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Bath and North East Somerset Council Clean Air Zone

Explanatory Note on CAZ System Cost Estimates

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1. Introduction

Poor air quality is the largest known environmental risk to public health in the UK[1]. 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 endeavored 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 Dioxide[2] setting out how compliance with the EU Limit Value for annual mean NO_2 will be reached across the UK in the shortest possible time. Due to forecast air quality exceedances, B&NES, along with 27 other Local Authorities, was directed by Minister Therese Coffey (Defra) and Minister Jesse Norman (DfT) in 2017 to produce a Clean Air Plan (CAP). The Plan must set out how B&NES will achieve sufficient air quality improvements in the shortest possible time. In line with Government guidance, B&NES is considering implementation of a Clean Air Zone (CAZ), including both charging and non-charging measures, in order to achieve sufficient improvement in air quality and public health.

Jacobs has been commissioned by B&NES to produce an Outline Business Case (OBC) for the delivery of the CAP; a package of measures which will bring about compliance with the Limit Value for annual mean NO2 in the shortest time possible in Bath. The OBC assesses the shortlist of options set out in the Strategic Outline Case[3], and proposes a preferred option including details of delivery. The OBC forms a bid to central government for funding to implement the CAP.

This note provides reference information and explanatory detail on how the capital and revenue cost estimates were derived for the proposed CAZ system. Terms and abbreviations used are set out in Appendix A.

A breakdown of the estimated costs is provided in the table in Appendix B. This divides the various elements of the system into the following sections:

1. Capital costs for the enforcement system, including:
    - supply, installation, configuration and testing of fixed Automatic Number Plate Recognition (ANPR) cameras
    - supply, installation, configuration and testing of a fully-equipped mobile enforcement vehicle (MEV)
    - supply, installation, configuration and testing of a back office system
    - provision of a control room facility including fitting out of the premises, fixtures, fittings, furnishing and ancillary items
    - Design peer review and project management for systems integration and operational planning
    - Project management of delivery phase
2. Capital costs for street works, including:
    - Supply and installation of camera mounting posts, cabinets, power supplies and associated ducting
    - Supply and installation of all cabinets, power supplies and ducting required for the optical fibre communications network

[1] Public Health England (2014) Estimating local mortality burdens associated with particular air pollution. https://www.gov.uk/government/publications/estimating-local-mortality-burdens-associated-with-particulate-air-pollution
[2] https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017
[3] Bath and North East Somerset Council Clean Air Plan: Strategic Outline Case, March 2018 (http://www.bathnes.gov.uk/sites/default/files/siteimages/Environment/Pollution/strategic_outline_case_bath_28.03.2018_with_annexes.pdf)

- Supply and installation of an optical fibre cable network including all required cabling and network termination equipment
- Supply and installation of PINACL wireless networking equipment including all required cabling, mounting and network termination
- Supply and installation of new and updated signage and road markings for the CAZ on local authority highway networks
- Supply and installation of new and updated signage and road markings for the CAZ on the Highways England Strategic Road Network (SRN)
- Installation of all required kerb line alterations and carriageway realignment works
- Design, project management and site supervision of all on-street works

3. Capital Costs for expansion of Clean Air Fund (CAF) non-charging measures. These would be delivered to reduce the disbenefit of the CAZ to lower income groups as well as increasing the impact of the CAZ. The list of measures includes:
   - Supply and installation of additional cycle parking across Bath
   - Expansion of Go Ultra Low (GUL) West electric car charge network
   - Provision of secure overnight parking outside Bath city centre. This would involve the supply and installation of internal site CCTV and lighting to enable opening of Lansdown P & R car park
   - Funding non-car alternatives for school children and workers under the Scoot/cycle to work initiatives
   - Provision of interest free loans for vehicle upgrades (via Clean Vehicle Technology Fund)
   - Provision of interest free loans for Electric Vehicle car charge points on private property
   - Bus retrofitting
4. QRA Risk
5. Operational (revenue) costs for CAZ operation, including: .
   - Provision of control room operations staff, supervisory staff and staff to operate the MEV
   - Enquiries to the DVLA database to identify captured vehicles
   - Annual licence costs for the back office system
6. Ongoing (revenue) costs for maintenance and support, including that for:
   - The roadside ANPR camera equipment, including any required VCA compliance checks
   - The optical fibre network and the PINACL wireless network
   - The back office system including any housekeeping activities
   - The control centre, i.e. the building and its associated facilities
   - Replacement and repair of signage and road markings

