

**JACOBS®**

**Bristol Clean Air Plan**

**Evaluation, Monitoring & Benefits Realisation Plan**

Document No OBC-38. 2

October 2019

Bristol City Council



## Bristol Clean Air Plan

Project No: 673846CH.ER.20.01  
Document Title: Evaluation, Monitoring & Benefits Realisation Plan  
Document No.: OBC-38  
Revision: 2  
Date: October 2019  
Client Name: Bristol City Council  
Project Manager: HO  
Author: SB  
File Name: Monitoring, Evaluation and Benefits Realisation Plan

Jacobs Engineering Group Inc.

1 The Square  
Temple Quay  
Bristol  
UK  
T +44 (0)117 910 2580  
www.jacobs.com

© Copyright 2019 Jacobs Engineering Group Inc. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

### Document History and Status

Revision	Date	Description	By	Review	Approved
1	October 2019	First draft	SB	HO	HO
2	October 2019	Draft report	SB	HO	HO

# Contents

<b>Acronyms and Abbreviations .....</b>	<b>iii</b>
<b>1. Introduction .....</b>	<b>1-1</b>
1.1 Summary of Evaluation Approach .....	1-2
1.2 Scope of the scheme .....	1-4
<b>2. Process Evaluation .....</b>	<b>2-6</b>
<b>3. Impact Evaluation .....</b>	<b>3-6</b>
3.1 Scheme Critical Success Factors .....	3-6
3.1.1 Desired Impacts to Monitor .....	3-7
3.2 Central evaluation .....	3-7
3.3 Monitoring Plan .....	3-8
3.3.1 Air Quality and Traffic Data Collection .....	3-10
3.4 Monitoring Outputs and Desired Impacts .....	3-11
3.5 Outcome Analysis .....	3-12
3.6 Benefits Realisation .....	3-13
3.6.1 Benefits Profile .....	3-13
<b>4. Delivery of the Monitoring &amp; Evaluation and Benefits Realisation Plan .....</b>	<b>4-14</b>
4.1 Costs .....	4-14
4.2 Timescales .....	4-15
4.3 Reporting .....	4-15
4.4 Governance .....	4-16
4.5 Risks and Mitigations .....	4-16
4.6 New Data Collection .....	4-17

## Table(s)

Table 1-1 Data Collection and Collation

Table 1-2: Monitoring Outputs for Assessing Desired Impacts (primary links only)

Table 1-3: Mapping of Monitoring Outputs and Outcomes Analysis (primary links only)

Table 1-4: Mapping of Desired Impacts and Outcome Analysis (primary links only)

Table 1-5: Scheme costs over monitoring and evaluation period

Table 1-6: Summary of new and existing data sets required for monitoring

## Figure(s)

Figure 1-1: The ROAMEF cycle

Figure 1-2: Flow diagram for Evaluation and Benefits Realisation Strategy

Figure 1-3: Bristol Small and Medium area CAZ boundaries



## Acronyms and Abbreviations

ANPR	Automatic Number Plate Recognition
AQO	Air Quality Objective
BCC	Bristol City Council
CAZ	Clean Air Zone
CSF	Critical Success Factor
Defra	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
EU	European Union
EV	Electric Vehicle
FBC	Full Business Case
GDP	Gross Domestic Product
HGV	Heavy Goods Vehicle
ITS	Institute of Transport Studies
JAQU	Joint Air Quality Unit
JSA	Job Seekers Allowance
LEP	Local Enterprise Partnership
LAQM	Local Air Quality Management
LGV	Light Goods Vehicle
NO <sub>x</sub>	Nitrogen Oxides
NO <sub>2</sub>	Nitrogen Dioxide
OBC	Outline Business Case
ONS	Office for National Statistics
PCM	Pollution Climate Mapping
PHV	Private Hire Vehicle
PM	Particulate Matter
ROAMEF	Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback
SME	Small to Medium Enterprise
SOC	Strategic Outline Case
VMS	Variable Message Sign



# 1. Introduction

The UK has in place legislation transposing requirements in European Union law, to ensure that certain standards of air quality are met, by setting Limit Values on the concentrations of specific air pollutants. In common with many EU member states, the EU limit value for annual mean nitrogen dioxide (NO<sub>2</sub>) is breached in the UK and there are on-going breaches of the NO<sub>2</sub> limit value in Bristol. The UK government is taking steps to remedy this breach in as short a time as possible, with the aim of reducing the harmful impacts on public health. Within this objective, the government has published a UK Air Quality Plan and a Clean Air Zone Framework, both published in 2017. The latter document provides the expected approach for local authorities when implementing and operating a Clean Air Zone (CAZ).

Due to forecast air quality exceedances, in 2017 Bristol City Council was directed by the Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) to produce a Clean Air Plan to achieve air quality improvements in the shortest possible time. In line with Government guidance, as part of the Plan, Bristol City Council has considered a range of options for the 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 and in line with legal requirements as set out below. Bristol City Council (BCC) have produced an Outline Business Case (OBC) for the delivery of an option including a package of measures which will be most likely to bring about compliance with the Limit Value for annual mean NO<sub>2</sub> in the shortest time possible in Bristol and reducing human exposure as quickly as possible.

