items are:

- Expanding the existing CBTF programme by providing additional funding for retrofitting registered, local Euro 3/4/5 buses
- Financial support for replacing pre-Euro 6 diesel and pre-Euro 4 petrol non-compliant vehicles with compliant ones. This combines:
 - Financial support (grants) for replacing pre-Euro 6 diesel and pre-Euro 4 petrol vehicles and taxis/PHVs with compliant ones
 - Financial support (interest free loans) for replacing pre-Euro 6 diesel and pre-Euro 4 petrol vehicles and taxis/PHVs with compliant ones
 - Complementary financial support for electric charging points on private land in order to encourage the uptake of electric vehicles
 - Complementary financial support for retrofitting in order to allow cheaper, non-compliant vehicles to be made compliant
- Provide support and facilities for alternative delivery and servicing options for businesses. This combines:
 - Delivery and servicing plans for businesses
 - Increased utilisation of the car/van club in Bath, with an emphasis on increasing the number of LGVs/vans available to businesses
 - Expanding the proposal (included in Go Ultra Low package) to introduce 'last mile' electric cargo bike hire to the city
- Provide a sustainable travel and transport team to facilitate the use of the mitigation schemes by the impacted groups and ensure uptake

Appendix A. OBC Non-Charging Measures Assessment

Step 1 - Evaluation of Non Charging Measures

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Step 2 - All Feasible

Measure ID		BA-1	BA-2	BA-3	BA-4	BA-6	BA-8	BA-9	BA-14	BA-15	BA-18	BA-19a	BA- 19b	BA-20	BA-21
Feasible		Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible
Measure Description		Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking.	Options to improve cycling and walking experience, aimed at encouraging modal shift.	Reduced residents' parking permit cost for ultra low emission vehicles.	Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city	Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy	Increased utilisation of car/van club network in Bath	Implement public transport route improvements both on key corridors in/out of the city and within the CAZ	Converting the experimental TRO for the bus lane on London Road at Lambridge to a permanent TRO	Rate relief/exemption for businesses within the zone	Retrofit funding for registered, local Euro 3/4/5 buses	Expand existing P&R site size. Provide additional P&R capacity at the university sites at weekends and during holiday periods.	Provide 24hr secure parking at all three P&R sites to encourage overnight use and facilitate extended operating hours	Scoot/cycle to school initiative	Anti-idling enforcement/publicity of impacts; school zig zag enforcement
Delivery possible by 2021?		Y	N	Y	N	Y	N	N	Y	Y	Y	N	Y	Y	Y
Abatement or Mitigation?		Mitigation	Mitigation	Abatement	Mitigation	Mitigation	Mitigation	Mitigation	Abatement	Mitigation	Abatement	Mitigation	Mitigation	Mitigation	Abatement
Scoring of Mitigation schemes	Low income households	2	3	N/A	2	1	1	3	N/A	1	N/A	2	1	3	N/A
	Local Businesses	2	2	N/A	2	1	2	2	N/A	2	N/A	2	3	1	N/A
	VFM	3	2	N/A	2	2	2	3	N/A	1	N/A	3	2	2	N/A
	Public Acceptability	3	3	N/A	3	3	3	2	N/A	2	N/A	3	3	3	N/A
Comment		Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers. Initial tranche of 128 cycle hoops identified for CAF funding. Additional cycle parking improvements to be considered for revenue funding.	Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers. Takes time to identify and implement suitable schemes. Scheme designs not sufficiently progressed to be delivered before CAZ implementation. Candidate for revenue funding, align with existing LCWIP work.	This measure is already being progressed. Bid for funding submitted to central government through Early Measures Fund	Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers. Not sufficiently progressed for inclusion in CAF, candidate for revenue funding.	Good potential as mitigation measure for low income households and local businesses. Some GUL sites identified to be implemented or upgraded with CAF. Align GUL work with revenue for other sites	Requires involvement of private partners, which is difficult to fast-track but has potential as mitigation measure for car drivers. Unlikely to affect commuting trips which form a large % of existing journeys. Considered for revenue funding.	Corridor improvements and priority schemes identified but designs not sufficiently advanced for CAF. Consider for revenue as work progresses.	This measure is already being progressed	Impractical to target businesses most affected by CAZ and therefore could provide businesses not affected with a discount	Provides additional air quality improvements rather than mitigation. Enables bus operators to continue to maintain existing services, without which car use would be expected to increase	Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers. Requires considerable work to identify suitable sites and therefore not sufficiently progressed for inclusion in CAF. Consider funding through revenue.	Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers.	Good potential as mitigation for low income households by incentivising/enabling school trips to be made by non-car modes. Only provides mitigation for car drivers.	Provides additional air quality improvements rather than mitigation. Additional benefit of publicising air quality impacts through enforcement.
Class C CAZ	Decision	Scalable Abatement	Mitigation	Progressing	Mitigation	Scalable Abatement	Mitigation	Mitigation	Progressing	Reject	Necessary Abatement	Mitigation	Mitigation	Scalable Abatement	Necessary Abatement
	Funding Stream	Implementation/Revenue	Revenue	Progressing	Revenue	Implementation/Revenue	Revenue	Revenue	Progressing	None	Implementation	Revenue	CAF	Implementation	Implementation
