

Parking

SHEFFIELD AND ROTHERHAM CLEAN AIR ZONE FEASIBILITY STUDY

POTENTIAL COMPONENTS OF THE PREFERRED OPTION

20th December 2018



DOCUMENT CONTROL

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1. OVERVIEW

1.1 Introduction

- 1.1.1 This document describes the main components of the Preferred Option which have been identified to achieve (NO₂-based) compliant air quality in Sheffield and Rotherham, and the main costs and benefits of these components which will be included in the main Economic Case of the Outline Business Case (OBC).
- 1.1.2 The appraisal will be undertaken in line with relevant JAQU guidance notes, namely Section 5 of the JAQU Options Appraisal Package guidance (downloaded from the appraisal guidance folder on Huddle on 26 November 2018).
- 1.1.3 The proposed approach to this Economic Appraisal is described in an earlier Technical Note, which has been discussed with relevant JAQU experts. A version of this earlier note (updated to reflect JAQU comments) will be provided as another supporting document to the OBC.¹
- 1.1.4 This main (potential) components of the Preferred Option have been grouped by 'Category/Mode', depending on how they relate to the following:
- Implementation of the Charging-CAZ;
 - Measures associated with Private Cars;
 - Measures associated with Taxis;
 - Measures associated with Buses;
 - Measures associated with Goods Vehicles;
 - Measures associated with Road-based Infrastructure and traffic restrictions;
 - Measures associated with Parking-based Policy/Infrastructure;
 - Measures associated with promoting the uptake of Ultra-Low Emissions Vehicles (EV Charging Infrastructure etc);
 - Measures associated with the Communications Plan and achieving behavioural change (including so-called 'Hearts and Minds' campaigns); and
 - Measures associated with Monitoring and Evaluation.
- 1.1.5 There is obviously some over-lap between these categories, but this note provides a disaggregation of the various aspects of the actions required to deliver the Preferred Option, to minimise the risk of double-counting or inconsistencies within the Economic Appraisal.
- 1.1.6 This document largely focusses on the measures which will ensure compliance with the relevant health-based air quality limit value in the shortest possible time and does not consider the wider package of measures which might be delivered by the revenue stream generated by the CAZ charge.

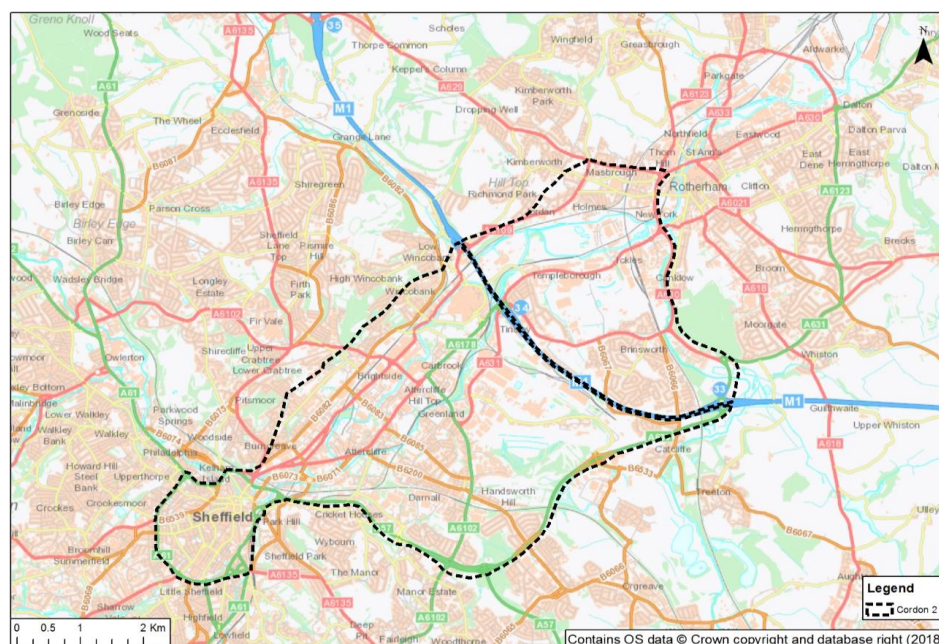
¹ Economic_Impacts_Appraisal_Scoping V2 28-11-2018.docx

1.2 Overview of the Options Which Will be Appraised in the Economic Case

1.2.1 The Outline Business Case will describe a set of 4 CAZ-based options which are all predicted to achieve compliant levels of annual average NO₂ at all required locations in Sheffield and Rotherham by 2021². The Economic Case will also include a number of variants and sensitivity tests around these 4 main CAZ-based options.

