

E01 Strategic alignment 20%

How does the project deliver against the objectives of the Clean Bus Technology Fund and form part of the areas wider air quality plan?

Project Description: Southampton City Council (SCC) working in partnership with the main bus operators (First Group, Bluestar, Unilink, Xelabus and Wheelers Travel) that provide bus services in Southampton to reduce local roadside NO₂ concentrations. The project will retrofit Clean Vehicle Retrofit Accreditation Scheme (CVRAS) accredited Selective Catalytic Reduction Technology (SCRT) equipment to 145 buses that currently are between Euro III and Euro V standard during 2017-18 and 2018-19. This will ensure that the vehicles achieve the desired reductions in NO₂ emissions in preparation for the implementation of the Southampton Clean Air Zone (CAZ) in March 2019. Currently there are 56 Euro VI buses operating in Southampton, with a further 52 new Euro VI buses due to be delivered by 2018. Accounting for these, the 145 buses represent all of the remaining non-Euro VI buses that will be operating in March 2019 in Southampton and the wider area via services beyond the city including those to Totton (the part of New Forest DC mentioned in the National Air Quality Plan for Nitrogen Dioxide in UK), Eastleigh and Winchester - where high concentrations of NO₂ exist in AQMAs.

Details of the buses that would be retrofitted, the Euro standard and age of the buses and routes:

The retrofit will cover 145 pre-Euro VI standard buses run on radial services into central Southampton. In total 3 Euro II buses, 52 Euro III buses, 32 Euro IV buses and 58 Euro V buses will be retrofitted. Vehicle ages of the 145 buses are as follows: 1x 1999; 1x 2000; 3x 2002; 1x 2004; 13x 2005; 15x 2006; 7x 2007; 11x 2008; 26x 2009; 2x 2010; 1x 2012; 23x 2013; 22x 2014 and 19x 2015). These buses operate on First Bus routes 2, 3, X4, X5, 6, 7, 8, 9, 11, 12 and 13; Bluestar routes 1, 2, 3, 4, 5, 6, X7, X7R, 8, 9, 11, 12, 16, 17, 18 and Quay Connect; Unilink routes U1, U2, U6, U9; Wheelers routes W1,301,302; and Xelabus route X4. Fifteen of these routes extend outside of Southampton (Totton, Eastleigh and Winchester) and improvements to the bus fleet will bring additional air quality benefits to AQMAs in these areas.

The Accredited Technology we propose to use: The scheme proposes to use SCRT retrofit technology. SCRT is an accredited technology and enables harmful emissions such as NO₂, Diesel Particulates, Carbon Monoxides and Hydrocarbons to be reduced by up to 95%. Retrofitting of SCRT has been successfully delivered for Euro II, III, IV and V diesel buses. These SCRT systems have been robustly tested and shown to meet the Euro VI equivalent designated emissions under CVRAS.

An explanation if you are submitting a bid on behalf of more than one local authority.

SCC is the sole authority for this submission, which is supported by Hampshire County Council, Eastleigh Borough Council and New Forest District Council – see their formal letters of support which are attached in the Technical/Commercial folder.

How this project fits into the area's wider air quality plan:

Southampton is the eighth most polluted city in the UK, accounting for 100 avoidable deaths each year. The National Air Quality Plan for Nitrogen Dioxide in UK (2017) has identified Southampton as one of five UK cities, outside London, that are not expected to meet national air quality limit values by 2020. As such Southampton is mandated to establish a CAZ by the end of 2019. This project will form part of the SCC's Clean Air Zone Strategy and Clean Air Zone Implementation Plan (adopted in November 2016) of which the aim is to bring about compliance with the air quality objectives within the shortest possible time. At present the Council is pursuing CAZ options that are likely to include a penalty charge for non-compliant buses operating within its boundary. A recommendation of the CAZ Strategy and Implementation Plan is to introduce retrofit for buses as this is an effective mechanism for delivering direct emission reductions. This CBTF funding bid addresses the priorities of the CAZ Strategy by collaborating and supporting operators to retrofit pre-Euro VI buses between now and 2019 with SCRT and bring forward the benefits of reducing NO₂ emissions while also ensuring operators are prepared for the introduction of the CAZ.

Alongside addressing the EU Directive exceedance, SCC has a responsibility to undertake Local Air Quality Management (LAQM) through review and assessment of monitoring data. The LAQM process has resulted in the designation of 10 Air Quality Management Areas (AQMA's) due to exceedances of the annual mean NO₂ objective. These exceedances result from road transport, therefore a programme to retrofit buses that regularly operate through these AQMA's will have a significant positive impact on concentrations. Once the 145 buses are retrofitted, the emission reductions will be immediate with this benefit subsequently resulting in reductions in NO₂ concentrations in AQMA and more widely across the city on main bus corridors.

Explanation of any other benefits beyond NO₂ reductions expected e.g. reduction in emissions of carbon dioxide (CO₂) and equivalents.

SCRT technology will achieve reductions in Particulate matter pollutants from diesel exhaust gas as well and NO₂. On official tests, harmful gasses such Particulate Matter can be reduced by over 98%.

E02 Delivering air quality benefits 20%

How does the project deliver improvements in air quality?

Demonstrate how the project will contribute to bringing local NO₂ concentrations within statutory limits¹ within the shortest possible time. Shorter timescales for compliance will be favoured.

The bus network in Southampton is comprehensive and is experiencing passenger growth, helping to provide an attractive alternative to the private car, thereby supporting more sustainable travel patterns. In 2016/17 there were 21.2m passenger journeys in the city on a total bus fleet of 255 vehicles. All of the ten designated Air Quality Management Areas (AQMAs) in the city (shown on Figure 1 in **F01 Air Quality**) have buses travelling through them. Buses in the current fleet of 255 vehicles contribute typically between 3.5 and 8.5% of the NO₂ emissions by source apportionment across 9 monitored sites but rising to as high as 20% and 42% on two monitored corridors with the highest frequency bus services*. Operators have advised us that by late 2018/ early 2019, there will be 110 Euro VI standard buses operating on routes in and into the city, based on current vehicle requirements (which are subject to change in light of operator network reviews). These Euro VI vehicles will either be purchased new or cascaded from elsewhere.

