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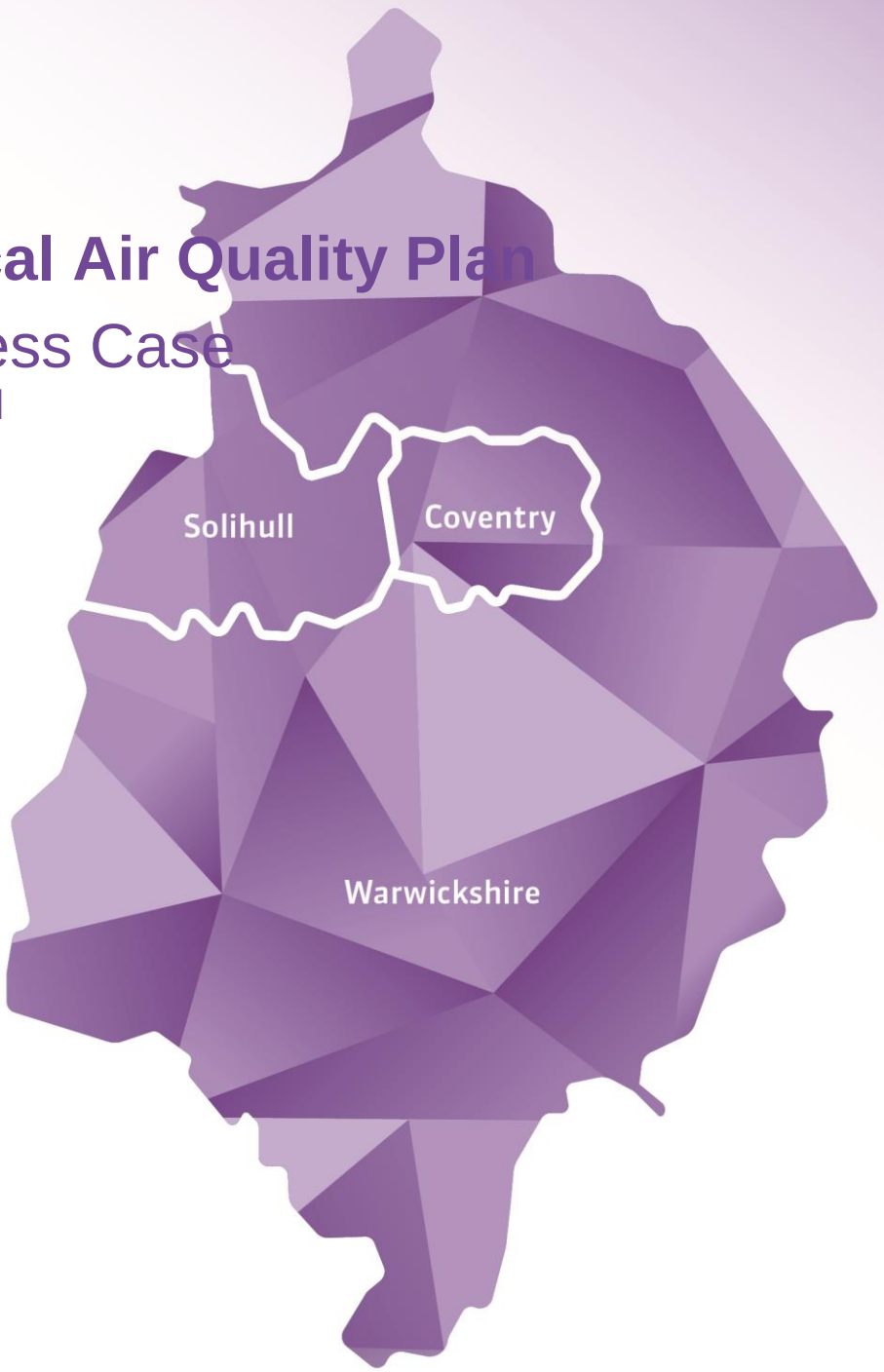

Coventry Local Air Quality Plan

Outline Business Case

Coventry City Council

February 2019

Coventry City Council

Solihull Metropolitan Borough Council

Warwickshire County Council

Notice

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The preparation of this Report has been co-ordinated by Atkins. Atkins led on the Strategic Case, the Economic Case and the Financial Case with Coventry City Council leading on the Commercial Case.