1.2.2 The four CAZ-based options are as follows:

- CAZ D inside Charging Area 1, defined as an area stretching from Sheffield’s Inner Ring Road to the A630 through Rotherham, but excluding the M1 motorway – see Figure 1 below for details – referred to here as **Option CAZ 1D**;
- CAZ D inside Charging Area 2 (created by excluding Rotherham from the Charging Area 1, as shown in Figure 1 below) plus a set of targeted measures designed to address a set of air quality hot-spots in Rotherham – referred to here as **CAZ 2D**;
- A CAZ D inside Charging Area 3 (defined as the area inside (and including) Sheffield’s Inner Ring Road – see Figure 2 for details), plus the local Rotherham measures included in CAZ 2D – referred to here as **CAZ 3D**; and
- A CAZ C (i.e. excluding private cars) inside Charging Area 3 plus the local Rotherham measures plus a set of additional measures designed to further-reduce NO_x emissions at a number of air quality hotspots in central Sheffield – referred to here as **CAZ 3C**⁺



² Which is 'the shortest possible time', based on the time required to procure and implement a CAZ scheme which covers an area large enough to achieve this compliance

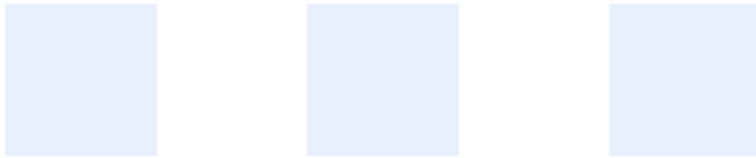


Figure 1 Potential Charging Areas 1 and 2



Figure 2 Potential Charging Area 3

1.3 The level of the CAZ charges

1.3.1 Based on the initial local Behavioural Research undertaken in Sheffield and Rotherham and proposals elsewhere (e.g. Leeds, Birmingham), our proposal is to have the following charges for non-compliant vehicles entering the CAZ area. We will consult further on the charging structure as part of the Statutory Public Consultation in early 2019.

Table 1. Proposed Charges

VEHICLE TYPE	PROPOSED CHARGE
Buses, Coaches and HGVs – CAZ-compliant	£0
Buses, Coaches and HGVs – non-compliant	£50/day
Taxis, Private Hire Vehicles, Vans/LGVs – CAZ-compliant	£0
Taxis, Private Hire Vehicles, Vans/LGVs – non-compliant	£10/day

1.3.2 In line with other national charging schemes, the charge is likely to be payable by midnight of the following day. Government are currently developing a national payment portal which will allow all charges from CAZs to be made via one point.



- 1.3.3 For the Preferred Option and the main potential variants, the proposed charging areas all lie wholly within Sheffield), Sheffield City Council would be responsible for enforcement of the payment of charges. Given that the preferred option does not include any CAZ charging Zone in Rotherham, and is not required, the division of operational responsibility for enforcement of any charging CAZ that straddles the two Authorities (e.g. Charging Area 1) has not been developed.

1.4 Exemptions from charging

- 1.4.1 Should Government accept our proposals, the presumption is that the Preferred Option for a Clean Air Zone Category C with additional measures (CAZ C+) will apply to all non-compliant vehicles that enter or move within the zone.
- 1.4.2 However, as part of the Clean Air Framework³, Government set out a number of exemptions to specific types of vehicle which we will apply to any CAZ area in Sheffield or Rotherham.
- 1.4.3 In addition, we will consider any potential locally-specific exemptions and test the need for any other exemptions through the Statutory Public Consultation in early 2019. Where appropriate, these exemptions could then be included in our Final Business Case proposals. Based upon the national framework, this may include:
- Historic and Specialist Vehicles (e.g. vintage buses)
 - Emergency Service Vehicles
 - Military vehicles
 - Community transport
- 1.4.4 None of these proposed exemptions involve enough vehicles to warrant identifying them separately within the traffic or emissions modelling.
- 1.4.5 There are currently no plans to exempt school buses from the CAZ charge, as we believe this sends the wrong message about the importance of the health of school children who are likely to have the greatest exposure to the emissions from these vehicles.

1.5 What would the money from charges be used for?

- 1.5.1 Any revenue raised locally through the charging CAZ (although collected nationally) will be given back to the Council but may only be used to support further work to improve air quality and promote more-sustainable travel. An agreed⁴ amount will be retained by central Government to fund the cost of operating the central payment portal. In the current version of the Cost Benefit Analysis this amount has been assumed to be 5% of the total revenue generated by the CAZ Charge i.e. the same % as assumed by Leeds.
- 1.5.2 In the Cost Benefit Analysis used to support the Economic Case, the charges are treated as a simple transfer of money, appearing as a disbenefit to the drivers of non-compliant vehicles with 5% of this amount shown as a benefit to Central Government and the remaining 95% showing as benefit to Sheffield and Rotherham Councils.

³ Defra (2017) *Clean Air Zone Framework*,
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/612592/clean-air-zone-framework.pdf

⁴

- 1.5.3 The Economic Case **excludes** the cost of setting up the **central national payment portal**, though does include the fixed % of the charging revenue which will be retained by the Central Charging Portal.
- 1.5.4 The Economic Case also currently excludes the costs and benefits of any scheme funded by the revenue stream, especially since the aim is to achieve a CAZ-compliant fleet (and hence reduce the income stream) as quickly as possible.
- 1.5.5 This simplifying assumption will tend to under-estimate the benefits of any CAZ charging scheme, provided the local schemes which are funded by the charging revenue have a positive Net Present Value (NPV) i.e. will generate more benefits than costs.
- 1.5.6 However, the aim is for the revenue to fall as quickly as possible, because the aim of the scheme is to remove the non-compliant 'dirty' vehicles from the local traffic as quickly as possible, not to generate a revenue stream. Care is therefore required when considering any potential benefits which might be generated by schemes funded by the charging revenue. This will limit the ability to fund other things, particularly given the ongoing maintenance and management costs of the CAZ and the need to fund the costs associated with the potential removal of the infrastructure from 2025.