7. Ongoing (revenue) costs for the operation of power and data communications networks, including:
    - Replacement and repair of B-Net optical fibre network
    - Licencing costs for the PINACL wireless network
    - Service charges for any third-party (e.g. BT, Virgin Media) network usage
    - Service and data charges for any mobile communications (e.g. 3G, 4G network usage
    - Electricity consumption of all on-street equipment
8. Ongoing (revenue) operational costs for the CAZ non charging measures, including:
    - Replacement and repair of provided cycle parking across Bath
    - Replacement, repair and management of new public electric car charging points
    - Maintenance of secure overnight car park outside Bath city centre. This would involve the replacement, repair and management of internal site CCTV and lighting to enable late night access to Lansdown P & R car park
    - Ongoing management and administration of providing non-car alternatives for school children and workers under the Scoot/cycle to work initiatives including any maintenance of cycle storage
    - Ongoing management to cover loan interest, defaulted payments and staffing costs of providing interest free loans for vehicle upgrades (via Clean Vehicle Technology Fund)
    - Ongoing management to cover loan interest, defaulted payments and staffing costs of providing interest free loans for Electric Vehicle car charge points on private property
9. Ongoing (revenue) costs for other activities, including:
    - PCN issue costs
    - CAZ publicity and advertising
    - Monitoring of air quality levels
    - Monitoring of traffic volumes and movements
    - Staffing required to carry out ongoing monitoring activities
    - Deactivation/decommissioning of the CAZ system once air quality targets have been reached

Each of the above sections are described in more detail within this note in order to provide further explanation of the estimated costs for each element and how these costs were derived.

2. Assumptions and Exclusions

It is anticipated that B&NES will own and operate the hardware and software required to carry out all CAZ processes, except for those external databases such as the DVLA database and the national taxi database, which will be the responsibility of others (primarily JAQU). It is also assumed that the B&NES system will include its own payment portal and not that proposed for development by central government.

Procurement of each part of the CAZ system will be undertaken using existing B&NES framework contracts, and if required pre-qualification frameworks which B&NES can access without the need for additional procurement. It may be necessary, pending clarification of framework expenditure limits, to carry out a tendering exercise for the supply and installation of the fixed ANPR cameras and MEV as well as certain non-charging measures such as electric car charge points.

3. Capital Cost Estimates

3.1 Enforcement System

The CAZ system supply and installation costs form approximately 18% of the total capital cost. This comprises the on-street camera equipment together with all housing, mounting and cabling infrastructure (excluding that for the data communications network, which is included in section 3.2.1 as part of street works activities). An allowance has also been made for provision of a mobile enforcement vehicle. All back office hardware, software, cabling and connection is included in these estimates along with costs for setting up of the control facility (i.e. the building in which CAZ operation is to take place). Finally, costs have been included for design, project management and other related activities by contractors and by B&NES staff.

3.1.1 On-Street Camera Equipment

For the supply of ANPR cameras an estimate of £[redacted] per camera was made based upon previous known ANPR camera installations. This includes supply-only of the camera hardware, i.e. camera and any associated on-street processing hardware as well as any required mounting and fixing hardware (e.g. bracket).

A total of 54 cameras at 27 locations was estimated to be required for the proposed CAZ. This was derived from a desktop study of the proposed zone boundary and key routes within the CAZ. A combination of AutoCAD® drawings, Google Maps™ and Google Street View™ were used to identify where cameras were needed to identify all vehicles entering the zone at each possible entry point. A limited number of site visits were also undertaken to confirm locations are suitable. The chosen methodology assumes one camera per inbound lane at each entry point and one camera on each lane exiting the CAZ. There are a limited number of proposed cameras within the zone supplemented by the MEV. These would capture vehicles entering, exiting and in a limited number of cases moving within the CAZ.