This would mean that there would be 145 buses operating in Southampton that would not be CAZ compliant. If successful, this CBTF retrofit bid would bring all of these remaining 145 pre-Euro VI standard vehicles into compliance before the commencement of the Southampton CAZ in March 2019. The programme of retrofitting would commence in mid-March 2018 and will take approximately nine months to fully retrofit the 145 identified vehicles, with the retrofit programme complete by early December 2018. As each vehicle is completed and tested we would expect there to be air quality benefits that would be realised immediately.

The accredited SCR technology identified for this provided by the suppliers we have currently identified (Eminox, HJS and Green Urban) and have been robustly tested to reduce emissions of NO_x and NO₂ by up to 99%, and particulate matter (PM_{2.5} & PM₁₀) by 95%. To ensure that local NO₂ concentrations are brought down the suppliers would undertake a full detailed survey of the buses to be retrofitted to validate the condition of the vehicles and prioritise those that the suppliers are already familiar with. A Gantt chart provided in section E03 setting out the approach to implementation.

Parts will then be ordered and a number of vehicles will be fitted with Temperature/NO_x Sensors in order to carry out in-service datalogging on the buses while they operate on their normal bus routes. Any design work or prototyping will be done during the first 6 weeks while waiting for the key components to arrive. On arrival of the parts a “First Off” system will be built and then installed on each of the different vehicle types. A post emissions measurement and system sign-off will then take place prior to finalising the timeframes for the completion of the retrofit programmes with bus operators.

The retrofit installations would take place within the four bus operators’ depot premises, with the accredited suppliers fitting SCRT technology to up to three vehicles per week. Where possible local specialists will be contracted to work with the supplier’s installation team. Local bus operators have the skills and experience to ensure they can maintain the systems well throughout the 5 years that the vehicles are expected to remain in service. Bus operators will select one of three suppliers of CVRAS Accredited Technology retrofit systems:

Eminox’s SCRT system is CVRAS approved and is capable of reducing NO_x and NO₂ by 99%, and particulate matter by 95%. It has been successfully fitted to 4,000 vehicles across Europe, including 2,000 vehicles in the UK and was used in 12 projects who have previously been successful in securing funding via the CBTF/CVTF. SCRT systems are designed for each each make and model of bus. Eminox Generation 3 catalyst technology developed by Johnson Matthey is supplied as standard with all our SCRT systems. They are designed to be highly reactive on NO₂. On a standard bus tested at Millbrook, the system can achieve NO₂ reductions of 99.5 % (for an ADL E400 Euro V)

HJS’ Real Blue SCRT system combines a CRT system with an SCR system. This system has been Millbrook tested and TfL/DfT approved for the ULEZ and CAZ’s. For Euro V vehicles tested, reductions of 99% of NO_x have been achieved. It has been successfully fitted to 3,000 vehicles across Europe including vehicles in the fleets of over five operators of TfL bus services. The Real Blue system is in compliance with TfL Euro 6 standards and will be CVRAS approved imminently.

GreenUrban’s “ecoNO_xt Generation 6” retrofit SCRT system – which combines a DPF (Diesel Particulate Filter) and DOC (Diesel Oxidation Catalyst) to reduce CO, HC and Particulate with SCR (Selective Catalytic Reduction) has been shown in Millbrook testing for a Euro 5 ADL Enviro 400 to deliver a 99.2% reduction in NO_x/NO₂, hence meeting the Euro VI equivalent designated emissions under the Clean Vehicle Retrofit Accreditation Scheme (CVRAS). The system comes complete with an ECU, Adblue Tank, pump & injector,

*For Stage 3 assessment, please refer to “F01 Air Quality” – which sets out more detail on how the Southampton CBTF retrofit project will contribute to bringing local NO₂ concentrations within statutory limits within the shortest possible time

pre/post NOx sensors, temperature/ back pressure and Load/Speed sensors to help calibrate the correct dosing within the exhaust flow. The system is expected to be CVRAS approved in the coming weeks.

Provide details of features such as on-board diagnostic (OBD) systems and the vehicles' capacity to impose a 'limp-home mode' operation, as described in the Clean Vehicle Retrofit Accreditation Scheme technical requirements.

The OBD systems provided by the three suppliers of SCRT are summarised below:

The **Eminox SCRT** system is designed to fully integrate with the vehicles' OBD and uses a Control and Diagnostics Interface (CADI). This integrates with the vehicle's OBD to actively manage SCRT systems and optimise performance. The CADI displays information on NOx reduction, Ad Blue Level & Back Pressure. Where limp mode (vehicle de-rate) is supplied on the original vehicle, the upgrade will replicate the original bus procedure. The OBD integration complies with CVRAS accreditation. There is integration with the vehicle MIL lights, Urea level and Engine derate alarms and these are displayed in the same manner as the original system. Eminox conduct extensive development and road testing to ensure every system has fully integrated OBD as designed by the OEM.

The **HJS Real Blue SCRT** system integrates fully with the vehicles original OBD systems (Euro 4/5) and the de-rate or limp home mode remains unaffected. The HJS After-treatment Control Unit (ACU) is connected via CAN-bus to the vehicles' ECU and transmits error codes to the vehicles diagnostic system. Full OBD integration is provided for all Euro 4/5 applications. For all Euro 3 applications all diagnostics and warnings are controlled by the HJS system as there is no existing after treatment system installed. As the de-rate function is not available on Euro 3 applications, the vehicle will continue to operate as normal in these circumstances.

GreenUrban's "ecoNOxt generation 6" system - has its own "On-Board Diagnostics" utilising the "engine out" and "tailpipe" NOx sensors which measures "Real-Time" NOx emissions reductions that get stored within the ECU for downloading via a Windows Friendly Software or through a Telematics Package. The system also comes with sensors to measure Adblue Level and Adblue Pressure and a visual display to warn the bus operator of the Adblue Levels which remains in the system. The sensors interface with the vehicles Can-Bus System so that if the operator fails to replenish the Adblue it will invoke a "Limp Home" Mode. Once the Adblue is replenished it is picked up by the systems ECU and normal operation/dosing will be resumed.

Provide details of the real time, or near to real time remote monitoring equipment (telematics) you propose to install and explain how tailpipe emissions will be monitored once the retrofits are complete (mandatory requirement).