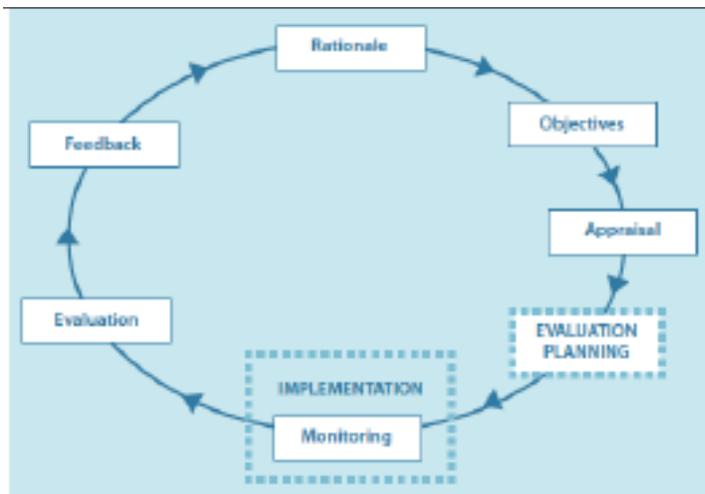
In line with Government guidance BCC is considering implementation of the 'Hybrid Option' which includes a diesel car ban across a small area (from 7am-3pm) and a charging scheme for non-compliant buses, taxis, HGVs and LGVs, alongside a number of other measures.

An Outline Business Case (OBC) has been produced for the delivery of the CAP; a package of measures which will bring about compliance with the Limit Value for annual mean NO<sub>2</sub> in the shortest time possible in Bristol. The OBC assesses the shortlist of options set out in the Strategic Outline Case, and proposes a preferred option including details of delivery. The OBC forms a bid to central government for funding to implement the CAP.

This document is written to support the OBC and sets out how the benefits of the scheme will be monitored, evaluated and realised. It has been produced in line with the Inception, Evidence and Options Appraisal packages of Guidance issued by the JAQU in 2017, and the HM Treasury Green Book.

The objective of the scheme is to deliver an option including a package of measures which will be most likely to bring about compliance with the Limit Value for annual mean NO<sub>2</sub> in the shortest time possible in Bristol and reducing human exposure as quickly as possible. To understand whether the scheme meets this objective, it is recommended that the "Standard Monitoring" approach set out in the Department for Transport's (DfT) "Monitoring and Evaluation Framework for Local Authority Major Schemes" (September 2012) is followed.

This report sets out the evaluation strategy and benefits realisation plan for the BCC Clean Air Plan scheme, covering the monitoring of impacts and the approach to determining the projected benefits, impacts and objectives. In line with HM Treasury's Magenta Book (2011) and DfT's 'Monitoring and Evaluation Strategy' (2013), the plan also covers two stages of the ROAMEF concept (Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback). This ensures that the Plan is aligned with the Government's broad policy making and delivery cycle, depicted in Figure 1-1.



**Figure 1-1: The ROAMEF cycle**

In addition to local monitoring and evaluation of the BCC CAZ Scheme, JAQU are undertaking a central evaluation which will take place over two to three years by a separate organisation, with certain local authorities selected as a case study for a more detailed assessment. This is likely to begin in Autumn 2019. The central evaluation will provide BCC and other Local Authorities with learning that can be used to help delivery of Local Plans. This should include an understanding of what measures are working to reduce emissions in the shortest possible time and improve on the understanding of how Local Plan measures may affect local areas. The central evaluation will also provide Local Authorities with advice on approaches to gather robust data.

## 1.1 Summary of Evaluation Approach

The proposed approach is designed to assess whether the outputs and impacts of the scheme deliver the desired benefits and overarching objectives. The approach reflects the scale and type of scheme, plus the resources available to complete an evaluation providing a strong evidence base to feed into the benefits realisation assessment, inform stakeholders and where necessary, refine schemes.

The evaluation will include quantitative and qualitative measures, thereby covering a range of outcomes and impacts. Furthermore, the evaluation strategy will help influence similar schemes. It will comprise both ‘process evaluation’ and ‘impact evaluation’, with the former focusing on the processes by which the scheme was undertaken and the latter focusing on whether the desired impacts of the scheme were realised.

Based on DfT monitoring and evaluation guidance, and the requirement to undertake ‘standard evaluation’ for this scheme, the key types of questions to be addressed through this process are:

- How was the scheme delivered?
- What difference did the scheme make?
- Did the benefits justify the costs?

To enable evaluation to take place, a monitoring framework needs to be in place. The requirements of the “Standard Monitoring” outlined in the September 2012 DfT guidance have been used as a guide. The requirements are:

- Scheme Build;
- Delivered scheme;
- Costs;

- Scheme objectives;
- Travel demand, including behavioural change;
- Travel times and reliability of travel times;
- Out-turn value for money;
- Impacts on the economy; and
- Carbon impacts.

The primary purpose of the scheme is to improve air quality within Bristol. Therefore, air quality will also be monitored, despite not being included within the 'standard monitoring' requirements.

The plan is defined in two parts, with the first part (process evaluation) covering the first three areas listed above (scheme build, delivery and costs) and the second area covering the scheme outputs, outcomes analysis and impacts to inform the benefits realisation. The second part will draw on the requirements in so far as they are applicable for this scheme.

Figure 1-2 illustrates the stages involved within the evaluation strategy and benefits realisation process. This process includes the following stages:

- Desired Impacts – These are based on the project's Critical Success Factors and reflect the intended effects of the scheme. These impacts are defined within Section 3.11 (listed as D1-D6).
- Monitoring Outputs – These include datasets that are likely to be impacted by the scheme. They are summarised within Section 3.2 (listed as M1-M9).
- Outcomes – These relate to the wider consequences of the scheme on society and the economy and are closely linked to the desired impacts. These outcomes are defined in Section 3.4 Outcome Analysis (listed as O1-O3).