Installation of cameras at each location was estimated at £[redacted], again based on Jacobs experience of previous similar installations. This is an average cost per location allowing for economy of scale where there are multiple cameras installed at a single location.

An enforcement vehicle was also included in the estimate at a cost of £[redacted]. This includes supply of the vehicle as well as supply and installation of all required equipment (camera, mountings, recording equipment, user interface), cabling and fitting out. It also allows for any modifications that may be necessary (e.g. auxiliary power supply) as well as suitable livery.

3.1.2 Back Office System and Control Facility

The cost for the back office system was based on an estimate of £[redacted] for each camera installed, i.e. £[redacted] for the proposed 54-camera system. This figure is based on implementation of an "in-house" solution, i.e. all hardware and software purchased, installed and operated by B&NES at a suitable local authority facility. Tentative enquiries have been held with the incumbent system supplier with this figure broadly in line with early indications. Although the back office system may have elements of it related to the extent of camera equipment installed (e.g. data storage), in practice the majority of the system is unlikely to be size-dependent as the required hardware and software will be needed irrespective of the number of cameras used. However, the design and functionality of the back office system is still ongoing, so this value is only a broad indication of cost based on those undertaken by Jacobs for other enforcement applications. This should allow for a considerable degree of additional software development and other "bespoke" work for the B&NES solution. A 20% contingency has been included and Optimism Bias for this element would be 200% in line with HMT Green Book advice for capital expenditure on equipment (upper limit). Nonetheless, given that the system design has yet to be agreed, this calculation should be considered with caution.

A nominal estimate of £100,000 was also included for setting up of the CAZ control facility. This assumes that a building is already available at no additional cost to B&NES and that the costs to be covered are for fitting out and furnishing the facility including furniture, lighting, power and communications cabling and termination and for any supporting services needed (e.g. administration, building security). [redacted]

3.1.3 Project Management and Other Services

Additional capital costs are included for design review, project management and other associated CAZ system activities by CAZ system suppliers/contractors. A sum of around £[redacted] has been included for such activities, as described above (including 20% contingency – see section 5).

The final element of capital cost for the CAZ system is that for project management and other related activities including B&NES financial, legal, procurement and HR support. A sum of £15,000 per month is estimated for a period of 18 months, totalling £270,000 based upon prior project expenditure and requirements from similar parking/enforcement schemes. This increases to £324,000 including 20% contingency.

3.2 Street Works

Costs for street works comprise 9% of the total capital cost. This includes all required cabinets, mounting posts, ducting and cabling for camera installation as well as ducting, cabling and connection of the data communications network. Cost estimates for associated road signing and markings were also included, as well as any required kerbing alignments.

3.2.1 Camera and Communications Network Infrastructure

In calculating costs for camera mounting and housing infrastructure (e.g. posts, cabinets, ducting), it was taken into consideration that some locations identified for camera installation may only require a single camera to be installed while others would have multiple co-located cameras that could share the infrastructure. It was therefore assumed that 30 of the 54 proposed cameras would each need a post, cabinet and power supply, with the remaining 24 cameras sharing this infrastructure. An estimate of £[redacted] was made for the supply and installation of a post and cabinet at each of the 30 locations along with a power supply at an estimated cost of £[redacted] each. The cost of the power supply will vary according to the proximity of each location to an existing supply but, based on experience of similar installations, it was considered that £[redacted] represented an appropriate average for provision of power in an urban location. It may be possible to reduce this cost if cameras can be located adjacent to existing street light columns or Distribution Network Operator (DNO) power supplies, however it is likely that most if not all connections will require some ducting to be installed between the camera post and a supply.

A small cost of £[redacted] was also included for installation of 10 metres of ducting between the cabinet and post at 14 of the 30 proposed locations. The remaining 16 posts will of course require ducting between the cabinet and post, but it was considered that the post and cabinet will be adjacent to one another at these locations and thus the ducting requirement will be minimal.