Eminox – If chosen by operators, the Eminox SCRT system will be supplied with a telematics system using validated components from established telemetry system providers that will transmit real time performance data via our control and Diagnostics Interface (CADI). This allows real time monitoring of NOx, urea levels and DPF back pressure. Performance is reported by a telemetry system via a web based data reporting system. This can show that the system is operating as intended and provide maintenance and service triggers for operators. The telemetry provides detailed data tracking of tailpipe emissions by time and location.

HJS - If chosen by operators, the HJS telematics system is fully integrated with the HJS after treatment system. The HJS ACU supplies the telematics system with power and also supplies the unit with all of the system data required for transmission via the telematics unit. The telematics system uploads every 2 minutes of operation and provides the data measurements in real time via GSM on exhaust gas temperature upstream DOC [°C]; exhaust gas temperature upstream SCR [°C]; exhaust gas temperature downstream SCR [°C]; engine intake temperature [°C]; AdBlue® tank temperature [°C]; DPF Backpressure [mbar]; AdBlue® tank level [l]; NOx concentration tail pipe [ppm]; NOx concentration engine out [ppm] and NOx conversion %.

GreenUrban - If chosen by operators, the GreenUrban "ecoNOxt generation 6" system comes complete with its own OBD utilising the "engine out" and "tailpipe" NOx sensors which measures "Real-Time" NOx emissions reductions which gets stored within the ECU for downloading via a Windows Friendly Software or through a Telematics Package. The Telematics runs on the Microsoft "Azure" platform which can store up to 30 different parameters such as NOx reductions, Adblue levels/usage, Temperature, Backpressure, RPM, Date, Time, Mileage, Fuel Usage etc. The system can also be setup to measure the average daily NOx reductions being achieved in real-time. The system provides operators with on-going "Real-Time" Emissions Reporting.

For all three systems, if the temperature sensor, dosing unit, upstream NOx sensor or ACU develops a fault, then the original fault code message as used by the OE system is transmitted by the HJS ACU to the vehicles ECU. Where predetermined system operating limits are breached, text message and e-mail alerts can be created and sent to the operator. This can then be looked into by technicians.

E03 Deliverability 20%

How will you ensure that the project delivers its objectives to time and budget?

You must include detail of an expression of interest from one or more bus operator.

We have developed this bid in partnership with the main operators in Southampton – First Hampshire Dorset & Berkshire, Bluestar, Unilink, Wheelers and Xelabus. The operators are continuing to invest in new Euro VI vehicles and have provided full details of their fleet composition (accounting for operational movements and capital expenditure) and their commercial arrangements with preferred suppliers of SCRT retrofit technologies. See the appended letters of support from operators in the Technical/ Commercial folder.

Detail of discussions with technology providers & reasons for chosen Accredited Technology.

We have had discussions with James Thorpe UK Sales Manager at EminoX, Mark Cooper, UK Sales Manager at HJS and Alan Barnard, Sales Manager at GreenUrban to understand their respective SCRT retrofit technology systems and their performance in reducing NO₂. Our reasons for choosing to work with these three suppliers are set out below:

EminoX

- Have already secured CVRAS accreditation for their SCRT system
- Strong performance and track record in delivery of retrofit programmes
- Offer SCRT training and diagnostic support for operators
- Have experience of servicing fleets and offer annual maintenance package post-retrofit
- Offer filters exchange and reconditioning
- Fleet of Mobile Technicians and fully trained sub-contractors with stocked vans
- Fitting of SCRT system will be delivered by EminoX led engineering teams

HJS:

- Are well-advanced in the process of securing CVRAS accreditation for their SCRT system – expected to be secured by mid-November 2017
- Are also one of the approved suppliers for the TfL project involving 6,000 buses)
- Over 800 SCRT installations completed in the UK, 3,000 in Europe
- Several common applications for particular vehicle types designed and ready to go
- Several Millbrook test results available
- Have commercial relationships with large operators in the UK who run services in Southampton
- Long term in service testing successfully completed for TfL

GreenUrban:

- Are well-advanced in the process of securing CVRAS accreditation for their SCRT system
- Have already undertaken the accredited “Revised LUB Test Cycle” at Millbrook and demonstrated that they can easily meet the required emissions standards
- Have already demonstrated in other cities on previous Clean Bus/Technology Funded programs that they can complete similar projects on time and within budget and were also selected recently to supply the largest project outside of London which was supply and installation of SCRT systems to Birmingham’s “National Express West Midlands” fleet of 210 double deck buses within a 6-month timeframe with fits at the operator’s depots outside of normal working hours
- Can provide on-going “Real-Time” Emissions Reporting
- Can provide an in-service R & M package throughout the life of the program
- Offer a standard parts & labour warranty for 3 years with an option for extended 2-year warranty to cover the 5 year period that the buses are required to remain in service after being retrofitted.

An explanation of the procurement process the local authority will undertake to award any necessary contracts.

If SCC is successful, it will issue a Project Inception Document (PID) to all local bus operators. This will set out the process for governance of award of CBTF funds to operators, the financial process.

The bus operators will be responsible for procuring the equipment through the accredited suppliers. This route has been chosen as it will make best use of the operators understanding of the technology, market, and their requirements can be tailored to their own needs subject to compliance with national procurement legislation. SCC will retain the grant funding to be allocated to operators through a contractual agreement framework. This approach has previously been adopted by SCC and the operators for the DfT’s Better Bus Area Fund (2012) as well as other funding streams involving the bus industry and ensures compliance with EU state aid and procurement rules. The process will be:

- Step 1 - Issue a ‘call’ for bids to bus operators
- Step 2 Bids received with costings / quotes / operator contribution
- Step 3 Decision made on bids
- Step 4 Letter issued confirming allocation to operator(s)
- Step 5 Operator(s) sign and return the Grant Award Letter

- Step 6 Project delivered by operator(s)
- Step 7 Claims submitted to SCC by bus operator(s)
- Step 8 Claims paid by SCC
- Step 9 Operators complete monitoring forms on as per the grant award letter terms.

Regarding Step 5, above, operators are required to confirm their compliance with the grant conditions by signing and returning to SCC a copy of the Grant Award Letter.