2. GENERAL ASSUMPTIONS

2.1 Timescales and Time-related Profiles

- 2.1.1 The current assumption is that the measures which are required to deliver compliance with the relevant air quality standards across Sheffield and Rotherham will largely be delivered during 2019, 2020 and the first half of 2021 (i.e. in time to have a beneficial impact on the annual average concentration of NO₂ for the 2021 calendar year).
- 2.1.2 In particular, the Preferred Option assumes that a charging CAZ scheme comes into operation on 1st January 2021 and the main behavioural responses to this will take place between now and the end of June 2021.
- 2.1.3 The appraisal of the Preferred Option currently assumes that the charging of non-complaint vehicles will continue until 31 December 2024 and the relevant signing, enforcement infrastructure and back office system will be decommissioned during 2025.
- 2.1.4 The appraisal also assumes that any improvement to the fleet is based on pulling forward vehicle purchases that would have taken place in 2025 in the Business as Usual scenario, so that there is no net improvement in fleet operating costs, emissions or air quality beyond 2024.
- 2.1.5 Similarly the benefits (or disbenefits) of any infrastructure beyond 2024 will either be ignored or dealt with qualitatively.
- 2.1.6 The Economic Appraisal will also not attempt to quantify the costs or benefits of the (as-yet-unspecified) measures delivered by the CAZ charging revenue stream, either up to the end of 2024 or beyond.

3. ACTIONS REQUIRED TO DELIVER THE PREFERRED OPTION

3.1 Implementation of the Charging-CAZ

3.1.1 The relevant components which will included in this category are as follows:

- The installation, operation and maintenance of a set of ANPR cameras at a number of locations within Charging Area 3 (as defined above) – the ‘optimum’ set of locations will be determined during the ANPR procurement process, but is currently assumed to involve between 30 and 40 locations and something in the order of 100 ANPR cameras;
- A periodic relocation of some of these fixed cameras (e.g. if particular locations are identified as ‘superfluous’ (not generating many observations of otherwise-unobserved’ vehicles) or in response to (unobserved) rat-runs and to strengthen the general enforcement message;
- The set-up and operation of a back office which uses the information from the enforcement cameras and the UK Government CAZ payment portal etc to enforce the payment of the relevant CAZ charges (e.g. identify vehicles which enter the CAZ without paying the charge, issue the relevant penalty notices, pursue payment, storage of relevant images and ANPR data etc) – these back office running costs are assumed to be covered by the CAZ charging revenue stream;
- All the traffic signing associated with operating the CAZ; and
- Decommissioning the signing, ANPR cameras and back office.

3.2 Measures associated with Private Cars

3.2.1 The Preferred Option currently does not include any measures associated with funding the upgrade of the private car fleet.

3.2.2 The various measures designed to encourage owners of non-compliant cars to (voluntarily) change their behaviour are described in Section 3.9 below.

3.3 Measures associated with Taxis

Black Cabs in Sheffield

3.3.1 There are currently over 800 London-style ‘black cabs’ in Sheffield, with an average age of around 12 years. 62% of this fleet are currently over 10 years old.

3.3.2 Defra’s forecasts of emissions from newer taxi fleets indicates that Euro 6 diesel hackney carriages (black cabs) do not have significantly improved NOx emissions when compared to older Euro standards and therefore will not be sufficient to improve air quality in Sheffield⁵.

3.3.3 The Preferred Option therefore envisages the black cab fleet converting to either Liquefied Petroleum Gas (LPG) using a retrofitted LPG engine designed especially for the standard black cab or to new battery-electric black cabs.

⁵ A Technical Note dealing with predicted taxi emissions will be provided as a supporting document to the OBC

- 3.3.4 However, where taxi drivers have recently upgraded to newer vehicles which will still be non-compliant under the CAZ. SCC will consider approaches such as ‘sunset periods’ which would give those drivers additional time to replace their vehicles. SCC propose to provide additional details of this in the Outline Business Case and confirm these based on results of the Statutory Public Consultation.
- 3.3.5 The uniqueness of Sheffield’s ‘black cab’ taxi fleet (age, and Hackney Carriages that are fully accessible for people with disabilities) ensures that SCC are likely to require taxi drivers to upgrade or replace their vehicles at a much faster rate than they would normally in order to achieve compliance under the clean air directive.
- 3.3.6 SCC have an important policy to operate a fully accessible Hackney fleet in Sheffield and are keen to ensure that the benefits of this policy are not eroded in the pursuit of compliant air quality. As a result, the range of fleet available to those offering Hackney services in Sheffield is currently very limited, with only one suitable electric ‘black cab equivalent’ vehicle currently on the market.
- 3.3.7 The Preferred Option therefore includes a support package for taxi drivers in Sheffield that will provide a mix of grant funding and interest-free loans to enable drivers to change their vehicles to meet the new standards. This is in line with CAZ proposals in other cities.
- 3.3.8 SCC are proposing that these new standards are consulted on and ultimately enforced as part of the CAZ proposals, rather than through an immediate change to Sheffield’s Taxi Licensing Policy.
- 3.3.9 However, the emissions modelling assumes that the ULEV requirement will be applied from early in 2019, as each taxi comes up for renewal and that this natural licence renewal cycle will result in around 60% of the fleet meeting the ULEV standard by mid-2021. This impact of the SCC taxi licencing policy is assumed to be in addition to the impacts of the proposed charging scheme on taxi owners decision to upgrade their vehicle. The taxi licensing policy will be updated in line with the date of FBC approval, to ensure that these benefits are delivered.
- 3.3.10 A combination of local behavioural research⁶ (i.e. confirming what is possible) and our analysis of the level of reduction required, particularly on various streets which currently experience a high level of black cab traffic, (i.e. confirming what is required) has suggested that:
- the introduction of a ULEV standard for vehicles being re-licencing and the likely response to a daily charge for non-ULEV vehicles entering central Sheffield will help ensure that over 90% of Sheffield’s Black Cab fleet will to be upgraded to ULEV standards by mid-2021;
 - the Council have expressed an ambition to support/encourage a more to a 100%-ULEV taxi fleet as soon as possible;
 - a combination of retro-fitting existing black cabs to run on LPG and replacing them with new battery electric black cabs is likely to be the most cost-effective/deliverable strategy which retains the benefits of the ‘100% accessible’ fleet providing hackney carriage services; and