Consideration was given to the cost of installing the digital communications network, which is proposed to be a combination of optical fibre and wireless networking. The optical fibre network will be an extension of the existing B&NES "B-Net" network and the wireless network is proposed to be an extension of the forthcoming PINACL network about to be installed across Bath. The proposed use of fibre or wireless was considered on a site-by-site basis according to the location of the existing fibre network in relation to each camera cabinet location. Of the proposed 27 camera locations, 14 are proposed to be connected to fibre and 13 by wireless communications.

Through analysis of the existing B-Net network in Bath it was estimated that 2000m of new ducting and fibre cabling would be needed to connect to the 14 cabinet locations, at an average cost of £[redacted] per metre (including cable supply and laying), and allowing for excavation in different surfaces, road crossings, etc. This gave a total cost estimate of £[redacted]. A further estimate of £[redacted] was made for termination of the fibre network in each of the 14 cabinets, including all required termination hardware and cabling to the camera hardware in the cabinet.

The remaining 13 cabinet locations proposed for wireless network connection to the existing PINACL network were estimated to cost £[redacted] per connection, i.e. £[redacted] in total.

3.2.2 Road Signing, Marking and Minor Realignment

Various estimates were made for civils works associated with the provision of road signing and marking as well as minor realignment of kerb-lines. It was assumed for the purposes of these estimates that no major carriageway or footway re-alignment work will be needed for any part of the proposed CAZ boundary.

An analysis was undertaken of the signing requirement for each of the entry and exit points at the proposed CAZ boundary. From this the following requirements were determined along with the estimated costs:

- 96 sign plates displaying CAZ entry/exit points, mounted on 48 x 76mm diameter posts (i.e. two sign plates per post) along with all required road markings. Estimated cost £[redacted] per location, i.e. £[redacted] total based upon current costs
- 45 advanced warning sign plates on B&NES roads, each on a 76mm diameter post advising road users of their approach to the CAZ. Estimated cost £[redacted] per post, i.e. £[redacted] total.
- An additional 2 advanced warning sign plates on SGC roads, each on a 76mm diameter post advising motorists of their approach to the CAZ. Estimated cost £[redacted] per post, i.e. £[redacted] total.
- Estimated 14 strategic locations for signage on the Highways England Strategic Road Network (SRN), including RRRAP assessments - HE contractors to undertake works. Estimated cost £[redacted] per location, i.e. £[redacted] total.
- 3 advanced sign plates advising motorists of the availability of each B&NES P & R site on approach as an alternative to entering the CAZ. Estimated cost £[redacted] per post - £[redacted] in total.

The above costs include supply of all signs and posts along with installation and basic traffic management on B&NES and SGC highways (note: traffic management on Highways England roads has been broadly estimated for inclusion at this stage).

An estimate for kerb-line amendments was calculated based upon an assumption that such amendments will be needed at 1 in every 3 camera locations to accommodate new signage or to highlight zone entry points. Thus 10 locations were estimated to need this work at a cost of £5,000 per location, i.e. £50,000 in total.

A nominal £50,000 has been included to cover the cost of additional traffic management measures including 'street works' notices required whilst footways are being excavated and signs or cameras installed. Some use of temporary traffic signals or 'stop and go' boards will be required where single lanes and footways are narrow on local authority roads and this item covers this occurrence.

Finally, an estimate was included for the provision of project management and site supervision of all of the above works. This was based upon a cost of £[redacted] per camera location, i.e. £[redacted] for the 30 locations.

3.3 CAF Non-Charging Measures – Implementation

Costs for non-charging measures comprise 73% of the total capital costs.

3.3.1 Provision of Additional Cycle Parking across Bath

It is proposed to install cycle stands in clusters of 8 stands at various locations. There are 10 sites identified which can accommodate 8 cycle stands within existing footway. The cost of each stand works out at £[redacted] with the stand itself costing £[redacted] with installation and supervision costing £[redacted] per stand with economies of scale included with 8 being co-located.

A further 6 clusters of 8 cycle stands, 48 in total would be installed at key strategic locations around central Bath but crucially within existing carriageway. These would replace existing parking. These are more expensive to install as a Traffic Regulation Order (TRO) and build out works are required in addition to extra design and site supervision. These stands work out at £[redacted] each, £[redacted] in total. The total cost for this package (including 20% contingency) would be just below £[redacted].