Following the initial call for bids, the outputs (number of units delivered) and remaining budget will be reviewed. This may result in subsequent 'calls' in accordance with the steps outlined above. The key issue will be to maximise the delivery of SCRT retrofits (in terms of fleet coverage), whilst ensuring a consistent and quality service from the each operator and their retrofit equipment suppliers. Clear processes for ensuring this will be set out in the grant agreements made by SCC with each operator.

Detail of the state aid advice received (mandatory requirement) and, if appropriate, details of how you will ensure agreements to implement the project will comply with EU State Aid rules and enable you to recover any grant which is deemed to be unlawful State Aid.

We have received the following advice regarding state aid:

CBTF funding awarded must be spent in accordance with State Aid rules. State Aid arises where:

- I. funding is provided from state resources (including grants from central or local government etc or subsidised services), AND
- II. the funding / measures favour certain undertakings or operators etc, AND
- III. the measure / funding has the potential to distort competition, AND
- IV. the measure / funding could affect trade between member States.

All four elements must be in place for unlawful State Aid to be present. In order to mitigate against unlawful State Aid arising there are a number of measures that can be relied upon, including use of competition to award funding and use of De Minimus provisions where appropriate.

To remove the State Aid risks, the introduction of an element of competition with the bidding process for funds is required, in a way that ensures all undertakings have equal access to funding (regardless of whether they are local, national or international undertakings). This will remove II) and III) above. Competition and bidding arrangements must be fair, transparent and genuine.

There is the power to provide funding that would otherwise amount to State Aid through the De-Minimus process, which can assist in relation to supporting some smaller, locally based undertakings. This applies where an operator has received aid in the current year and previous two financial years that amounts to no more than €200,000 (the limit for transport related undertakings). That must encompass ALL state funding from ANY source over the three year rolling period so any company that receives subsidies or other grant funding from other state sources will need to be carefully audited to ensure they meet De-Minimus levels and the limits apply to the whole registered company (not just the locally based arm of it). However, given the level of annual BSOG payments, it is unlikely this will apply locally, other than for the very smallest operators.

Any mechanisms for awarding funding to operators will need to be designed and implemented to meet the above restrictions in relation to any funding that is used to enhance third party / private sector commercial or subsidised vehicles in any way.

Confirm ability to provide quarterly reports, attend review meeting and provide a final report by 30th September 2019.

The three potential suppliers which bus operators would choose to appoint from have confirmed to us that they can provide the required quarterly reports to local bus operators. Operators will then provide this information to Southampton City Council. The process for provision of reports by operators will be clearly set out through the grant agreement and reported through the mechanisms stated in this agreement. Suppliers would be able to supply data to operators to meet the requirements of the CBTF program in a final report at the end of September 2019.

A clear project plan in the form of a Gantt chart showing the milestones, dependencies and outcomes. This will include the submission of quarterly reports.

	Duration	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-18
CBTF funding award	1 day (Fri 5 Jan)	◆												
Call for bids to operators	1 day (Mon 8 Jan)	◆												
Operators submit bids	1 day (Fri 12 Jan)	◆												
SCC assesses bids	2 days (by Tue 16 Jan)	■												
Operators told outcome	1 day (Wed 17 Jan)	◆												
Operators notify suppliers	1 day (Fri 19 Jan)	◆												
Suppliers check vehicles	1 week (by Fri 26 Jan)	■												
Suppliers order parts	6-8 weeks		■	■	■									
Design work new types	6-8weeks		■	■	■									
Agree access to vehicles	2 weeks			■	■									
1st stage of retrofits (x40)	9.5 weeks				■	■	■	■						
First Quarterly Report	1 day (by 5 Apr)				◆									
Prototyping for new vehicle	2 weeks				■	■								
Testing of telematics	4 weeks					■	■	■	■					
Second quarterly report	1 day (by 5 July)							◆						
2nd stage of retrofits (x117)	24 weeks						■	■	■	■	■	■	■	■
Driver training/ driver aids	8 weeks		■	■	■	■	■	■	■	■	■	■	■	■
3rd quarterly report	1 day (by 5 Oct)										◆			
Testing of telematics	14 weeks									■	■	■	■	■
Refurbs of buses	14 weeks											■	■	■
4th quarterly report	1 day (by 5 Jan)													◆
Monitoring & evaluation	Ongoing					■	■	■	■	■	■	■	■	■

Confirm there is committed resource for delivery of the project

Project Management Resource - The project will be managed by SCC through our Sustainable City Team, which is led by Neil Tuck. The Senior Responsible Officers (SROs) are Mike Harris, Service Director – Growth and Mitch Sanders, Service Director - Transactions. To ensure that the project is delivered to time and budget it will report to the existing Clean Air Board, chaired by Cllr Hammond Cabinet Member for Sustainable Living, and the Strategic Bus Punctuality Taskforce Board, attended by representatives from each operator and chaired by Cllr Rayment, Cabinet Member for Environment & Transport.

Retrofitting resource - Each of the suppliers have their own specialist team of installers are comprised of several teams of OE trained bus and coach technicians who each have extensive experience in the installation of emission abatement systems. They also have arrangements in part with suitably qualified third party installers who have experience of retrofit for a range of vehicle types. These teams have successfully installed over several hundred SCRT systems in London and other UK cities. Their teams of technicians have been accredited by VOSA in the existing London Low Emission Zone introduced in 2012 who can undertake the installation work in full or work together with an accredited third-party installer. All installs will be quality checked by team leaders. Each supplier has experience in project management of delivery of retrofits. Some suppliers have retrofit commitments in London that area currently underway, there is capacity to deliver retrofits as part of this bid in February and March 2018 and over the period from April to November.

An assessment of the main risks to the successful delivery of the project

Main Risks	How risk will be mitigated against
<i>Business failure of installation partner</i>	the suppliers can provide several installation options
<i>Breakdown of relationship with installer</i>	suppliers can provide trained alternatives on standby
<i>Delays to project</i>	SCC, operators and suppliers will provide an experienced project management team to mitigate impact
<i>Loss of key members of staff involved with retrofitting</i>	suppliers can provide other trained technicians and will ensure multiple technicians are trained for standby
<i>System installation errors</i>	ensure installations are signed off by team leader and operator Poor vehicle pre condition ahead of installations – suppliers will carry out vehicle pre checks circa two weeks in advance of fitment
<i>Poor relationship with operator</i>	supplier is able to provide team leader on site to manage relationship and handle issues
<i>Changes to project</i>	the suppliers would implement change management procedure
<i>Vehicle availability</i>	suppliers would conduct project meetings with operator staff prior to project kick off

Changes to vehicle layout (on the same make/model retrofit application)	suppliers would carry out pre install checks across vehicles, minor changes can be completed on site
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E04 Value for money 20%

How will the project deliver value for public money?