⁶ This local behavioural research is described in a report which will be provided as a supporting document in the OBC – this will need a proper cross-reference here

- The proportion of the black cab fleet which is suitable for the LPG retro-fit is currently around 17%, suggesting that the remainder will need to consider replacement with electric vehicles.

Car-based taxis/PHVs in Sheffield

- 3.3.11 There are currently around 1,900 Private Hire Vehicles (PHVs) registered in Sheffield.
- 3.3.12 These car-based PHVs tend to be newer than the black cabs, with an average age currently around 5 years old. However, around a third of them are currently over six years old. Almost all of this fleet are currently diesel vehicles.
- 3.3.13 For car based PHV's, Euro 6 diesels still emit significantly more NO_x than a similar age of petrol-hybrid or electric car – these cleaner technologies are referred to as Ultra-Low Emission Vehicles (ULEVs). The Preferred Option therefore seeks to convert the PHV fleet in Sheffield to ULEVs as quickly as possible.
- 3.3.14 The local behavioural research and the required reduction in emissions has suggested that almost all car-based taxis registered in Sheffield will upgrade to a predominantly petrol-hybrid-based vehicle by mid-2021 and that this ULEV standard should therefore be assumed for all car-based taxis registered in Sheffield. SCC are proposing that these new standards are consulted on and ultimately enforced as part of the CAZ proposals, rather than through an immediate change to Sheffield's Taxi Licensing Policy. The Charging Area 3 CAZ should then enforce this ULEV standard, when it comes into operation on 1st January 2021.
- 3.3.15 The behavioural response assumptions used in the emissions modelling emissions assumes that a ULEV-based policy for private hire vehicles licenced in Sheffield SCC modelling is adopted early in 2019 and this delivers upgrades of around 60% of the car-based taxi fleet to ULEV standards, in addition to the impacts of the proposed introduction of CAZ charging scheme in central Sheffield on 1 January 2021. The taxi licensing policy will be updated in line with the date of FBC approval, to ensure that these benefits are delivered.

Car-based taxis/PHVs in Rotherham

- 3.3.16 There are currently over 750 taxis registered in Rotherham (providing both hackney carriage and private hire services).
- 3.3.17 The local behavioural research and the required reduction in emissions in order to operate in the CAZ, suggests that Rotherham taxis are likely to move towards a predominantly petrol-hybrid-based ULEV fleet in the future. Whilst Rotherham's Taxi Licensing scheme sets some of the highest vehicle standards in England, consideration will be given to whether differential licensing fees for electric hybrid and ultra-low emission vehicles should be introduced into the Policy in future.
- 3.3.18 The emissions modelling and Economic Case Appraisal assumes that around 60% of the fleet of car-based taxis registered in Rotherham will have been upgraded to this petrol-hybrid-based ULEV standard by the end of June 2021, if an incentive scheme to upgrade is introduced.

Taxi-related Incentives

- 3.3.19 To help ensure these required improvements to the three taxi fleets are delivered, the Preferred Option assumes the following measures & incentives:
- The charging CAZ will charge all vehicles registered as taxis and which do not meet this ULEV standard £10/day to operate within Charging Area 3 (as described above);
 - The taxi licensing in Sheffield will move as quickly as possible to adopt the relevant ULEV standards when issuing or renewing taxi licences;
 - Taxi licensing in Rotherham will review its approach to ULEV standards in line with the submission for the FBC.
 - The frequency of inspections and licence renewals will be reduced for ULEV vehicles – details of this and other incentives will be confirmed during the relevant consultation process – ie between now and the submission of the FBC;
 - 100% of the cost of the LPG retrofits (which offer fairly negligible benefits to the relevant black cab owners) will be paid for by the Implementation Fund;
 - 5-year Interest-free loans will be provided to black cab owners who agree to upgrade to a battery electric black cab;
 - Incentives of £X, £Y and £Z will be offered to owners of black cabs, car-based taxi owners in Sheffield and taxi owners in Rotherham respectively, to upgrade their vehicle to ULEV standards prior to the introduction of the charging-CAZ;
- 3.3.20 A separate note describes all of the potential ‘in-kind’ incentives that might be included in these incentives to taxi owners in more detail.
- 3.3.21 The benefits of the reduction in the exposure of taxi drivers to harmful levels of air pollution, particularly while waiting at the various city centre taxi ranks should be highlighted when describing the proposed scheme to taxi owners/operators.