3.3.2 Expansion of Go Ultra Low (GUL) West Electric Car Charge Network

It is proposed to install 120 new electric vehicle charging points within Bath with a mixture of 30 rapid charge and 90 fast charge points. The costs are £[redacted] for rapid charge and £[redacted] for each fast charge point, both include installation. Fast charge points could be upgraded to rapid charge at a later date as demand increases. These charge points are required to support a projected increased use of electric vehicles and requirement of users to charge them more quickly. A further estimated £[redacted] would be required in order for the DNO to increase the capability of its network, likely involving additional substations to allow for the extra draw from the network whilst users charge their vehicles. The total cost of introducing this measure would be £[redacted]

3.3.3 Provision of Secure Overnight Parking Outside Bath City Centre

It is proposed to improve security by way of lighting & CCTV at Lansdown P & R site in order to reduce trips into the CAZ. Visitors to the city would be able to park outside the CAZ without facing the charge instead using the P & R. The costs of this measure would comprise £[redacted] for design and preliminary work including surveys, £[redacted] for site construction work including supervision and £[redacted] for required CCTV and ANPR cameras and connections. These costs would total £[redacted] and are based upon similar work which has recently been undertaken within B&NES improving a car park.

3.3.4 Funding non-car alternatives for school children / workers under Scoot/cycle to work initiatives

This measure comprises 3 separate measures: cycle storage units, cycle training and provision of a formalised walking bus. The cycle storage units which would all be sited within schools would cost including all associated installation and administration costs are £[redacted] for 13 units and £[redacted] for 6 required units giving a total cost of £[redacted]

Cycle training using 'Cycle to School' courses is proposed at 5 schools across 3,570 pupils attending each of the 5 schools. Total cost of providing training to a limited number of pupils is £3,650.

The third non car measure is the provision of a formalised walking bus. It is anticipated that 7 schools would be served by this initiative with costs across a 3 year period of £48,000. This would include a limited input from paid staff as it is expected that volunteers such as parents would contribute towards this initiative. Tabard provision and administration costs are included. The total cost of this measure is £177,650.

3.3.5 Provision of interest free loans for vehicle upgrades and EV charging points

It is currently unconfirmed how much capital would be required to administer this initiative. It is currently proposed that the Council borrows £[redacted] to loan to the public on an interest free basis for electric vehicle purchases. A further £[redacted] is estimated to be required to loan to the public as well as businesses on an interest free basis to encourage provision of private electric vehicle charging points. It is anticipated that this initiative would be managed by a specialist loan administrator on behalf of B&NES.

3.3.6 Bus Retrofitting

In order to mitigate the effects of the CAZ it is proposed that 65 buses across various providers would require engine upgrades in order to improve their emissions from Euro 5 to Euro 6 standard. The majority of buses (47) belong to FirstGroup. The cost for each upgrade is £[redacted]. An additional 2 FirstGroup buses require upgrading from Euro 2/3 emission standard to Euro 6. The cost for each of these is £[redacted]. In total the cost of providing this CAF bus retrofitting measure is £[redacted]. There would be no ongoing revenue cost with this measure.

3.4 QRA Risk

3.4.1 Risk

Risk has been calculated using MonteCarlo software with risks established for the appropriate stage when it is relevant within the project. The following unit costs of delay (£ per month) have been considered for the various risks that could cause delay to the project:

- £[redacted] month – for risks during the OBC/FBC stage that do not affect the critical path of project. This allows for project management costs and the potential for a limited amount of re-work.
- £[redacted] month – for risks during the OBC/FBC stage that affect the critical path of project. This is based on the average spend per month of the project to date.
- £[redacted] month – for risks during the OBC/FBC that affect the critical path of project and include legal staff costs. This is based on the average spend per month of the project to date plus an allowance for a limited amount of legal assistance within a month.
- £[redacted] month – for risks that occur during delivery/operation of the scheme. This is based on the approximate monthly cost of staff required to enforce the scheme.