Clearly state the amount of funding requested from the Authority in 2017/18 and in 2018/19.

SCC is requesting £2,677,835 from the CBTF (including VAT) with match funding of £815,680.

Year	2017/18 (£)	2018/19 (£)	Total for 2017/18-2018/19
CBTF capital grant sought	700,000	1,997,835	2,677,835
Local Match Funding	82,840	732,840	815,680
Total	782,840	2,710,675	3,493,515

Provide a breakdown of the costs of the project and an explanation of how the costs have been calculated.

The £2,677,835 of CBTF funding sought would cover the cost of manufacture, fitting, monitoring equipment and 5 year warranties for accredited SCRT technology systems for the 145 buses. These have been calculated based on quotations operators have received from the suppliers of retrofit systems for specific vehicle types.

Cost breakdown of SCRT technology manufacture and install:

No of buses	Make/ Model	Engine	Euro Strd	Operator	Retrofit system	Cost per bus £	Total Cost £
30	Wrightbus StreetLite midi single decker	Cummins 6l	V	First	Eminox /HJS /Greenurban SCRT	14,335	430,050
21	Volvo B7 RLE Wrightbus single decker		IV	First		14,335	301,035
4	Volvo B70L Wrightbus single decker		III	First		14,335	57,340
10	ADL Trident double decker		III	First		14,335	143,350
34	Mercedes 0530N Citaro single decker	OM906hLA 6.4l	III	Bluestar	GreenUrban ecoNOxt SCRT (Adblue) System	14,335	487,390
1	Optare Excel 2 Single decker	OM906hLA 6.4l	III	Bluestar		14,335	14,335
21	ADL Enviro 400 Double Decker	Cummins ISBe6 6.7l	V	Bluestar		15,192	319,032
12	Scania CN230UD OmniCity Double Decker	DC916 8.9l	V	Bluestar		15,192	182,304
2	DAF SB120 Cadet ISBe4 Single Decker	Cummins B series 3.9l	III	Bluestar		13,327	26,654
3	Volvo B7TL Enviro 400 Double Decker	Volvo D7C 7.3l	II/ III	Bluestar		14,335	43,005
1	ADL Dart Nimbus Single Decker	Cummins ISBe6 5.9 Ltr	II	Bluestar		13,327	13,327
4	Scania N230UD East Lancs Double Decker		IV	Wheelers	Eminox /HJS /Greenurban SCRT	15,192	60,768
2	Volvo B7RLE Wrightbus Single Decker		V	Xelabus		14,335	28,670
145					Total =		2,107,260

Cost of monitoring equipment and warranties: In addition to the SCRT systems themselves, CBTF grant is sought for monitoring equipment and extended 5 year warranties for all 145 vehicles. These further SCRT-related costs total £570,575 including VAT. This works out at £3,935 per bus, broken down as follows:

Cost of £708 per bus x145 of installing the telematics package (Total = £102,660).

Cost of £1,200 per bus x 145 of providing real time data feeds to meet CVRAS requirements (Total = £174,000)

Cost of £2,027 per bus x145 of upgrading standard 2 year manufacturer’s warranty to 5 years (Total = £293,915)

Therefore the total cost of all SCRT systems, telematics, data feeds and warranties is £2,677,835

Explain why particular technologies are being chosen to give maximum value and why others have been considered, but not chosen.

The project of retrofitting existing older vehicles with the accredited NOx Abatement SCRT Technology to upgrade them in line with Euro 6 emissions levels is deemed to be extremely cost effective and timely. For any of the three suppliers SCRT systems, this represents very good value for money you can retrofit at least 15 vehicles for the cost of one new Euro 6 vehicle.

SCRT was chosen above any other technology because it was the only one that can meet the requirements of the CVRAS issued by DEFRA/LowCVP.

Operators consider that there is a strong air quality case for utilising CBTF funding to meet the costs of installing e-fan technology because this will mitigate against increases in CO2 emissions that would otherwise arise from retrofitting pre-Euro VI fleets with SCRT systems. Utilising CBTF funding in this complimentary measure, will also help to improve mpg and address the expected reduction of mpg for operators resulting from the retrofitting of SCRT systems.

Detail how value for money will be incorporated into procurement processes.

From discussions with operators and suppliers, the City Council has a clear understanding of the average costs of retrofit systems. If quotes for retrofit work received from suppliers are higher than these benchmark costs, we will ask for clarification from bus operators as to the reasons for the higher costs (i.e. supplier has not already developed retrofit systems for a particular bus vehicle type – so extra prototyping costs incurred). Bus operators would carry the risk of any increases in unit costs for SCRT and monitoring equipment.

Disclose the amount of any additional funding being provided from other sources towards the project.

As part of this project, there is £815,680 of match funding over the two years that has been secured from bus operators.

Year	2017/18	2018/19	Total for 17/18-18/19
Driver training	40,000	40,000	80,000
Vehicle/ engine refurbishments	30,000	680,000	710,000
Driver green aids	12,840	12,840	25,680
Total	82,840	732,840	815,680

Give assurance that the retrofitted buses will remain in service in the area for 5 years or 150,000 miles, whichever is earliest.

We confirm from our discussions with all of the local bus operators that this will be the case, and is backed up in the letters of support attached in the Technical/ Commercial folder. This will be a condition of all grants awarded to operators for retrofit technology. Vehicles that would not remain in service for five years have been excluded, and these would be replaced by Euro VI buses.

Assurance processes to ensure the funds are spent in a correct, transparent and effective way

The project will be managed by SCC through our Sustainable City Team, which is led by Neil Tuck. The Senior Responsible Officers (SROs) are Mike Harris, Service Director – Growth and Mitch Sanders, Service Director - Transactions. To ensure that the Southampton accredited SCRT bus retrofit project is delivered to budget it will report to the existing Clean Air Board, chaired by Cllr Hammond Cabinet Member for Sustainable Living, and the Strategic Bus Punctuality Taskforce Board, attended by representatives from each operator and chaired by Cllr Rayment Cabinet Member for Environment & Transport.