3.4 Measures associated with Buses

- 3.4.1 There are over 600 buses operating on Sheffield and Rotherham’s roads, representing 1% of road traffic but around 5% of the emissions. These buses contributes a significant amount to the total NO_x emissions on many links. For example, transport modelling indicates that on Rawmarsh Hill in Rotherham, 19% of the total traffic NO_x emissions are emitted by the bus fleet using that route.
- 3.4.2 It is clear therefore that, by delivering improvements to the bus fleet on targeted routes, air quality could be significantly improved across the two authorities. This represents a significant opportunity to improve air quality across the two Authority areas, since a Euro VI bus delivers an almost 95% reduction in emissions against earlier Euro standards. In addition, encouraging greater use of existing bus services as an alternative to private car will also help reduce air pollution.
- 3.4.3 It will also be important for the Business Case and the subsequent delivery of the Preferred Option to ensure that proposals to improve air quality in targeted areas does not have adverse effects on another, both within single Authorities, between neighbouring Authorities or over a wide distance. For example, measures to improve the bus fleet in one area must not allow the bus operators to simply transfer the air quality problems to another. Both Sheffield and Rotherham are therefore keen to ensure that any improvement in the

bus fleet due to the proposed charging zone in Sheffield, does not negatively affect the quality of Rotherham's bus fleet.

- 3.4.4 The two Councils will therefore seek support to ensure that all scheduled buses, operating in any of the air quality problem areas are upgraded or retrofitted to achieve the Euro 6 standard as a minimum. In addition, both Sheffield and Rotherham share an ambition that nearly all buses operating in the two Authorities should meet the Euro VI standard, in order to significantly reduce NO_x and NO₂ emissions across the two Authorities.
- 3.4.5 Working closely with Bus Operators and SYPTE, Sheffield City Council have been awarded £1.947m from the Government's Clean Bus Technology Fund (CBTF) announced in Spring 2018. This funding award will see 117 non-Euro 6 diesel buses operating in Sheffield retrofitted with technology which will improve their engine performance and reduce emissions to a compliant Euro VI standard.
- 3.4.6 The emissions and air quality modelling has suggested that a number of key locations can be brought into compliance by upgrading the bus fleets operating along the relevant streets to EURO VI emissions standards, either by using relevant retro-fit technology (where possible) or replacing them with EURO VI vehicles.
- 3.4.7 In particular, buses operating on Sheaf Street and Arundel Gate (in Sheffield) or on Fitzwilliam Road or Rawmarsh Hill (in Rotherham) are assumed to be operating to a EURO 6 emission standard when the Charging Area 3 CAZ comes into force at the start of 2021.
- 3.4.8 Initial discussions with bus operators have indicated that in order to achieve compliance in their fleet operating in Sheffield and Rotherham will require further retrofit engine technology along with the potential for a number of new buses.
- 3.4.9 First South Yorkshire and Stagecoach Yorkshire will deliver the retrofits to their buses, with the Council providing the grants to pay for them from the CBTF. The buses use high frequency services on routes where air quality levels set out by the EU are being breached. 93 First buses and 24 Stagecoach buses will be upgraded by Spring 2019.
- 3.4.10 Bus operators are keen to continue to work collaboratively with the Council to seek additional funding support for retrofit engine technology along the principles of the Government's CBTF and we will be seeking this continued support through our OBC submission.
- 3.4.11 Through early engagement it should also be noted that certain bus operators have indicated that their ability to retrofit their vehicles is not possible due to the age of their vehicles. Further discussions including those through Statutory Public Consultation will be required in order to consider the potential implications of this fully.
- 3.4.12 The Economic Appraisal assumes that the majority of buses operating with the charging area in central Sheffield and in any areas of poor quality in Rotherham will have been retrofitted or replaced by a EURO 6 vehicle.
- 3.4.13 The costs of this upgrade to the various bus fleets have been informed by inputs from three of the main bus operators in the area and will be included in the Economic Appraisal within the OBC.

- 3.4.14 The current version of the Preferred Option assumes a sharing of the costs of these bus fleet upgrades between the Implementation Fund, Clean Air Fund, Clean Bus Fund and the bus operators. To avoid jeopardising the relevant negotiations with the bus operators, the current assumed split between Government and operator funding is not reported here.
- 3.4.15 The funding for retrofitting is currently assumed to be provided 100% by one or other of the potential sources of central Government funding.
- 3.4.16 A small number of interest-free loans are assumed to be made available to the bus operators, to help them fund the relevant purchase of new vehicles (e.g. where retrofitting is not an option). It is likely that these will be capped at a level which is consistent with the cost of a typical bus retrofit.
- 3.4.17 The Economic Appraisal currently assumes little net benefit (or disbenefit) to the operator from retrofitting a Euro V standard vehicle and a modest fuel saving when replacing older vehicles with 2nd-hand EURO VI vehicles.
- 3.4.18 No other incentives to bus operators are included in the current definition of the Preferred Option.
- 3.4.19 No attempt is made to estimate the impact on passenger revenue from the newer vehicles.