The QRA figure in line with WebTag guidance (P(Mean) is £[redacted] during the project implementation stage and a further £[redacted] during the delivery stage of the project. The total risk pot would therefore be £[redacted].

Full details of the QRA are provided in OBC-23 Quantified Risk Assessment, within Appendix M of the OBC.

4. Revenue Cost Estimates

4.1 CAZ Operation

CAZ operation costs account for approximately £[redacted] in total and primarily relate to the provision of staff, ongoing software licensing and data enquiries to the DVLA database.

Based upon the modelling data and an assumption that 10% of those vehicles which are required to pay do not, it is envisaged that almost 72,000 PCNs would be generated which would require 8 staff and a manager to process within required timescales. It is anticipated that B&NES would employ these staff from the outset and should numbers of PCNs reduce they would reduce staffing levels accordingly.

The MEV is assumed to be manned by a single member of staff and an ongoing cost to utilise the vehicle is included.

A member of staff is also proposed to manage successful delivery of the various CAF non charging measures to mitigate the introduction of the CAZ. In total it is envisaged that 9 staff would be employed at £[redacted] each and 2 staff at £[redacted] to ensure satisfactory CAZ operation at a total cost of £[redacted] per annum. This would reduce over time as the number of contraventions reduce.

Estimates were also made of the cost for retrieving data from the DVLA database. This assumes that B&NES will purchase an annual license for this data from the DVLA at a cost of £[redacted] However, it is understood that other options are being discussed between JAQU and the DVLA to allow access to this data by CAZ authorities, which may change this estimate.

The final cost estimate for CAZ operation is that for back office software licenses. This will depend largely upon the final selected overarching system but a general estimate of £[redacted] has been included pending more detailed discussions with system suppliers.

4.2 Maintenance and Support

Annual maintenance and support accounts for a relatively small proportion of the total revenue costs. Costs for maintenance and support of on-street equipment were calculated as follows:

- Roadside camera equipment, including Vehicle Certification Agency (VCA) compliance check – £[redacted] per camera, i.e. £[redacted] for all 54 cameras per annum.
- Optical fibre data communications network – £[redacted] per location, i.e. £[redacted] in total for the 14 cabinet locations where a fibre connection is proposed
- Wireless data communications network - £[redacted] per location, i.e. £[redacted] in total for the 13 cabinet locations where a wireless connection is proposed

Revenue costs for back office equipment and services were calculated as follows:

- Back office hardware and software maintenance/housekeeping - £[redacted]. This is based upon an assumption of 10% of the total back office system capital cost (including 20% contingency – see section 5), which is considered as an acceptable guideline for estimating such costs.
- A nominal building maintenance cost estimate of £30,000 (including 20% contingency).

Estimates were also included for the replacement of any CAZ signage that may become damaged. This assumes that 1 in 10 signs will need replacing each year. This would require replacement of 5 CAZ boundary signs each year at a cost of £[redacted] each (i.e. £[redacted] total) and 5 CAZ advance warning signs each year at a cost of £[redacted] each (i.e. £[redacted] total). This cost also includes any required maintenance of the 3 signs which make reference to B&NES Park and Ride sites.

It has been assumed that the limited number of SRN signs would require a modest maintenance contribution for the period they would be in place. This is due to the signs being protected away from the carriageway. If maintenance is required, provision would be made under the maintenance regime of the Highways England Area 2 term maintenance contractor. It is estimated that £[redacted] would be required per annum.

4.3 Power and Data Communications Networks

Assuming the adoption of B-Net optical fibre and PINACL wireless data communications, the annual costs for data communications and power provision are expected to be negligible within the total annual revenue costs. This assumes that B-Net has no ongoing costs beyond the maintenance costs identified in section 4.2 above. An estimate was included for licensing associated with the PINACL wireless network, at a cost of £[redacted] per location per year, i.e. £[redacted] for the 13 camera locations proposed to use the wireless network.

No allowance has been made at this stage for any additional communications networks that may be required for backhaul or backup services such as "landlines" from BT or Virgin Media, or mobile network services.