The assurance process to ensure that funds are spent in a correct and effective way is summarized below:

Southampton City Council requires the following in respect of funding claims by the local bus operators:

- In advance of providing funding, SCC will need to see quotes for work from each operator.
- Claims for vehicle retrofit work will be paid in arrears, upon receipt of invoices from bus operators.
- A project claim form will need to be signed by the bus operator and Southampton City Council for each claim. The form will ask for claims to be identified as capital and for which project component (e.g. SCRT technology supply and fitting/ telematics package costs/ e-fan supply and fitting).
- Each project claim form should be accompanied by an invoice to Southampton City Council for the amount being claimed. The invoice should set out what has been purchased and that it is for application on buses operating in Southampton. Copy invoices paid by operators to their suppliers which support the claim in full should be attached. Southampton City Council will refund costs including VAT (where an operator is not VAT registered).

F01 Air Quality 20%

As set out in clause 5 of Section 1 of this ITA, if there is insufficient funding available to fund all successful applications at stage 2 the successful applications will be further assessed for their air quality benefits to ensure optimal support towards the objectives of the fund.

A score out of 100 (see page 17) will be given to each bid against the following requirement:

- Applicants are to demonstrate how significant the project will be to bringing local NO₂ concentrations within statutory limits within the shortest possible time

Higher scores will be awarded: where the project will deliver a greater portion of the necessary reductions in NO₂; where it is clear how the project fits into a wider air quality compliance plan for the area; and where the reductions will be delivered in a short timescale.

That score will be added to the scores from the stage 2 and the applications will be ranked. Grants will be awarded to the highest-ranking applications until the fund is exhausted.

Grant Applicants should submit all the information requested in this question in the Online Commercial envelope.

How this project fits into the area's wider air quality plan:

Strategic – Wider Council policy support; EU Directive and CAZ/Supporting Measures

The **Southampton City Strategy** sets four outcomes to achieve. One of these is that “People in Southampton live safe, healthy, independent lives”. One of the priorities to achieve is to improve air quality.

The **Southampton Local Transport Plan 2011-2031** provides the local policy framework for transport in the city. On a cross-boundary basis jointly agreed with neighbouring local authorities, Policy E seeks to deliver improvements in air quality through Air Quality Action Plans and promotion of cleaner, greener vehicle technologies. At the city level, Policy SO6 seeks to achieve improved air quality and environment, and reduced greenhouse gas emissions.

The four key priorities set out in the **Clean Air Strategy for Southampton** are: Improve air quality in the city, support businesses and organisations, collaborate with communities and residents and promoting sustainability. At present, the preferred option for introducing a CAZ to Southampton is a Class B that is citywide. This means that non-compliant buses (pre-Euro VI) will be required to pay a daily penalty charge. The extent of the Clean Air Zone has yet to be confirmed, but is likely to be either covering the whole city administrative area or the city centre.

If successful, this CBTF funding bid will address these four key priorities by collaborating with and supporting all the local bus operators to retrofit pre-Euro VI buses between now and 2019 with SCRT technology and bring forward the benefits of reducing NO₂ emissions while also ensuring operators are prepared for the introduction of the CAZ in 2019.

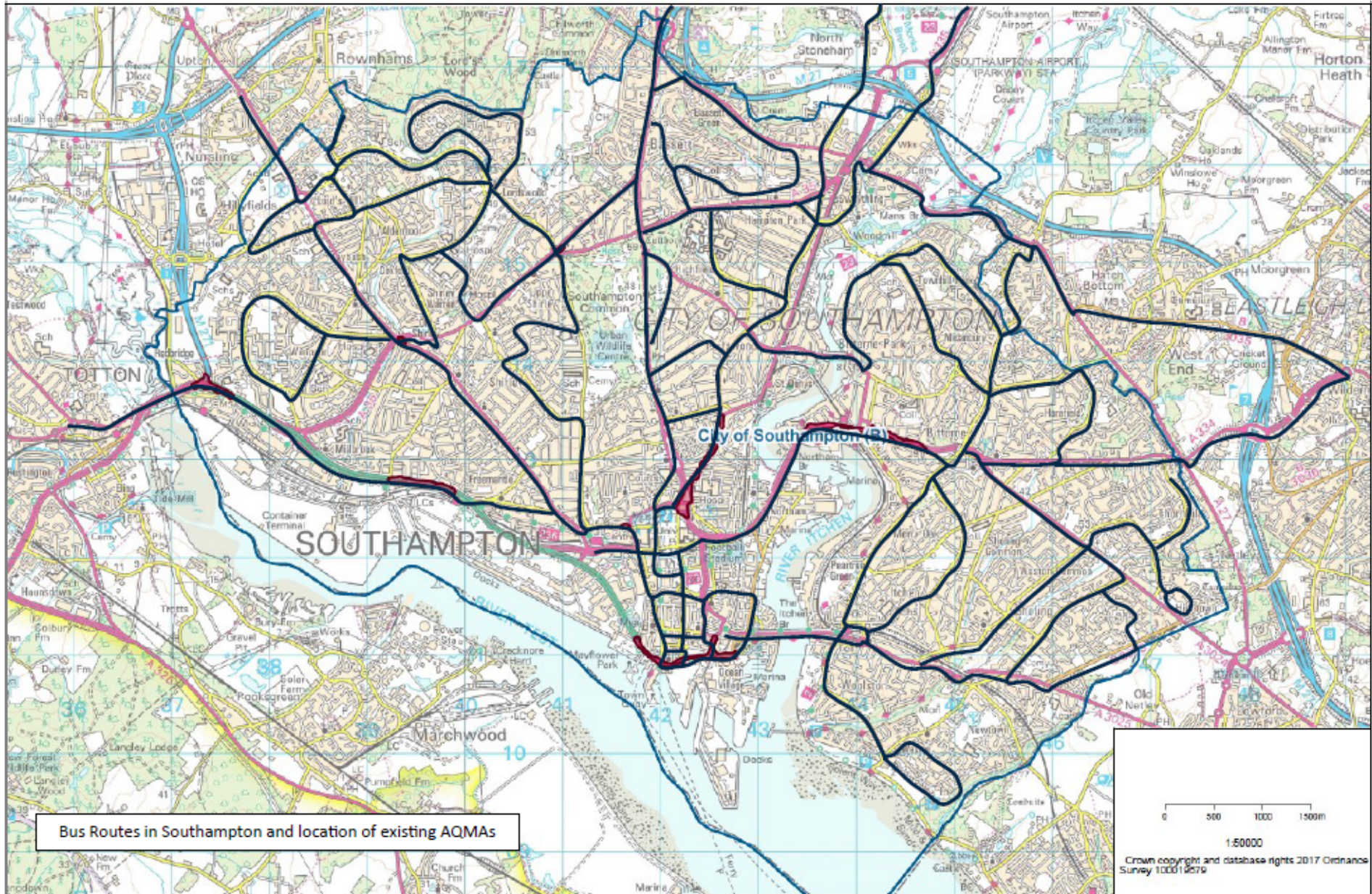
As well as planning for the mandated penalty charging system by 2019, the **Clean Air Zone Strategy and Implementation Plan** includes a package of measures to support the CAZ and deliver further improvements in air quality which were identified following an assessment of the options by independent consultants (Ricardo and Low Emission Strategies 2014). This package was developed following extensive stakeholder engagement, air quality modelling, cost benefit analysis and assessment to gauge deliverability. One of the key recommendations of the CAZ Strategy and Implementation Plan is to introduce retrofit for buses. This was recognised as being an effective mechanism for promoting change amongst local stakeholders. A further recommendation was anti-idling enforcement for buses, retrofit technology. SCC will be encouraging operators to consider installing stop-start technology on appropriate vehicle types.