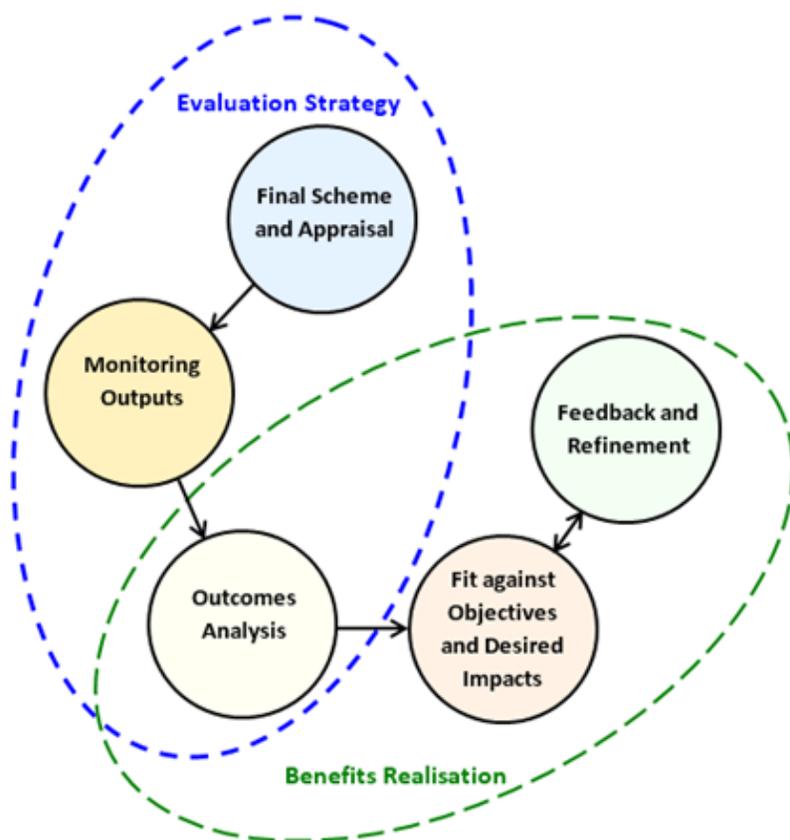


Figure 1-2: Flow diagram for Evaluation and Benefits Realisation Strategy

## 1.2 Scope of the scheme

The United Kingdom (UK) has in place air quality legislation, passed down from the European Union (EU), to ensure that certain standards of air quality are met. The legal limit for concentrations of NO<sub>2</sub> is 40 µg/m<sup>3</sup> as an annual mean. This legal limit is breached across a number of cities in the UK, including at several locations in Bristol.

BCC, along with 27 other local authorities, has been directed by Minister Therese Coffey and Minister Jesse Norman to produce a Clean Air Plan (CAP) to achieve air quality improvements in Bristol in the shortest possible time.

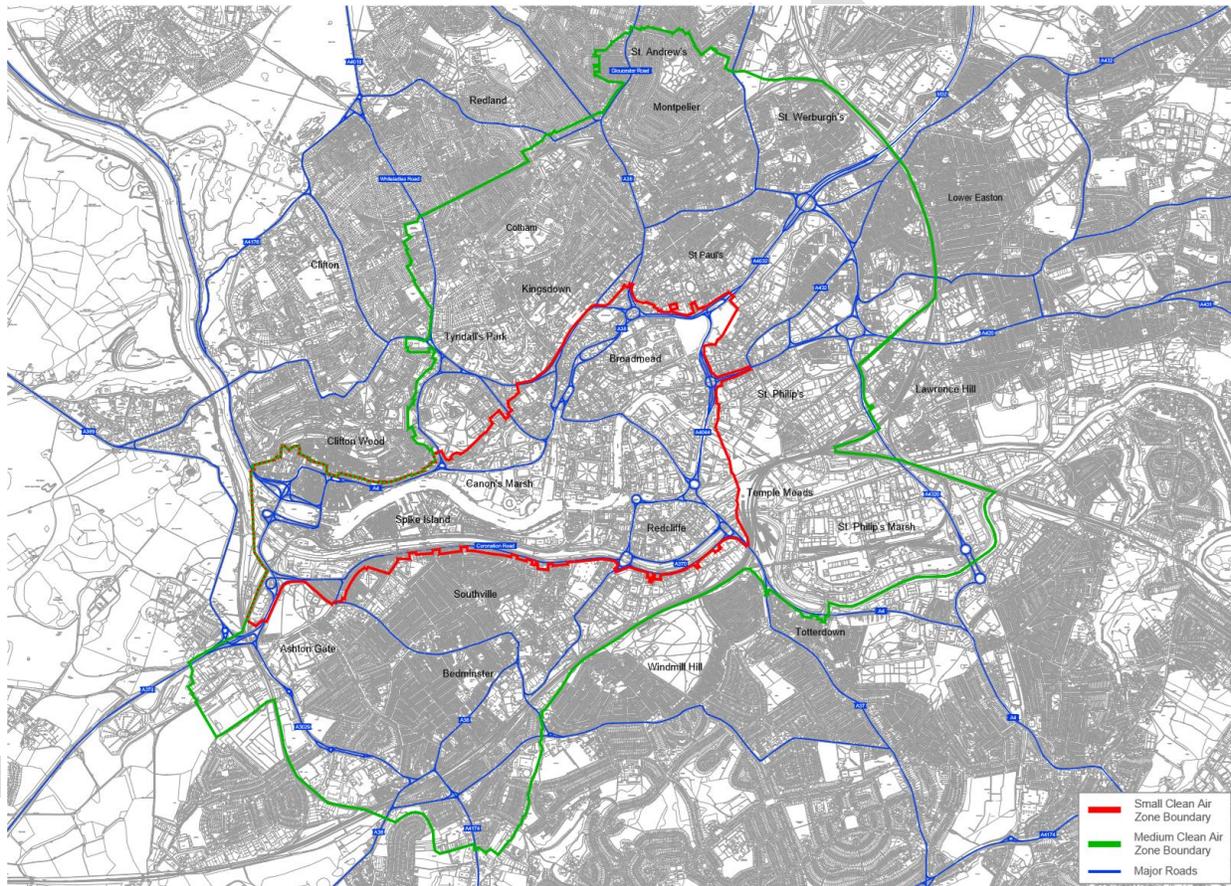
After lengthy analysis, the 'Hybrid Option' was selected as the preferred scheme to comply with government guidance (see the OBC Options Assessment report for more detail on this process). This option is expected to achieve compliance by 2025, with this compliance date being driven by exceedances at Church Road. These measures aim to reduce NO<sub>2</sub> levels within Bristol to legal limits within the shortest possible timeframe.