In terms of mains power supplies, a cost estimate was made of £[redacted] per year for each of the 54 cameras, i.e. £[redacted] in total. This assumes all camera and communications equipment has a total power consumption of 100 Watts and that the price of electricity is 11 pence per kilowatt hour.

4.4 CAF Non Charging Measures - Operations

CAF non-charging measures cover annual operating costs for the following measures:

- Maintenance of cycle stands is assumed to be required for 1 in every 10 new stands giving a total cost per annum of £[redacted].

- Expansion of GUL West electric vehicle charge points is envisaged to require no ongoing operational cost payable by B&NES. This is due to the infrastructure although owned by B&NES, being managed and operated by Bristol Energy, under a dedicated West of England area contract. Surplus revenue would be used to maintain and reinvest in the network and as demand increases for these units the increased income should cover operational costs.

- The provision of secure parking at Lansdown P & R site would incur ongoing operational costs of £[redacted] per annum. This would be due to mobile patrols of the site costing £[redacted] pa and public relations work costing £[redacted] per year in order to promote the site to Bath businesses and visitors. A moderate £[redacted] is also included to cover maintenance of new infrastructure. It is assumed that any large scale repair or replacement issues such as vandalism or resurfacing would be covered within existing operational budgets and from revenue raised within existing operational hours.

- Scoot / Cycle to work initiative is anticipated to cost £[redacted] to operate each year. This cost assumes 1 in 10 new cycle storage containers requires maintenance at an estimated cost of £[redacted] each so 2 in total. It should be noted that the walking bus cost has been included as a capital cost due to equipment and organisation being required at the outset of the scheme.

- Interest free loans for both the upgrade of vehicles via the Clean Vehicle Technology Fund and installation of electric vehicle charging points on private land by business or private users are anticipated to require an ongoing operational cost of 2%. This would cover the loan interest to be paid back for the initial borrowing by the Council as well as defaults on payments and staff administration. A specialist loan administering company would likely be deployed to manage this initiative with costs covered within the 2%. Given it is assumed that £[redacted] would be required to operate each loan scheme, this would equate to £[redacted] for each measure.

- Anti-idling measures are proposed to be introduced in conjunction with the CAZ and enforced by the directly appointed Council enforcement officers. It is proposed that 2 anti-idling enforcement officers would be employed throughout a 5 year period costing £[redacted] each per annum. In addition, a publicity and PR campaign would be run costing £[redacted] per annum. Therefore, costs to operate this measure would be £[redacted] per year and £[redacted] for the full 5 year term.

4.5 Other Activities and Services

Traffic Penalty Tribunal (TPT) charges are included as each PCN issued contributes a nominal 35 pence towards the ongoing existence of this independent panel. If almost 72,000 PCNs are issued as expected during the first year (this figure is anticipated to reduce during the life of the CAZ) it would cost £25,188.00.

Printing each PCN for issue including associated materials is calculated to cost [redacted] With 71,966 PCNs anticipated to be issued this operational cost would be £[redacted]. Postage if sending first class at 67 pence per stamp would cost £48,213.00. This could be reduced to 58 pence per PCN if using second class stamps for postage.

A nominal cost estimate of £[redacted] per year was included for publicity and advertising of the CAZ scheme prior to and during its operation. It is likely, however, that this cost will reduce over time as the scheme becomes familiar to the public and the need for ongoing publicity diminishes, although it is expected that some publicity will always be required.

A cost estimate of £[redacted] per year was included for more regular monitoring of air quality levels using existing B&NES air pollution monitoring equipment. An estimate of £[redacted] per year was also included for increased

monitoring of traffic flows, again using existing B&NES traffic count detection equipment with perhaps an occasional minor supplementary survey.

Economic indicators would also be monitored throughout the scheme. This would cost £[redacted] per year. Active mode use (walking and cycling) would also be monitored with the same ongoing cost. Costs to undertake both of these monitoring tasks is £[redacted].

A sum was included for the provision of B&NES staff to undertake ongoing monitoring of the scheme, including progress/performance reporting, user satisfaction surveys and other related activities. An estimate of £35,000 per year was included for 1 FTE staff member for this role.