The project will deliver a greater portion of the necessary reductions in NO₂

Figure 1 shows a map of the bus routes operating within the Southampton City Council administrative area and the AQMAs within the city (marked in red). Routes (shown in black) continue north to Eastleigh and Winchester, north east to Hedge End, east to Hamble and Fareham and north west to Salisbury and west to Totton, Marchwood, Hythe and towns in the New Forest

Based on the Low Carbon Vehicle Partnership Clean Bus/Vehicle Technology Fund Evaluation Study findings, SCR retrofit of Euro III, IV and V buses demonstrated NO_x emission reduction up to 99%, 97 and 98%, respectively and the report also concludes that excellent conformity between lab and “in service” reductions is demonstrated. These findings, and the fact that the majority of buses that are being proposed under this scheme are Euro III, IV and V provides confidence that this proposal will deliver NO_x emissions reductions.

Figure 1: Map showing the bus network in Southampton and locations of AQMAs



To understand the scale of contribution buses have to emissions in Southampton, simple emissions source apportionment based on the DfT's 2016 traffic count data and the Emissions Factor Toolkit v8.0 are summarised in Table 1, where it is evident that contribution of buses and coaches to total NO_x emissions (g/km) ranges from 3% up to 38% and PM₁₀ contribution ranges from 2% to 24%. The final column of Table 1 puts the emissions reductions into context with the air quality monitoring data for 2016 (provisional data only). Assumptions and uncertainty include using DfT count points as close to AQMA's, assuming speed limit speeds (kph), estimating journeys based on timetables published on operator webpages and on information of routes and buses provided by operators or published online.

Analysis of a DfT count point location on Shirley High Street close to the Romsey Road AQMA shows that buses and coaches contributed 38% to NO_x emissions (g/km) from road vehicles. According to bus timetables, there is approximately 500 trips by CBTF scheme targeted routes through the Romsey Road AQMA, which has a 2016 maximum monitored annual mean NO₂ of 43 µg/m³ (just north of Shirley High Street Count Point). Retrofitting these buses with technology capable of up to 99% reductions in NO_x and NO₂ emissions will result in an immediate step change in emissions. It is therefore feasible that targeting this significant source of emissions could bring about compliance in a short time, limited only by how quickly the retrofit technologies can be installed.

The simple source apportionment also identifies that at AQMA's the Bitterne Road West AQMA (2016 maximum annual mean NO₂ result - 43 µg/m³) estimated NO_x emissions contribution from buses and coaches is 17%. This retrofit scheme will potentially reduce NO_x emissions by 99% on ~236 trips through this AQMA, significantly reducing the bus and coach contribution while also reducing overall concentrations. Furthermore, source apportionment undertaken as part of the Western Approach AQMA air quality assessment (2014) indicates that % of total modelled NO_x from buses ranges from 2.2% up to 13.3% at NO₂ monitoring locations along this AQMA. This particular section of road was identified as an area in exceedance of the EU Air Quality Directive limits. This scheme proposes to retrofit buses that undertake approximately 260 timetabled journeys through this area, likely a significant portion of all movements contributing to total modelled NO_x on this route.

All potential routes identified so far by bus operators as suitable for this scheme travel through at least one AQMA, with many routes operating through two or three AQMA's (see table 1). It is therefore expected that improvements will be citywide, addressing both LAQM and Air Quality Directive exceedances. There are also wider benefits where routes are through AQMA's of neighbouring authorities. In particular, the Eastleigh Borough Council A335 Southampton Road AQMA sees regular movements from Bluestar and UniLink buses from the depot, located north of the AQMA in Chickenhall Lane, to the city Centre. There are also routes with stops located along this section of the AQMA. The Bluestar 1 route also terminates in Winchester City centre, also an AQMA, while many Bluestar routes operate through the New Forest District Council EU Air Quality Directive exceedance on the Redbridge Causeway and Bluestar 6 extends to the Lyndhurst AQMA. At present, retrofit technology is the most feasible and immediate method by which emissions reductions from buses can be made. Collaborating with operators to retrofit avoids the limited fleet upgrade to CAZ compliant diesels (Euro VI) with air quality benefits plateauing beyond 2019/2020, whereas the proposal for retrofit along with engine remapping, the potential for start stop technology and monitoring to feedback and influence driver behaviour will deliver improvements beyond CAZ compliant diesels. Furthermore, the accreditation of proposed technologies ensures that if successful, the project will deliver the reductions in emissions required. Other measures influence the contribution of buses to air quality including the introduction of bus lanes has been explored and implemented where feasible and the Council continues to work with operators within the Quality Bus Partnership framework as other methods to deliver improvements.