3.5 Measures associated with Goods Vehicles

Light Goods Vehicles

- 3.5.1 Light Goods Vehicles (LGVs) make up around 13% of total traffic and create around 20% of the NO_x emissions from traffic in Sheffield and Rotherham. Our modelling indicates that assuming 'Business as Usual' upgrades to the local LGV fleet, there will be around 5,000 non-compliant LGVs operating within the Charging Area 3 per day in 2021.
- 3.5.2 The analysis of the ANPR data suggested that the average age of the LGV fleet in central Sheffield is 7 years, with almost half of them currently more than 6 years old. They predominantly use diesel engines.
- 3.5.3 The local behavioural research into likely responses of LGV drivers found that:
- LGV drivers generally stated that they would replace their vehicles when maintenance costs reach a certain level.
 - Most LGV drivers (87%) agreed that the councils should try to reduce air pollution whilst 58% agreed that the councils should reduce the number of the most polluting vehicles in high pollution areas.
 - Half of LGV drivers said that LPG had little, or no, appeal to them as an alternative to their vehicle
 - Over half of LGV drivers said that electric vehicle alternatives potentially would appeal to them
- 3.5.4 Many drivers suggested they would require a financial incentive in order to upgrade their vehicle.

- 3.5.5 The range of companies, SMEs and individuals that use LGVs is significant in the Sheffield and Rotherham area, as in most cities. Therefore, the required support packages may need to be wide-ranging, as many local businesses (particularly smaller local businesses and self-employed business people in Sheffield and Rotherham) may need additional support to help them upgrade, retrofit or replace their older, non-compliant LGVs.
- 3.5.6 The Preferred Option includes the following assumptions relating to the upgrade of the Light Goods Vehicle fleet operating within Charging Area 3:
- Pulling forward the upgrade of an existing average non-compliant LGV from 2025 to 2019-2021;
 - Existing levels of support (eg Plug in Van grant) are maintained or expanded (to help encourage the required proportion of LGV owners to upgrade to the lowest emission vehicles possible);
 - Providing a 5-year interest free loan for the full cost of this upgrade, offered to the proportion of the local LGV owners needed to achieve the levels of uptake assumed in the emissions and air quality modelling (57% of non-compliant LGVs predicted under the Business as Usual assumptions upgraded to CAZ-compliant by mid-2021), targeted at the LGVs which make the most journeys in areas of poor local air quality⁷;
 - Providing an extra incentive of £X per upgraded vehicle to Y% of the owners making these upgrades – the details of this incentive scheme will be refined by the Statutory Public Consultation / Stakeholder Consultation process.
- 3.5.7 The Economic Appraisal will also include the benefits/disbenefits associated with switching fuel (eg from diesel to electric), as described in the relevant JAQU Guidance⁸.
- 3.5.8 The number of LGVs making trips within Charging Area 3 has been derived from the SRTM3B traffic model and converted to distinct vehicles using factors of 4.0 trips per day (consistent with the LTS model of London).
- 3.5.9 See Section 0 below for details of the proposed funding for additional infrastructure associated with supporting the move to ultra-low emission goods vehicles.

Heavy Goods Vehicles

- 3.5.10 Heavy Goods Vehicles (HGVs) make up only about 2% of total traffic, but create 15% of the NO_x emissions on Sheffield and Rotherham's roads.
- 3.5.11 Within the cost-benefit analysis being reported here, the HGV fleet is split into 'Rigids' and 'Articulated Vehicles', using the corresponding portions of currently-non-compliant vehicles observed at two ANPR camera 'clusters' close to Sheffield City Centre.
- 3.5.12 The number of HGVs making trips with Charging Area 3 has been derived from the SRTM3B traffic model and converted to distinct vehicles using factors of 3.0 trips per day (for Rigid HGVs) and 2.0 trips per day for articulated vehicles (consistent with the LTS model of London).

⁷ These are likely to be predominantly Sheffield-based vehicles, but the details of eligibility for these loans will be confirmed during the statutory consultation process

⁸ JAQU Guidance suggests that ordinary running cost savings from a new vehicle of the same fuel type are captured in the perceived benefits of a new vehicle, estimated by applying the 'Rule of a Half' to the difference in the vehicles' values.

- 3.5.13 The Economic Appraisal excludes the costs of upgrading HGVs which pass a given camera cluster less often than once per month, to avoid the economics being dominated by the costs associated with upgrading the very large number articulated HGVs which visit central Sheffield less than once per month, but which would need to be upgraded to achieve the 'default' behavioural HGV responses suggested in the relevant JAQU guidance⁹.
- 3.5.14 The (current version of the) Preferred Option assumes that a small proportion of Rigid and Artic HGV owners are offered a 5-year interest-free loan to cover the full cost of their vehicle upgrade. The details of eligibility for this interest-free loan will be confirmed during the Statutory Public Consultation / Stakeholder Consultation process.
- 3.5.15 No other incentives for the owners of non-compliant HGVs are assumed in the current version of the (Preferred Option).
- 3.5.16 However, there may be specific challenges for locally-based companies that depend on HGV for their business. SCC will therefore work closely with the city's businesses through the Statutory Public Consultation / Stakeholder Consultation process, to fully understand the implications for local businesses within and around the proposed CAZ area, to help deliver effective and cost-effective improvements to the fleet of HGVs using Sheffield and Rotherham's roads.