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Executive summary

Coventry is one of 22 towns and cities identified in the UK as being forecast to exceed legal limits for NO_2 through Government modelling in 2021. Coventry City Council (CCC) has been working closely with the Government's Joint Air Quality Unit to identify the best package of measures that will bring NO_2 levels into compliance with the set legal limits in the shortest possible time. CCC has been focussed on ensuring that this package brings wider community and economic benefits to the city in addition to the public health benefits that would result from achieving NO_2 compliance.

This Outline Business Case (OBC) sets out the comprehensive process that has been undertaken to complete this task. The role of JAQU in this process is gratefully acknowledged, with guidance and support provided by JAQU officers in supporting CCC in completing the detailed technical work required to ensure that the best possible outcome is achieved for the residents and businesses of Coventry.

The problems with NO_2 compliance within the city are focussed upon some of the main radial routes into the city centre, and the sections of the ring road that connect these. In particular, the worst problems have been identified as being on Holyhead Road. The approach that CCC is advocating, based on the technical work and on good supporting evidence, is based upon a package of measures that will facilitate dynamic traffic management to steer traffic away from air quality hotspots and to reduce traffic congestion within the city, This preferred option also encourages and facilitates the uptake of cleaner buses and taxis, cleaner public sector and private sector vehicle fleets as well as promoting walking, cycling and bus travel for local journeys by providing enhanced and more attractive routes and services.

The total cost of this package is around £74 million over a 10 year period, and this would deliver benefits both by improving air quality and supporting economic growth and a more healthy and active local population.

This package has been benchmarked, in line with Government requirements, against a scenario whereby non-compliant vehicles (those that do not meet the required emission standard) are charged for entering a Clean Air Zone (CAZ). This would be cheaper to implement, being costed at around £46 million (including operating and maintenance costs for the enforcement system). It would also generate income from the charges levied on drivers with non-compliant vehicles. However, this scenario would have significant detrimental impacts for some of the more deprived communities within the city, as set out in the Distributional Impact Assessment that forms part of this OBC. The cost of paying the CAZ charge, relative to incomes, dis-proportionately falls on dis-advantaged social groups that have non-compliant vehicles and for who affordability is an issue. These residents are constrained in their ability to afford compliant vehicles and therefore would effectively be forced to pay the charge.

Importantly, the CAZ D charging option would leave no long-lasting legacy for the city, as the system would be redundant by 2027 when full compliance would be achieved in terms of the vehicle fleet within the city.

In comparison, the preferred option would leave Coventry with an efficient and responsive dynamic traffic management system enabling CCC to proactively manage traffic flows across the city, as well as a greatly enhanced walking and cycling network providing a far better environment for local communities.

CCC's preferred option, referred to as Option DS12a in this document, offers the best solution in terms of balancing air quality improvements and achieving social and economic objectives. Although the preferred option incurs a higher initial capital cost, the package of non-charging measures includes investment in Coventry's transport infrastructure, which will benefit residents and the local economy over the longer term. The preferred option has the potential to have a transformational impact on how residents move around the city through travel behaviour change and from the implementation of high quality walking and cycling infrastructure that will have lasting air quality and health benefits. This option performs significantly better in economic terms than Option DS2 (the CAZ D charging option) and does not impose an additional cost on

income constrained residents. Furthermore, the preferred option achieves air quality compliance in a similar timeframe to the benchmark CAZ D charging option.

The Council is therefore proposing to Government that the preferred option be funded and is therefore seeking Government support to take this option forward, to the benefit of the city of Coventry, its residents and businesses

1. Strategic Case

1.1. Introduction

The Strategic Case presented in this Report illustrates a case for change, providing context for the rationale that supports options for the reduction of annual mean Nitrogen Dioxide (NO_2) concentrations in Coventry.