The Hybrid Option applicable to specific zones of operation shown in Figure 1-3 includes:

- A charging scheme for non-compliant buses, taxis, HGVs and LGVs. This charge applies once a day regardless of how many times you go in or out of the medium zone.
- A 24hr a day seven days a week HGV weight restriction (3.5 tons) on some of the most polluted routes: Rupert St, Baldwin Street, Park Row/Upper Maudlin Street, Marlborough Street and Lewins Mead: 24 hours a day, 7 days a week.

<sup>1</sup> Work undertaken to develop the TROS for this scheme component identified delivery risks associated with imposing restrictions at these four locations. The scheme will be refined to limit the restrictions to Marlborough Street in the FBC.

- Bus and local traffic interventions in the most polluting areas; this includes a Park and Ride on the M32, an inbound bus lane on the M32 from Junction 2 to Cabot Circus car park, an inbound bus lane on Cumberland Road, and using existing traffic signals to control the amount of traffic entering congested areas with poor air quality.
- A scrappage scheme (up to £2,000) for private diesel cars. This would provide a grant towards a new vehicle or an alternative mode of transport. Vehicles belonging to residents in Bristol, Bath & North East Somerset, North Somerset and South Gloucestershire would be eligible – as long as their drive into work includes the Option 1 charging zone area or they live in the area.
- A diesel car ban over a specific small central area from 7am to 3pm, 7 days a week (does not apply to taxis, private hire vehicles or emergency vehicles).



**Figure 1-3: Bristol Small and Medium area CAZ boundaries**

The Hybrid Option measures described above, would be delivered through funding from the Implementation Fund and Clean Air Fund, provided by central government. The Implementation Fund provides funding to deliver measures required to achieve compliance with air quality standards in the shortest possible time. The Clean Air Fund provides funding via a competitive bid process, to deliver measures that aim to mitigate and adverse impacts which are expected fall upon disadvantaged groups. Additional schemes and mitigation measures could potentially be funded by any net revenue produced from the charging zone, although this revenue is not guaranteed. The estimated total cost of the Hybrid Option measures is £99,400,000.

Timescales for delivery include:

- Scheme opening – 2021
- Modelled year of NO<sub>2</sub> compliance – 2025

## 2. Process Evaluation

Process evaluation seeks to answer the question ‘How was the scheme delivered?’. This involves the assessment of whether a scheme is being implemented as intended, by monitoring the intervention’s processes, timelines and budget throughout the implementation phase. This information will be used to inform the case for similar schemes across the UK.

The three areas of monitoring, evaluation and reporting will be:

- Scheme build – Covering procurement of the scheme, achievement of timescale and key milestones, risk outcomes and stakeholder feedback.
- Delivered scheme – Covering scheme refinements and success of the proposed design and materials used. This will include any measure taken to minimise any identified negative impacts during implementation.
- Outturn costs – These will be compared to forecasts covering capital and on-going operating and maintenance costs, ensuring the scheme financial performance is in line with the business case.

These three aspects of the scheme will be reported one year before scheme opening, as well as annually from 1 to 5 years after scheme opening.

## 3. Impact Evaluation

In line with the HM Treasury’s ‘Magenta Book’ (2011), impacts evaluation attempts to provide an objective test of what changes have occurred, and the extent to which these can be attributed to the scheme.

### 3.1 Scheme Critical Success Factors

A number of Critical Success Factors (CSF) have been developed for the scheme in order to assess each scheme option. The CSFs summarise the desired impacts of the intervention and it is necessary to understand these intended effects before assessing and evaluating the changes caused by the scheme. The following CSFs were used for the current scheme:

#### Primary Critical Success Factor

- Deliver compliance with NO<sub>2</sub> air quality Limit Values<sup>2</sup> and Air Quality Objectives<sup>3</sup> in the shortest possible timescales

#### Secondary Critical Success Factors

- **Strategic**
  - Provide equity across different vehicle type and trip purpose
  - Compliance with Defra Draft CAZ framework, including minimum requirements
- **Economic**
  - Mitigate financial impact on low income households
  - Improve health of low income households
  - Maximise positive effects on the economy, whilst minimising any negative impacts
  - Improve public health across Bristol
- **Commercial**
  - Delivery timescale risks of procurement
- **Financial**
  - Likelihood of revenue equating to implementation/operational costs<sup>4</sup>

<sup>2</sup> (EU NO<sub>2</sub> concentration Limit Values)

<sup>3</sup> (LAQM air quality Objectives for NO<sub>2</sub> as set out in the Air Quality (England) Regulations (SI2000/928 as amended))

<sup>4</sup> Complying with the legal test which was set out by the High Court in November 2016 in R (ClientEarth) (NO<sub>2</sub>) V Secretary of State for Environment Food and Rural Affairs [2016] EWHC 2740 (Admin), only shortlisted options which achieve compliance with the NO<sub>2</sub> Limit Value in

- Upfront capital required for scheme
- Risk of financial penalty to the Council/s
- **Management**
  - Public acceptability which could impact on the option's deliverability
  - Political acceptability which could impact on the option's deliverability

### 3.1.1 Desired Impacts to Monitor

A number of desired impacts have been identified based on the scheme CSFs. These impacts will be monitored and assessed in order to feed into the benefits realisation plan and are considered appropriate to evaluate the outcomes of the proposed scheme. These desired impacts include:

Implementation Fund Scheme:

- D1 – Deliver compliance with NO<sub>2</sub> air quality Limit Value in the shortest possible time
- D2 – Deliver compliance with NO<sub>2</sub> Air Quality Objective in the shortest possible time

Clean Air Fund Scheme:

- D3 – Minimise the negative impacts and maximise the benefits of the scheme on local businesses
- D4 – Minimise adverse impacts on traffic
- D5 - Facilitate use of public transport and sustainable travel
- D6 - Minimise the impacts of the scheme on residents, particularly low-income households

One of the main aims of the scheme is to improve public health across the city, and to ensure that low income households also benefit from any health impacts. However, the public health benefits of improved air quality are long term (over lifetimes) and therefore would not be appropriate to include as a desired impact, as they could not be adequately assessed within a short period of scheme delivery.