3.6 Measures associated with Road-based Infrastructure

- 3.6.1 The Preferred Option contains the following road infrastructure components:
- Optimisation of traffic signals at the Abbeydale Road/Springfield Road junction on the A621 radial route into Sheffield (south west of Sheffield city centre) to minimise the emissions from traffic passing through this junction – NB this was funded through the Early Measures Fund;
 - Optimisation of traffic signals to minimise the traffic emissions on Derek Dooley Way;
 - Optimisation of traffic signals to minimise the traffic emissions on Fitzwilliam Road (in Rotherham);
 - Reduction of the speed limit on the A630 Sheffield Parkway, from 70mph to 50mph;
 - Junction improvements and bus priority measures to support the diversion of buses away from Rawmarsh Hill (in Rotherham); and
 - Signage and TROs etc required to implement an HGV ban northbound on Wortley Road (in Rotherham).
- 3.6.2 The cost of these road schemes, including appropriate levels of adjustment for optimism bias, are summarised in an Appendix to the Economic Case of the OBC.

⁹ The local behavioural research undertaken in Sheffield & Rotherham did not include any HGV owners

3.7 Measures associated with Parking-based Measures

- 3.7.1 The modelling of the Preferred Option has assumed a 5-minute ‘generalised time’ has been added to the cost of parking inside Charging Area 3, to help encourage some of the car trips to choose alternative modes.
- 3.7.2 This is likely to be implemented as an extension of the Controlled Parking Zone.
- 3.7.3 This is unlikely to happen quickly enough under Business as Usual assumptions to help achieve compliance in 2021, so some funding will be required as part of the CAZ Implementation scheme to accelerate this parking restraint measure. would be implemented in practice.
- 3.7.4 A nominal £200,000 has been assumed in the funding model, currently split 50/50 between the Implementation Fund and local SCC funding. This budget would support the initial preparatory work to identify the changes to the current controlled parking zones in Sheffield which are likely to provide the most cost-effective reduction in NO_x emissions within the areas at most risk of having non-compliant air quality.
- 3.7.5 It is expected that the actual delivery of the resulting parking controls would be at worst cost-neutral (i.e. have costs which are covered by the increased parking revenue they generate), but this would be confirmed by the Study which is funded by the £200K highlighted above. There may also be a need for some short-term borrowing, to fund the new infrastructure before the additional parking or CAZ charging revenue is generated. This scheme will therefore need to be reviewed/refined between the submission of the OBC and FBCs, to reduce the various uncertainties associated with it.

3.8 Measures associated with promoting the uptake of Ultra-Low Emission Vehicles

- 3.8.1 The (current version of the) Preferred Option assumes the following additional charging infrastructure for electric vehicles:
- The £1.16M package of funding to enhance the network of public chargers in Sheffield and Rotherham, funded by the Early Measures Fund;
 - The £650K package of Rapid Chargers for electric taxis in Sheffield, as detailed in a bid submitted to OLEV at the end of November 2018;
 - A further 2 x £650K follow-up package of rapid chargers for Sheffield taxis, when the rate of uptake of plug-in electric taxis in Sheffield and the use of the initial set of on-street rapid chargers by the ‘early adopters’ of the first wave of electric taxis in Sheffield is known;
 - An additional £300K for public chargers in Sheffield – details to be confirmed by the ‘Charger Strategy’ currently being developed for SCC; - 75% of these costs are currently assumed to be covered by OLEV, with the remaining 25% to be funded by the private sector;
 - An additional £200K for public chargers in Rotherham – details to be confirmed by the ‘Charger Strategy’ currently being developed for RMBC these costs are currently assumed to be shared 75%/25% between OLEV and the private sector; and
 - An additional £100K of charging infrastructure for the operators of large fleets of (Light) Goods Vehicles in central Sheffield who are willing to switch to an electric fleet

– details of likely demand and eligibility criteria etc to be determined by the Statutory Public Consultation / Stakeholder consultation process – the current version of the funding model assumes these costs are split 75%/25% between OLEV and the fleet owners.

3.9 Costs/Measures associated with Communications and ‘Hearts & Minds’

3.9.1 The current assumptions regarding the Communications Plan and Hearts & Minds campaigns are summarised in the table below.

Table 2. Current Estimate of the Preferred Option Communications -related Costs

Component	Cost Estimate		Source/Comment
SCC Hearts & Minds Comms - EMF - SCC	£ 40,000		Already awarded
SCC Hearts & Minds Comms - EMF - RMBC	£ 40,000		Already awarded
H&M Campaigns - 2019 - SCC residents	£ 264,000		6 weeks (Emails from AC 7/12/18 and LB 11/12/18 to DTC)
H&M Campaigns - 2020 - SCC residents	£ 528,000		12 weeks (Emails from AC 7/12/18 and LB 11/12/18 to DTC)
H&M Campaigns - 2021 - SCC residents	£ 264,000		6 weeks (Emails from AC 7/12/18 and LB 11/12/18 to DTC)
Targetting goods vehicle owners (to encourage upgrading)	£ 40,000	pa	Assumption
Stakeholder Engagement & Public Consultation - SCC	£ 46,000		Email from AC 7/12/18
Stakeholder Engagement & Public Consultation -RMBC	£ 34,500		Email from AC 7/12/18
General Comms - OBC	£ 83,400		Email from AC 7/12/18
General Comms - FBC (per annum)	£ 88,700		Email from AC 7/12/18
H&M /Ecostars campaigns to persuade other big fleets to upgrade - per annum	£ 60,000	pa	(Email from JK)

3.10 Measures associated with Monitoring and Evaluation

3.10.1 The current assumptions regarding measures designed to monitor the impacts of the various measures (e.g. to check that we are on track to achieve the fleet upgrades required to achieve the required reductions in traffic emissions) and to feed into the evaluation of the full CAZ package are summarised in the table below.