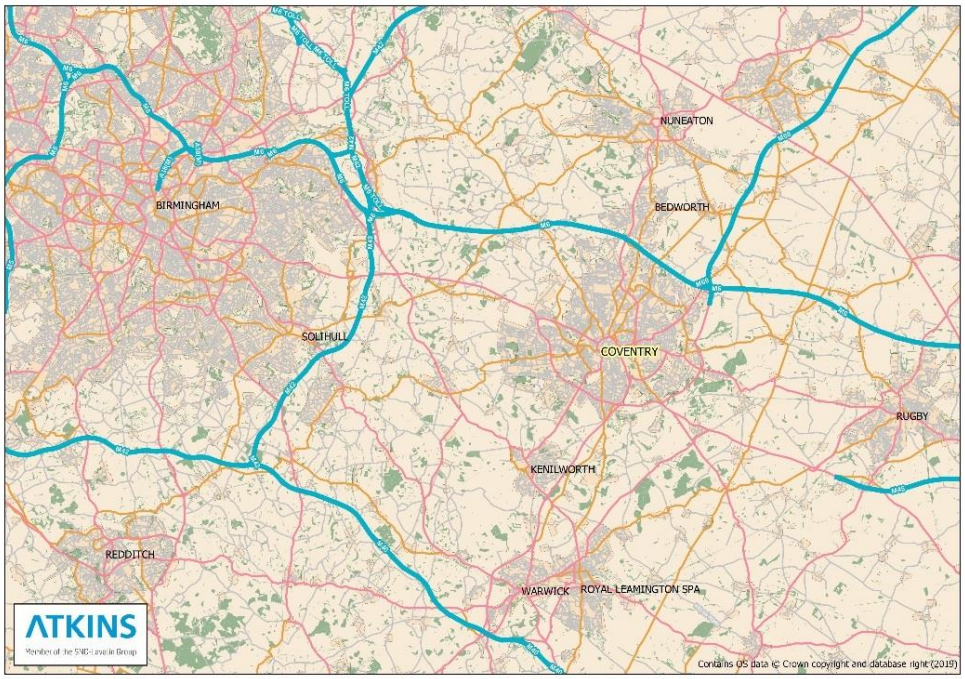
The Government has set out its plans to deliver a cleaner, healthier environment that benefits people and the economy. Although UK air quality has improved significantly over recent decades, it is recognised that there is still more to do, though action must be proportionate, with the interests of local people being the main driver for improving air quality.

Coventry City Council (CCC) is committed to transforming Coventry into a cleaner and healthier city, supporting economic growth, improving health and providing a wider choice of travel options. Improvements in air quality underpin this vision. Coventry has been awarded the UK City of Culture for 2021 and making improvements to improve air quality within the city fully aligns with the City of Culture themes of Being Human, Reinvention and Moving, and the vision of *reimagining the place of culture in a diverse, modern Britain*. Coventry therefore has an opportunity to adopt a solution which delivers a lasting improvement in air quality and to showcase this solution to a wider audience.

Coventry is renowned for its rich tradition in innovation, and CCC is keen to support innovative solutions involving emerging technology. The city is also a leader in the automotive industry and has a vision for a future that incorporates integration of systems and technology such as Ultra Low Emission Vehicles (ULEV), connected and autonomous vehicles, digital data / communications and energy generation, storage and distribution. The city is home to the factory manufacturing the world leader in electric powered taxis, as well as being selected as the site for the UK's Battery Industrialisation Centre. Electric vehicles are therefore at the heart of this vision and will play a key part of reducing emissions from road transport.

Coventry is well connected to other major towns and cities in the UK due to its good access to the strategic road network and the national rail network. It is important that Coventry works closely with its key neighbours as this will allow Coventry to reduce NO_2 concentrations and improve the health and wellbeing of its residents and those who travel to work in Coventry or those who visit for other reasons. Figure 1 shows the location of Coventry along with some of the key neighbours, including Birmingham, Warwick, Leamington, Solihull and Leicester.

Figure 1 – Geographic location of Coventry



1.2. Business strategy

The High Court has instructed the Government to put in place a strategy to achieve the legal limits for air quality, in the shortest possible time. Accordingly, in July 2017 the Government published a revised plan to tackle roadside NO_2 concentrations across the UK. Based on DEFRA Pollution Climate Mapping (PCM) model outputs, 22 towns and cities[1], including Coventry, were forecast to exceed legal NO_2 limits in 2021.

To help achieve compliance, the Government has formed the Joint Air Quality Unit (JAQU), which comprises officers from the Department for Transport (DfT) and the Department for Environment, Farming and Rural Affairs (DEFRA), with a remit to work with the relevant local authorities to produce action plans to reduce the roadside NO_2 concentrations in those 22 towns and cities to below the legal limit. JAQU has produced an evidence package to assist officers in local authorities to develop feasibility studies for their local plan, and has provided support throughout the development of each local plan.