Class D CAZ	Decision	Mitigation	Mitigation	Progressing	Mitigation	Mitigation	Mitigation	Mitigation	Progressing	Reject	Necessary Abatement	Mitigation	Mitigation	Mitigation	Necessary Abatement
	Funding Stream	CAF/Revenue	Revenue	Progressing	Revenue	CAF/Revenue	Revenue	Revenue	Progressing	None	Implementation	Revenue	CAF	CAF/Revenue	Implementation
Class C CAZ	CAF												1		
	Revenue	1	2		3	4	5	6				7		4	5
	Implementation	1		1		2			2		3				
	Progressing	1				2							3		
Class D CAZ	CAF													4	
	Revenue	1	2		3	4	5	6						8	
	Implementation										1	7			2
	Progressing			1					2						
Measure ID		BA-22	BA-23	BA-24	BA-25	BA-26	BA-27	BA-28	BA-29	BA-30	BA-31	BA-32	BA-33	BA-34	BA-35
Feasible		Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible	Feasible
Measure Description		Provide additional cycle parking across the city centre in visible locations and pilot a management scheme to improve proper usage of cycle parking.	Options to improve cycling and walking experience, aimed at encouraging modal shift.	Reduced residents' parking permit cost for ultra low emission vehicles.	Expand proposal (included in Go Ultra Low package) to introduce electric cycle hire to the city	Expand proposal (included in Go Ultra Low package) to increase the public electric car charging network and develop an on-street charging policy	Increased utilisation of car/van club network in Bath	Implement public transport route improvements both on key corridors in/out of the city and within the CAZ	Replace experimental TRO for bus lane on London Road with permanent TRO	Rate relief/exemption for businesses within the zone	Retrofit funding for registered, local Euro 4/5 buses	Expand existing P&R site size. Provide additional P&R capacity at the university sites at weekends and during holiday periods.	Provide 24hr secure parking at all three P&R sites to encourage overnight use	Scoot/cycle to school initiative	Anti-idling enforcement/publicity of impacts; school zig zag enforcement
Delivery possible by 2021?		N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Abatement or Mitigation?		Mitigation	Mitigation	Mitigation	Mitigation	Mitigation	Abatement	Abatement	Mitigation	Mitigation	Mitigation	Mitigation	Abatement	Mitigation	Abatement
Scoring of Mitigation schemes	Low income households	1	3	1	2	1	N/A	1	2	2	3	1	N/A	2	N/A
	Local Businesses	2	1	2	3	1	N/A	2	2	1	1	2	N/A	2	N/A
	VFM	1	2	2	2	1	N/A	2	1	1	2	1	N/A	3	N/A
	Public Acceptability	3	3	3	2	3	N/A	3	3	2	3	2	N/A	2	N/A
Comment		No certified technology has been identified that would allow this to be implemented in the required timescales for CAF. Consider under revenue should technology become available.	Good potential as mitigation for all vehicles, and can be targeted at most affected groups.	Good potential as mitigation for local business by enabling greater use of electric vehicles. Less effective for mitigating impacts on low income households who are unlikely to have the resources to purchase electric vehicles.	Good potential as mitigation measure for low income households and local businesses, but only provides mitigation for car drivers. Requires considerable work to identify suitable sites and therefore not sufficiently progressed for inclusion in CAF. Consider funding through revenue.	Impractical to target impacted individuals and therefore unlikely to provide good VFM. Any subsidy will be time limited and therefore may not result in sustained changes in behaviour as people revert back once subsidy ends.	This measure is already being progressed and the revised policy was consulted on June 2018	Good potential as mitigation. Can be targeted at local businesses who have non compliant commercial vehicles.	Will increase attractiveness of P&R as alternative option to driving into Bath. Cannot be targeted at Low Income individuals. May increase demand for P&R to exceed current capacity.	Potential as mitigation. Personalised travel advice will help those affected find alternative transport that fits their needs. Potential for longer term shift from car dependency.	Good potential as mitigation. Will provide incentive and support for those affected to use alternative transport. Potential for sustainable change in behaviours.	Personalised travel advice will help affected businesses establish alternative methods for their service and delivery needs. Potential for longer term beneficial changes in behaviour.	Abatement scheme that allows improvements to air quality, particularly at hot spots on gradients and canyons, where existing weight restrictions are poorly observed.	Potential as mitigation. Targeted optimisation of signals to prioritise buses will increase the attractiveness of this mode.	Abatement scheme to allow traffic flow restriction to the air quality hot spot on Gay St providing improvements to air quality at this location. Not required for D Class CAZ
Class C CAZ	Decision	Mitigation	Scalable Abatement	Mitigation	Mitigation	Reject	Progressing	Mitigation	Scalable Abatement	Mitigation	Mitigation	Mitigation	Necessary Abatement	Scalable Abatement	Reject
	Funding Stream	Revenue	Implementation	CAF	Revenue	None	Progressing	CAF	Implementation	CAF	CAF	CAF	Implementation	Implementation	None
Class D CAZ	Decision	Mitigation	Mitigation	Mitigation	Mitigation	Reject	Progressing	Mitigation	Mitigation	Mitigation	Mitigation	Mitigation	Necessary Abatement	Mitigation	Necessary Abatement
	Funding Stream	Revenue	CAF	CAF	Revenue	None	Progressing	CAF	CAF	CAF	CAF	CAF	Implementation	CAF	Implementation

*Schemes need to be deliverable by the start of 2021 and have cabinet support
*All modal shift/vehicle upgrade items need to include an allowance for advertising/marketing resource (to fund AQ campaign team)