Table 3. Proposed Components of the Monitoring and Evaluation Program

Component	Cost Estimate		Source/Comment
M&E EMF - SCC	£ 45,000		Actual Award
M&E EMF - RMBC	£ 20,000		Actual Award
M&E_Maintain existing ANPR cameras_SCC	£ 17,000	pa	As discussed 11/12/18
M&E_Maintain existing ANPR cameras_RMBC	£ 8,000	pa	Email exchange 14/12/18
M&E_Regular analysis of ANPR data - SCC	£ 15,000	pq	As discussed 11/12/18
M&E_Regular analysis of ANPR data - RMBC	£ 7,500	pq	As discussed 11/12/18
M&E_Checking compliance with Rotherham schemes	£ 20,000	pa	Email exchange 14/12/18
M&E_Strengthening the AQ Monitoring/Modelling Teams_SCC	£ 50,000	pa	As discussed 11/12/18
M&E_Strengthening the AQ Monitoring/Modelling Teams_RMBC	£ 50,000	pa	As discussed 11/12/18
M&E_Regular analysis of AQ data_SCC	£ 7,500	pq	As discussed 11/12/18
M&E_Regular analysis of AQ data_RMBC	£ 7,500	pq	As discussed 11/12/18
M&E_Campaign Awareness Research_SCC	£ 80,000		As discussed 11/12/18
M&E_Behavioural Change Monitoring/Evaluation_SCC	£ 80,000		As discussed 11/12/18

3.10.2 Further details of these monitoring and evaluation tasks will be provided in the OBC.

3.11 Costs associated with Project & Finance Management and PFS

3.11.1 The estimated cost of project management and professional services support (PFS) etc are summarised in the table below.

Table 4. Programme Management and Professional Services

Description	< 1st July 2019 (6mnths)	2020 (12 months)	> 31st March 2021 (3 months)**	sub-total minus inflation	total inc inflation (*6% total)	Notes
CAZ resource - SCC / RMBC shared						
Programme Manager (CDS) - 1 x FT equivalent	42,750	85,500	21,375	149,625	158,603	Per month cost (2018) inc % to cover back-fill via delivery partner. CDS resource sub-total £1,048,427
Project Management (CDS) - 2 x FT equivalent	99,996	199,992	49,998	349,986	370,985	
Budget Monitoring (CDS) - 50 hrs / month	9,000	18,000	4,500	31,500	33,390	
Business Support (CDS) - 100 hrs / month	12,000	24,000	3,000	39,000	41,340	
Project Officer support (CDS) - 1 x FT equivalent	38,478	76,956	19,239	134,673	142,753	
Stakeholder Coordination - 1 x FT equivalent	38,478	76,956	19,239	134,673	142,753	combination of PM and Business support rate
Cost Management - 1 x FT equivalent	42,750	85,500	21,375	149,625	158,603	guess assuming £400 fee / day for 7 days / month
Delivery partner back-fill admin fee				24,727	26,211	2.5% on CDS resource costs above
Commercial Services	12,000	24,000	6,000	42,000	44,520	assuming same fee as per OBC / FBC?
Financial Services	24,000	48,000	12,000	84,000	89,040	assumed 3 x requirement to that for the OBC / FBC ?
Legal Services	12,000	24,000	6,000	42,000	44,520	
Technical - Highways & Transport - design, supervision, maintenance contract management (AMEY)				75,000	79,500	Nominal sum - 7.5% assuming delivery value of £1m
Technical - ANPR quality assurance, specialist support and system integration to support client / senior user				140,000	148,400	Nominal sum - assuming 7% on £2m capital delivery value
Technical - ANPR -system - strategic systems integration / coordination				70,000	74,200	Nominal sum - assuming 7% on £1m system / back office value
sub-total				1,466,809	1,554,818	
Plus 15% RMBC				220,021	233,223	
sub-total				1,686,831	1,788,041	
contingency allowance 20 %				337,366	357,608	
Total				2,024,197	2,145,649	1.0600

- 3.11.2 NB The Funding Model used in the Economic Case works in in current prices and therefore the values it uses exclude the impacts of inflation.
- 3.11.3 The cost of providing the various interest free loans assumed in the Preferred Option) are estimated by assuming the provider of the capital would charge 7% per annum on the outstanding balances for the various replacement vehicles etc. This 'interest rate' is assumed to cover all of the admin costs associated with providing the interest-free loans.
- 3.11.4 The net effect of applying this 7%pa interest rate to a 5-year loan is 17.5% of the initial lump sum – as explained elsewhere in the documentation which supports the Economic Case of the OBC.
- 3.11.5 The Preferred Option suggests that the total amount of interest free loan required (including 16% contingency) is close to £200M, resulting in a total (undiscounted) cost of capital of close to £25M. This financing for vehicle upgrades therefore represents a significant proportion of the overall cost of the Preferred Option.