Table 1: Bus Route and AQMA Information

AQMA	Proposed routes through AQMA	Approximate Trips by Routes (Average per day Mon-Sun)	Approximate Buses and Coaches Source Apportionment (% of total road transport NO _x emissions g/km using EFT v8.0 and nearby DfT Count Points)	Approximate Buses and Coaches Source Apportionment (% of total road transport PM ₁₀ emissions g/km using EFT v8.0 and nearby DfT Count Points)	Approximate Buses and Coaches Source Apportionment (% of total road transport PM _{2.5} emissions g/km using EFT v8.0 and nearby DfT Count Points)	AQMA Max 2016 Annual Mean NO ₂ (µg/m ³)
Redbridge/ Millbrook (SCC PCM Area of Exceedance)	BS6, BSX7(+R), BS8, BS9, BS11, BS12	263	CP56347 Millbrook Rd West = 5.1%	CP56347 Millbrook Rd West = 3.0%	CP56347 Millbrook Rd West = 3.2%	52
			CP6368 Near School = 3.0%	CP6368 Near School = 1.8%	CP6368 Near School = 1.9%	
			CP73615 Causeway = 3.3%	CP73615 Causeway = 2.0%	CP73615 Causeway = 2.1%	
Romsey Road	F2, F3, BS4, BS17, BS18	513	CP7580 Shirley High St = 38.4%	CP7580 Shirley High St = 24.3%	CP7580 Shirley High St = 25.6%	43
Winchester Road	U6, X11	94	CP56347 Winchester Rd = 16.0%	CP56347 Winchester Rd = 9.0%	CP56347 Winchester Rd = 9.7%	31
Burgess Road	U9	2	No representative count point	No representative count point	No representative count point	47
Bevois Valley	F7, BS2, U1, U6, U9	539	CP73615 Bevois Valley South = 3.3%	CP73615 Bevois Valley South = 2.0%	CP73615 Bevois Valley South = 2.1%	53
			CP46964 Bevois Valley North = 2.8%	CP73615 Bevois Valley North = 1.8%	CP73615 Bevois Valley North = 1.9%	
Bitterne Road West	F2, F8, BS3, BS16, BS18	560	CP616891 East of Bridge = 2.9%	CP616891 East of Bridge = 1.7%	CP616891 East of Bridge = 1.8%	43
			CP646963 West of Bridge = 17.1%	CP646963 West of Bridge = 9.7%	CP646963 West of Bridge = 9.7%	
Victoria Road	F6, F9, F11, F13	236	No representative count point	No representative count point	No representative count point	40
New Road	F8, BS3, BS16, BS18	357	No representative count point	No representative count point	No representative count point	45
Town Quay/Platform Road	F2, F6, BSQC, U1	320	CP38212 Town Quay = 7.4%	CP38212 Town Quay = 4.2%	CP38212 Town Quay = 4.5%	42
			CP75251 Platform Road = 4.3%	CP75251 Platform Road = 2.4%	CP75251 Platform Road = 2.5%	

It is clear how the project fits into a wider air quality compliance plan for the area

This project will form part of the SCC's Clean Air Strategy and Clean Air Zone Implementation Plan (adopted in November 2016) of which the aim is to bring about compliance with the air quality objectives within the shortest possible time. The four key priorities set out in the Clean Air Strategy for Southampton are:

1. Improve air quality in the city
2. Support businesses and organisations
3. Collaborating with communities and residents
4. Promoting sustainability

Working in collaboration with local bus operators to improve air quality through installing retrofit technologies addresses these four priorities, while also providing a mechanism of supporting them through a period of rapid change with regards to the implementation of the proposed Clean Air Zone. The use of accredited suppliers ensures that these improvements are robust and reliable and will deliver continued improvement for the following 5 years that the vehicles are expected to be in operation.

As well as planning for a penalty charging CAZ by 2019, the plan includes a package of measures to support the CAZ and deliver further improvements in air quality which were identified following assessment of the options by independent consultants (Ricardo and Low Emission Strategies). This package was developed following extensive stakeholder engagement, air quality modelling, cost benefit analysis and assessment to gauge deliverability. One of the key recommendations of the plan is to introduce retrofit for buses: SCRT for older buses. This was recognised as being an effective mechanism for delivering direct emission reductions whilst promoting change amongst local stakeholders. A further recommendation was a campaign of anti-idling for buses. Retrofit technology which includes stop start technology also addresses this recommendation. Furthermore, targeting buses for retrofit that operate throughout the cities AQMA's ensures that the Council is addressing air quality exceedances that have been identified through the LAQM monitoring and review process.

Finally, the CBTF will supplement a range of measures that the Council is currently undertaking to improve air quality within the City. Currently under development is a Clean Air Network (CAN) to provide a platform for businesses to share best practice and experience in delivering air quality improvements. The CBTF would be a foundation from which to build the bus CAN in the city and the wider sub-region. The holistic approach by the Council also includes measures to encourage low emission private transport through city centre parking concessions, creating a city-wide publically accessible EV charging network, incentivising low emission taxis through the licencing process and promoting active travel modes. The CBTF sits alongside these measures, which together will bring about compliance more quickly.

The reductions will be delivered in a short timescale

The CVRT/CBTF LowCVP Evaluation study identifies technologies that delivered emissions reductions. Using this information and assurances by suppliers that they are working toward, or have achieved accreditation gives confidence that these emissions reductions will be delivered. The Gantt chart in E03 that the first stage of retrofits will commence in March 2018. It is expected that emissions reductions will be immediate from installation of retrofit on vehicles. This immediate reduction will be translated to reduction in pollutant concentrations in AQMA's and at the area of AQ Directive exceedance as routes selected for retrofit operate through these areas. The evaluation study conclusions and accreditation scheme also provides confidence that the emissions reductions will continue for the expected life of the vehicle ensuring reductions are maintained, while monitoring means that any issues that are flagged can be identified and dealt with. Retrofitting pre-Euro VI buses through the CBTF is the most feasible immediate and cost effective measure to reduce emissions from buses with operators, suppliers and the Council prepared to implement immediately.