Improvements to air quality have been shown to produce beneficial impacts on public health<sup>5</sup>, therefore the public health aims of this scheme should be achieved if the air quality objectives and EU NO<sub>2</sub> Limit Values are met.

## 3.2 Central evaluation

As well as the local scheme plan, information gathered will be provided to support the central evaluation of all the CAPs implemented in the UK. The following aspects are to be assessed centrally:

- What impact have Local Plans had on air quality, NO<sub>2</sub> emissions and health?
- How have Local Plans affected behaviours of car owners, public transport users, local businesses? Have behaviours changed in expected or unexpected ways?
- How has the impact of the Local Plans varied for different local groups, including more vulnerable residents or transport users?

---

the shortest possible time, are appraised across this criterion. The relevant analysis is presented in the Financial Case chapter of the Strategic Outline Case.

<sup>5</sup> 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>

- How have external factors influenced the effectiveness of the Local Plans?
- How does the approach to implementing Local Plans affect the scale and pace of impacts?

The central evaluation will be undertaken by a separate organisation, with certain local authorities selected as a case study for a more detailed assessment. BCC will submit quarterly reports to JAQU for central evaluation, covering air quality and traffic data.

### 3.3 Monitoring Plan

In order to assess whether the impacts of the scheme are as predicted, a monitoring plan has been produced, outlining the programme of data collection and information collation tasks for the scheme.

Key questions which the monitoring plan seeks to answer include:

- Was the scheme delivered to costs and timescale?
- Has the scheme delivered the desired impacts and benefits as forecast?
- Has the scheme shown out-turn value for money as predicted?
- What lessons can be learnt to help shape air quality strategies for Bristol?
- Has the scheme had any unpredicted impacts?

Where possible, methods of data collection have been selected which are completed as part of ongoing air quality and transport monitoring, in order to minimise additional costs whilst maximising the data available to identify scheme impacts.

The area to be monitored includes those parts of the city within the proposed charging and diesel ban zones, but also those areas neighbouring the zones and across the wider city, as appropriate.

Further details of the proposed ANPR camera locations, which will be used to monitor data as well as enforcing the charging and diesel ban zones, are available within the OBC.

Table 3-1 lists the data to be collected and collated as part of the monitoring plan, with information on the method and frequency of data collection and rationale for its inclusion.

The areas of data collection include:

- M1: Air quality data
- M2: Vehicular fleet information
- M3: Traffic flows
- M4: Jobs seekers allowance information
- M5: UK business count data
- M6: Retail/business/office space vacancy figures
- M7: Park and Ride passenger data
- M8: Walking and cycling counts
- M9: Stakeholder feedback from council user group forums

Table 3-1 Data Collection and Collation

Measure	Data to be used	Rationale for inclusion	Data collection methods	Frequency of data collection
<b>M1: Air quality data</b>	NO <sub>2</sub> concentrations data collected at existing monitoring locations within the BCC area.	To understand changes in air quality (particularly NO <sub>2</sub> concentrations).	Diffusion tubes and real time monitoring	Baseline (pre-scheme) and then ongoing monitoring.
<b>M2: Vehicular fleet information</b>	Number of compliant/non-compliant vehicles driving within the BCC charging zone.	To understand how the type of vehicles travelling in Bristol changes over time	ANPR cordon, cross-referencing with DVLA vehicle database	Baseline (pre-scheme) and then continuously through permanent ATCs (analysed quarterly)
<b>M3: Traffic flows</b>	Traffic flows within the charging zone and diesel ban area, as well as across the wider city	To understand how the scheme impacts on traffic flows and speeds along key routes within the highway network	ANPR cordon Permanent Automatic Traffic Counts (ATCs)	At least 2 weeks during baseline monitoring (pre-scheme) and then continuously through permanent ATCs (analysed quarterly)
<b>M4: Job seekers allowance (JSA) information</b>	ONS data from NOMIS web, relating to JSA benefits claimants in BCC	To understand any changes in the number of individuals applying for JSA within BCC, in order to assess impacts on the local labour market and economy.	Publicly available data. Will be compared against other similar cities to help isolate the impact of the scheme from other unconnected variables.	Baseline (pre-scheme) and then annually for five years after scheme opening
<b>M5: UK Business Count Data</b>	ONS data from NOMIS web, relating to business demography	To understand changes in the number and type of businesses operating in Bristol in order to assess economic impacts.	Publicly available data. Will be compared against other similar cities to help isolate the impact of the scheme from other unconnected	Baseline (pre-scheme) and then annually for five years after scheme opening