In accordance with Government requirements, CCC is required to produce an Outline Business Case (OBC) that assesses a number of options and identifies a preferred option to help the city achieve compliance with the legal NO_2 limits in the shortest possible time.

A charging Clean Air Zone (CAZ) is required, by Government, to be one of the options assessed, due to modelling by the Government showing that, at a national level, this will achieve compliance with air quality targets in the shortest possible time. This option will be used as a benchmark for other options.

The overall objective, as set out in this OBC, is to identify the package of measures that will achieve compliance with the legal NO_2 limits in the most efficient and effective manner whilst also supporting the wider vision of the CCC for achieving sustainable economic growth and fitter, healthier, more prosperous communities within Coventry.

1.3. Policies and strategies

1.3.1. UK Government policy and strategy

In July 2017 the UK Government (DEFRA and DfT) published a plan[2] for tackling roadside NO_2 concentrations. In this report the UK Government set out its commitment to achieving a cleaner and healthier environment, with the aim of benefitting both people and the economy. The Government aims to improve air quality for people living and working in the UK, based on the understanding that poor air quality can also be harmful to the natural environment and to the economy.

Air pollution is the largest environmental risk to public health in the UK, and it is known to have disproportionate effects on vulnerable groups. In particular, poor air quality disproportionately affects the very old, the very young, and those with chronic conditions. It also has greater impacts on those who live, work or go to school in more deprived areas.

UK research has shown that NO_2 may increase the prevalence of respiratory infections in children. The European Commission believes that, in the UK alone, poor air quality is still responsible for more than 32,000 premature deaths every year.

DEFRA has made initial estimates that NO_2 contributes to shortening lives by an average of 5 months, which range from healthy individuals experiencing negligible effects to susceptible individuals whose poor health is seriously exacerbated by NO_2 pollution. The overall population burden is estimated to be equivalent to 23,500 deaths in the UK per year.[3]

Furthermore, data from the Public Health Outcomes Framework[4] indicates that the 'under 75 mortality rates from respiratory disease', between 2014 and 2016, was 43.3 per 100,000 for Coventry and 33.8 per 100,000

[1] Later increased to 33 local authorities

[2] UK plan for tackling roadside nitrogen dioxide concentrations – July 2017

[3] Air Quality, A Briefing for Directors of Public Health, March 2017, Defra and Public Health England

[4] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

for England. It is likely that the negative impacts of poor air quality in Coventry is likely to be a factor in the city having higher mortality rates than the national average for England.

The natural environment can also be damaged through high NO_2 concentrations, contributing to acidification and eutrophication, which can have an adverse impact on animals, plants and biodiversity. Economically, air pollution can increase social costs from lost working days, due to ill health caused by air-pollution related health problems.

Although nitrogen oxides fell by almost 70% between 1970 and 2015, poor air quality continues to be the largest environmental risk to public health in the UK[5]. Consequently, the Government has adopted legally binding national emission limits for air pollutants, with the aim of improving air quality. The Government's top priority is to reduce the NO_2 concentrations on and near roads, where higher NO_2 levels result from emissions from motor vehicles. Due to elevated levels of traffic and exposure on roads in urban areas, reducing air pollution in towns and cities is an important focus.

The Government aims to achieve the air pollution reduction in towns and cities through encouraging innovative vehicle solutions, such as electric vehicles, alongside ending the sale of conventional petrol and diesel cars and vans by 2040, as well as targeting behaviour change amongst communities, employers, education establishments and policy makers. The Government is currently committed to investing over £2.7 billion for air quality improvements and cleaner transport. Coventry has a good record in attracting Government funding for initiatives aimed at encouraging the increased use of low emission vehicles, as evidenced with the current programmes to install electric vehicle charging points across the city centre and within surrounding residential areas, as well as the joint project with National Express to upgrade engines on their older buses to achieve Euro V1 standard.

1.3.2. Clean Air Zone framework

The Government has identified ten key pillars to drive forward its industrial strategy, including delivering affordable energy and clean growth, alongside investing in science, research and innovation, upgrading infrastructure and driving growth across the country. Furthermore, local authorities also have a role to play in supporting this through the development and implementation of proposals for improving air quality, and Clean Air Zones are identified as one of the measures for helping deliver this ambition.