Finally, a cost has been included to cover the drafting and any subsequent changes required to the Legal Charging Order. This is anticipated to be of the order of £[redacted]

4.6 Scheme Decommissioning Cost

An estimate was made for decommissioning of the CAZ once air quality compliance levels have been achieved and the scheme is considered by B&NES as no longer necessary. This will require the removal of all on-street camera and communications equipment, including cabinets, and the removal of all signage and road markings. It also includes removal of the mounting posts for the cameras and the signage. An estimate of £[redacted] was made for this activity at each of the 27 camera locations, i.e. £[redacted] in total and £[redacted] at each sign location equating to £[redacted]

A cost of £[redacted] has been included for decommissioning the back-office system and the control facility. In total it is estimated that decommissioning the system would cost £[redacted].

5. Contingency Estimates and Other Variations

The cost estimate calculations described above for both capital and revenue elements were each subject to a 20% "uplift" to allow for contingency. This is shown in the table of costs in Appendix B.

It should be noted that all capital and revenue price estimates provided in this document are assumed to be firm and fixed for the duration of CAZ installation and operation. No allowance has been made for index-linked or any other such potential variations in prices over time.

Optimism Bias is also included at standard industry rates. There are various rates used and these are shown within a separate tab on the cost spreadsheet and range from zero up to 200% dependent on the item in question. With optimism bias applied the scheme CAPEX costs would increase from £[redacted] (including contingency and risk) to £[redacted]. OPEX would increase from [redacted] with optimism bias applied.

6. Summary of Capital and Revenue Costs

As can be seen in the table in Appendix B, allowing for the contingency costs and risks previously described, the total capital cost for the proposed Bath CAZ is estimated to be just under [redacted]. Approximately £[redacted] of this is for supply and installation of the enforcement system (cameras, enforcement vehicle, control room setup and back office hardware and software) along with various project management services. A further £[redacted] is for street works activities including supply and installation of cabinets, mounting posts, signing and road marking as well as any minor kerb realignment. Again, this includes estimates for various project management and site supervision activities.

The most significant cost of implementing the project is for CAF non charging measures. This group of measures is projected to cost £[redacted] with the 120 GUL electric vehicle charging points costing 50% of this total. Bus retrofits at £[redacted] is the other significant contributory cost.

Risk is also incorporated at almost [redacted]

The annual cost of operating the CAZ (again, including contingency) is estimated to be around £[redacted]. This comprises the following costs (rounded to the nearest £1,000):

- £[redacted] for supervisory and operations staffing (including enforcement vehicle drivers)
- £[redacted] for DVLA data licensing
- £[redacted] for back office system licensing
- £[redacted] for maintenance and support (on-street and back office)
- £[redacted] for power and communications network charges
- £[redacted] for CAF non charging measures - operations
- £[redacted] for other ongoing activities including publicity and monitoring of air quality and traffic volumes (including a member of staff to carry out such activities)

The final cost element is that for future decommissioning of the CAZ, estimated to be £[redacted]

Appendix A. Terms and Abbreviations

Item	Description
ANPR	Automatic Number Plate Recognition
B&NES	Bath and North East Somerset Council
BT	British Telecom
CAF	Clean Air Fund
CAZ	Clear Air Zone
DNO	Distribution Network Operator
DVLA	Driver and Vehicle Licensing Agency
EV	Electric Vehicle
GUL	Go Ultra Low
JAQU	Joint Air Quality Unit
MEV	Mobile Enforcement Vehicle
P & R	Park and Ride
PCN	Penalty Charge Notice
RRRAP	Road Restraints Risk Assessment Process
SRN	(Highways England) Strategic Road Network (motorways and trunk roads)
TPT	Traffic Penalty Tribunal (for adjudication of PCN appeals)
TRO	Traffic Regulation Order
VCA	Vehicle Certification Agency (for approval of certified enforcement devices)

Appendix B. Breakdown of CAZ System Cost Estimates

This information has been redacted for reasons of commercial sensitivity

Appendix C.

JACOBS

This information has been redacted for reasons of commercial sensitivity