Measure	Data to be used	Rationale for inclusion	Data collection methods	Frequency of data collection
			variables.	
<b>M6: Retail/business/office space vacancy figures</b>	Vacancy statistics from internal council data. Market data from property consultants.	In order to understand economic impacts of the scheme in terms of changes to the number of businesses operating within Bristol.	Internal data collection as part of ongoing process. Regular property market reports published by property consultants in the public domain could also be used.	Baseline (pre-scheme) and then annually for five years after scheme opening
<b>M7: Park and Ride passengers data</b>	Occupancy statistics (Cloud Amber) and bus ticket data (First).	To understand changes in the number of people using the P&R into Bristol	Collected as part of ongoing monitoring activities by operators	Baseline (pre-scheme) and then annually for five years after scheme opening
<b>M8: Walking and cycling counts</b>	Pedestrian and cycle counts on key routes within the city	To understand changes to the number of people walking and cycling along key routes within Bristol	Commissioning of new surveys	Baseline (pre-scheme) and then annually for five years after scheme opening
<b>M9: Stakeholder feedback from council user group forums</b>	Stakeholder feedback covering relevant elected members, stakeholder groups, the LEP.	To understand the opinions of stakeholders on scheme delivery and impacts. To understand some of the less quantified impacts such as package effects.	Part of the ongoing consultation process for transport strategies in the City.	1, 3, 5 years after scheme opening

### 3.3.1 Air Quality and Traffic Data Collection

At the time of reporting there is a strong indication that 2025 will be the year when compliance of the NO<sub>2</sub> Limit Value will be achieved. That is, air quality modelling results of non-compliance on Church Road will be resolved separately. On this basis, additional air quality monitoring will be focused on the effectiveness of the Hybrid Option which indicates a compliance year 2025. The additional modelling at 2025 will also effected the natural compliance year. It is likely that the natural compliance year will be 2027, rather than 2029.

Taking the precautionary stance, the current modelling identified 48 locations where the predicted concentration was non-compliant in 2024, these are priority locations where air quality monitoring sites

will ideally need to be established. Not all locations are within the Bristol City administration boundary. A pragmatic approach will be taken which will omit locations outside of the boundary plus other locations within which fail to meet health and safety sitting considerations. In addition, a new continuous NO<sub>x</sub> air quality monitoring site will be established on Marlborough Street, a key corridor where compliance is predicted to be late.

These data will be collected from 2020 to 2028 (i.e. one year post 2027 the likely year of natural compliance). In addition, of the 48 sites 90 other sites that are forecast to be non-compliant in 2021, will be monitored using diffusion tubes. Existing BCC monitoring sites will be used if they are suitable for air quality monitoring. This will provide data on measure M1 (air quality data).

ANPR surveys will be used to collect traffic data. These surveys will cover a period of one week in 2020, 2022 and 2025. ANPR surveys will take place for one week in 2020, 2022, 2025 at 48 locations that have been identified as showing compliance issues in the baseline 2024 model. This will provide data for monitoring of measures M2 and M3 (vehicular fleet information and traffic flows). A number of permanent traffic data collection sites will be established at points of interest within Bristol, this data will feed into JAQU's central evaluation process.

### 3.4 Monitoring Outputs and Desired Impacts

Table 3-2 summarises the links between Monitoring Outputs and Desired Impacts.

Table 3-2: Monitoring Outputs for Assessing Desired Impacts (primary links only)

Monitoring Outputs (M) by Desired Impacts (D)	D1: Deliver compliance with NO2 air quality Limit Values	D2: Deliver compliance with NO2 Air Quality Objectives	D3: Minimise the negative impacts and maximise the benefits of the scheme on local businesses	D4: Minimise adverse impacts on traffic	D5: Facilitate use of public transport and sustainable travel	D6: Minimise the impacts on residents, particularly low-income households
M1: Air quality data						
M2: Vehicular fleet information						
M3: Traffic flows						
M4: Job seekers allowance (JSA) information						
M5: Changes in business numbers						
M6: Retail/business/office space vacancy figures						
M7: Park and Ride passenger data						
M8: Walking and cycling counts						

<b>Monitoring Outputs (M) by Desired Impacts (D)</b>	<b>D1: Deliver compliance with NO<sub>2</sub> air quality Limit Values</b>	<b>D2: Deliver compliance with NO<sub>2</sub> Air Quality Objectives</b>	<b>D3: Minimise the negative impacts and maximise the benefits of the scheme on local businesses</b>	<b>D4: Minimise adverse impacts on traffic</b>	<b>D5: Facilitate use of public transport and sustainable travel</b>	<b>D6: Minimise the impacts on residents, particularly low-income households</b>
<b>M9: Stakeholder feedback from council user group forums</b>						

### 3.5 Outcome Analysis

Outcome analysis investigates the wider longer-term benefits of the scheme on the city and will be assessed based on data collected as part of the scheme monitoring outcomes (M1-M9). These outcomes are strongly linked to the desired impacts of the scheme (D1-D6) and are listed below:

- O1: Deliver compliance with NO<sub>2</sub> air quality Limit Values and Air Quality Objectives in Bristol
- O2: Minimise financial impacts of the scheme on low income households within Bristol
- O3: Overall neutral or benefit to the local economy

Figure 1-2 illustrates how monitoring outputs are used to feed in to the outcome analysis and benefit realisation process. Table 3-3 maps how each monitoring output (M1-M9) will be used to evaluate the outcome analysis (O1-O3) and therefore contribute to the assessment of benefits realisation.

**Table 3-3: Mapping of Monitoring Outputs and Outcomes Analysis (primary links only)**

<b>Monitoring Outputs (M) by Outcome Analysis (O)</b>	<b>O1: Deliver compliance with NO<sub>2</sub> air quality Limit Values and Air Quality Objectives in Bristol</b>	<b>O2: Minimise financial impacts of the scheme on low income households within Bristol</b>	<b>O3: Overall neutral or benefit to the local economy</b>
<b>M1: Air quality data</b>			
<b>M2: Vehicular fleet information</b>			
<b>M3: Traffic flows</b>			
<b>M4: Job seekers allowance (JSA) information</b>			
<b>M5: Changes in business numbers</b>			
<b>M6: Retail/business/office</b>			

Monitoring Outputs (M) by Outcome Analysis (O)	O1: Deliver compliance with NO <sub>2</sub> air quality Limit Values and Air Quality Objectives in Bristol	O2: Minimise financial impacts of the scheme on low income households within Bristol	O3: Overall neutral or benefit to the local economy
space vacancy figures			
M7: Park and Ride passenger data			
M8: Walking and cycling counts			
M9: Stakeholder feedback from council user group forums			

### 3.6 Benefits Realisation

The data collected as part of this Monitoring and Evaluation Plan will be used to demonstrate the realisation of the scheme benefits and objectives.

Table 3-4 summarises the relationships between the desired impacts of the scheme (D1-D6) and the scheme outcomes (O1-O3). Alongside Table 3-2 and Table 3-3, this identifies the links between the data outputs collected as part of the monitoring process (M1-M9), the desired impacts (D1-D6) and outcomes (O1-O3) which form part of the benefits realisation. The process of monitoring and benefits realisation can be refined as necessary to allow optimisation of benefits and assessment of all objectives and desired impacts.

#### 3.6.1 Benefits Profile

BCC was instructed to reduce NO<sub>2</sub> concentrations within the city to legal levels in the shortest time possible. Modelling of the preferred Hybrid Option indicate that this primary CSF should be achieved by 2025. Therefore, benefits to air quality produced by the Clean Air Plan are likely to be realised in a reasonably short timeframe from implementation. Monitoring of scheme outcomes and impacts will continue for five years after scheme opening, in order to assess the realisation of air quality benefits. This will take place alongside monitoring of impacts to the economy and transport within the city, in order to assess how these factors develop over the course of the scheme. A monitoring period of five years is recommended within the guidance<sup>6</sup> and this should provide an appropriate timescale to assess the wider impacts and benefits of the scheme.

<sup>6</sup> DfT's 'Monitoring and Evaluation Framework for Local Authority Major Schemes' (September 2012)

Table 3-4: Mapping of Desired Impacts and Outcome Analysis (primary links only)

Outcome Analysis (O) by Desired Impacts (D)	O1: Deliver compliance with NO <sub>2</sub> air quality Limit Values and Air Quality Objectives in Bristol	O2: Minimise financial impacts of the scheme on low income households within Bristol	O3: Overall neutral or benefit to the local economy
D1: Deliver compliance with NO <sub>2</sub> air quality Limit Values			
D2: Deliver compliance with NO <sub>2</sub> Air Quality Objectives			
D3: Minimise the negative impacts and maximise the benefits of the scheme on local businesses			
D4: Minimise adverse impacts on traffic			
D5: Facilitate use of public transport and sustainable travel			
D6: Minimise the impacts of the scheme on residents, particularly low income households			

## 4. Delivery of the Monitoring & Evaluation and Benefits Realisation Plan

### 4.1 Costs

The costs associated with the evaluation, monitoring and benefits realisation analyses are outlined within this section.

A total cost of £402,327 will be required for monitoring, evaluation and benefits realisation. This estimate is included within the project costs supporting the Financial Case of the OBC. The timing of expenditure on monitoring, evaluation and benefits realisation is assumed to be consistent across the assessment period, given the common frequency of data collection and assessment. Costs are as outlined in Table 4-1.

A sum has also been included within the scheme costs for the provision of BCC staff to undertake ongoing monitoring of the scheme. An estimate of £20,000 was included for 1FTE staff member for this

role. Air quality monitoring (installations) forms part of the scheme capital costs and the air quality ongoing monitoring will be included within operational costs.

**Table 4-1: Scheme costs over monitoring and evaluation period**

<b>Activity</b>	<b>Total Cost</b>
<b>Air Quality Monitoring (ongoing monitoring)<sup>7</sup></b> (Including costs for Marlborough Street site)	£264,000
<b>Traffic Levels Monitoring (ongoing monitoring)</b>	£50,000
<b>Economic Indicators (ongoing monitoring)</b>	£25,000
<b>Active Modes (ongoing monitoring)</b>	£25,000
<b>Staff (ongoing monitoring)</b>	£20,000
<b>Air Quality Monitoring (Installations)</b> (Including Infrastructure at Marlborough Street, staff costs and site decommission)	£18,327
<b>Total</b>	<b>£402,327</b>

JAQU have stipulated that monitoring and evaluation costs should come out of the revenues generated from any proposed charging scheme.

## **4.2 Timescales**

A summary of data collection timescales is presented below:

- Stage 1 – Before opening (1 year before) – surveys in 2020
- Stage 2 – 1 year after full opening of the scheme – surveys in 2022
- Stage 3 – Ongoing monitoring until a year after natural compliance 2028

Air quality data and traffic flow, composition and speed data will be collected quarterly during stages 2 and 3.

## **4.3 Reporting**

The evaluation and benefits realisation strategy and reporting will be managed by the BCC Project Manager, with support from relevant officers. They will ensure the plan is successfully completed in accordance with the quality assurance defined by BCC.

<sup>7</sup> These costs include air quality monitoring up to and including one full year post the date of natural compliance.

Central evaluation has been set up by JAQU in order to gain a better understanding of which schemes and policies work best in reducing nitrogen dioxide (NO<sub>2</sub>) within England in the shortest possible time. JAQU has commissioned Ipsos MORI, the Institute of Transport Studies (ITS), Enviro Techology Services and Air Quality Data Management in order to undertake the central evaluation.

Air quality data and traffic flow, composition and speed data will be shared with JAQU on a quarterly basis (at the end of March, June, September and December). Air Quality data will include information from real time monitoring and diffusion tubes, which will be provided to the central evaluation team. If available, historical data ATC and speed data (from 2015 or earlier) will also be submitted to the ITS within the first submission. This will include any historical air quality, ATC or traffic speed data. Air quality data will be submitted to JAQU in the format of the 'Air Quality Monitoring reporting template' provided within the guidance. ANPR data, alongside other traffic data including vehicular fleet information and walking and cycling counts, will be provided to the ITS.

Data and reports submitted to the central evaluation and ITS will be used by JAQU and BCC to adapt and improve their approach to the scheme and also will be used to assess how effectively Local Plans have been in meeting their aims. The findings of the central evaluation will be reported back to BCC through a quarterly newsletter to all Local Authorities, annual reports and individual reports from deep-dive and rapid-assessment case studies to Local Authorities. These reports are intended for internal use only. Learning from the central evaluation will be shared with other Local Authorities by JAQU.

BCC will also submit a report to JAQU outlining programme management factors including information on activity undertaken, financial spend, review of programme risks and performance against key indicators. These reports will be submitted quarterly.

BCC monitoring reports will be made available to stakeholders via the [CleanAirforBristol.org](http://CleanAirforBristol.org) website.

#### **4.4 Governance**

The evaluation and benefits realisation strategy and reporting will be managed in accordance with the management strategy and quality assurance defined by BCC within the OBC Management Case.

#### **4.5 Risks and Mitigations**

There are a number of risks associated with the completion of the monitoring and benefits realisation plan. These risks include:

- It is assumed that data from third parties will be available for use by BCC. For example, information from private companies (e.g. First data on bus patronage) and from other local authorities may not be made available by these organisations.
- Some publicly available data is only available with a minimum one-year lag. This could lead to some delay in the assessment when using data available in the public domain.
- Many of the variables being monitored within this plan are impacted by a large number of external factors. This is particularly true of economic factors such as retail footfall, which are likely to be affected by wider national and international policies and economic performance. To try to isolate and measure the explicit impact of the CAP, a benchmarking exercise will be undertaken to compare economic performance in Bristol against other comparable cities.
- It is assumed that the current BCC programme of air quality monitoring will be continued for the evaluation and benefits realisation period.
- Diffusion tubes are used by BCC to monitor air quality data, however this method generally produces lower quality measurements than automatic monitors. This could reduce the accuracy of the air quality data collected.

## 4.6 New Data Collection

This plan has been developed in a way that minimises additional data collection. Where possible, data has been sourced from data sets which are already collected as part of BCC and third party organisation's ongoing operations. Efforts have been made to use monitoring outputs which can be used to assess multiple impacts and outcomes. Information on how data will be provided for each monitoring output (M1-M9) and whether new data surveys are required, is summarised in Table 4-2.

**Table 4-2: Summary of new and existing data sets required for monitoring**

Monitoring Outputs (M)	Stage 1 – before opening	Stage 2 – 1 year after opening	Stage 3 – 2-5 years after opening
M1 (Air Quality Data)	This data will be collected by BCC through a network of automatic and passive (diffusion tube) monitoring locations.	This data will be collected collected by BCC through a network of automatic and passive (diffusion tube) monitoring locations.	This data will be collected collected by BCC through a network of automatic and passive (diffusion tube) monitoring locations.
M2: Vehicular fleet information	Data available from ANPR survey undertaken as part of business case preparation	ANPR cameras installed to enforce the diesel ban and charging zones will provide this information	ANPR cameras installed to enforce the diesel ban and charging zones will provide this information
M3: Traffic flows	New traffic surveys will be required	Data on traffic flows will be available from ANPR cameras installed to enforce the diesel ban and charging zones, alongside new traffic surveys in areas outside of these zones.	Data on traffic flows will be available from ANPR cameras installed to enforce the diesel ban and charging zones, alongside new traffic surveys in areas outside of these zones.
M4: Job seekers allowance information	Publicly available Job Seekers Allowance data will be available from NOMIS (ONS)	Publicly available Job Seekers Allowance data will be available from NOMIS (ONS)	Publicly available Job Seekers Allowance data will be available from NOMIS (ONS)
M5: UK business council data about changes in business	Publicly available business demography data from ONS	Publicly available business demography data from ONS	Publicly available business demography data from ONS
M6: Retail/business/office space vacancy figures	Data collected by BCC and property consultants as part of on-going processes.	Data collected by BCC and property consultants as part of on-going processes.	Data collected by BCC and property consultants as part of on-going processes.
M7: Park and Ride passengers data	Already collected by bus operators	Already collected by bus operators	Already collected by bus operators

Monitoring Outputs (M)	Stage 1 – before opening	Stage 2 – 1 year after opening	Stage 3 – 2-5 years after opening
M8: Walking and cycling counts	New surveys required	New surveys required	New surveys required
M9: Stakeholder feedback from Council user group forums	Collected as part of BCC existing on-going consultation process	Collected as part of BCC existing on-going consultation process	Collected as part of BCC existing on-going consultation process

As summarised above, new data collection will only be required for monitoring outputs M1, M2, M3 and M8. Further details of transport and air quality data collection is set out below.

It is proposed that the following Air Quality data is collected:

- Air quality monitoring at the 48 sites predicted to be non-compliant in 2024. Omitting sites outside the BCC boundary and those failing to meet health and safety considerations. Data will be collected from 2020-2028.
- Establishment of a new continuous NOx air quality monitoring site on Marlborough Street, a key corridor where compliance is predicted to be late.
- Air quality monitoring at 90 other sites forecast to be non-compliant in 2021 (138-48=90). Annual sampled data in 2020, 2022 and 2025
- Use of some existing BCC sites if locations are suitable

It is proposed that the following Traffic Data is collected:

- Repeat ANPR surveys for one week in 2020, 2022, 2025.
- Additional ANPR surveys at 48 locations (those showing compliance issues in the baseline in 2024) for one week in 2020, 2022, 2025.