A Clean Air Zone (CAZ) defines an area where targeted action is taken to improve air quality and resources are prioritised and coordinated to shape the urban environment in a way that delivers improved health benefits and supports economic growth. CAZs are designed to address all sources of air pollution including NO_2 and bring together local measures to deliver immediate action to improve air quality and health with support for cities to grow, while delivering sustained reductions in pollution and a transition to a low emission economy.

To support local authorities in their approach to implementing and operating a CAZ, DEFRA and DfT produced the Clean Air Zone Framework[6] (2017). This framework sets out the principles for the operation of CAZs in England. It provides the expected approach to be taken by local authorities when implementing and operating a CAZ. CAZs included in the Framework fall into two categories: non-charging CAZs and charging CAZs.

The Framework identifies four classes of charging CAZs, which should be investigated, as DEFRA modelling suggests that they are likely to reduce NO_2 emissions in the shortest possible time. These are:

1. Class A CAZ – Targeting taxis and Private Hire Vehicles (PHVs), buses and coaches;
2. Class B CAZ – Targeting taxis and PHVs, buses, coaches and HGVs;
3. Class C CAZ – Targeting taxis and PHVs, buses, coaches, HGVs and LGVs; and
4. Class D CAZ – Targeting taxis and PHVs, buses, coaches, HGVs, LGVs and private cars.

Local authorities need to ensure businesses and the public have a clear expectation of what a CAZ is, and how they could be affected. Where a CAZ is introduced it should be identified in the Local Plan(s), and in other local policies, including the Local Transport Plan, at the earliest opportunity. However, as noted below, CCC has a recently adopted Local Plan (December 2017) as its key local land use policy document, and as a constituent member of the West Midlands Combined Authority, the WMCA's Local Transport Plan provides the strategy transport policy framework for the city.

[5] Air Quality, A Briefing for Directors of Public Health, March 2017, Defra and Public Health England

[6] Clean Air Zone Framework (2017). Department for Environment Food and Rural Affairs, DfT

1.3.3. Coventry City Council Local Plan

CCC's Local Plan (2017)[7] states that the whole of Coventry is designated as an Air Quality Management Area and has been since 2009. A primary cause of the poor air quality in the Coventry urban area are emissions from road transport. The Local Plan sets out Coventry's vision to help re-establish itself as one of the country's top 10 cities. However, it must be recognised that transport requirements associated with the construction phase itself may have a negative impact upon air quality.

The Local Plan identifies many issues, risks, strengths and benefits that Coventry is likely to face, which have been developed and considered through a range of evidence and consultation responses. The Local Plan therefore provides a range of policies that seek to build upon strengths and opportunities whilst reducing the risks and issues. One of the risks Coventry currently has is the need to improve air quality across the city and help combat climate change.

CCC is a partner of the Low Emissions Towns and Cities Programme (LETCP) and is working together with other West Midlands authorities to improve air quality and reduce emissions from road transport. This is alongside the emerging 'West Midlands Metropolitan Transport Emissions Framework' which sets out transport's role in tackling air quality issues and has proposed a range of policies. The intention is to do this by promoting the uptake of low emission fuels and technologies, establishing and sharing best practice policies, and developing various tools and resources. The objectives of the programme are to investigate and produce various regional strategies designed to improve air quality, with a view to meeting national air quality objectives.

Funded through the DEFRA Air Quality Grant, the aims of the LETCP and West Midlands Transport Emissions framework are to:

- Improve air quality through reducing road transport emissions, and simultaneously reducing carbon emissions;
- Establish best practice policies and measures for the West Midlands, creating transferable models for other towns and cities;
- Improve health; and
- Maximise opportunities for economic development through the transition to a green economy.

To support the improvement in the city's air quality, the Local Plan includes a policy for air quality. This states that major development schemes should promote a shift to the use of sustainable low emission transport (electric vehicles and vehicles that use biofuels) to minimise the impact of vehicle emissions on air quality. These development sites will be located to maximise accessibility by sustainable modes of transport, specifically public transport, walking and cycling. All major development proposals should be suitably planned to design out any adverse impacts on air quality and be in accordance with the West Midlands Transport Emissions Framework and associated policies.

Additionally, the policy sets out that major development proposals will require the submission of an air quality assessment, as they may lead to a significant deterioration in local air quality resulting in unacceptable effects on human health, local amenity or the natural environment. Note that a supplementary planning document (SPD) is currently being developed as stated in the policy.

1.3.4. Coventry City Council Area Action Plan

CCC has prepared an Area Action Plan[8] (AAP) to help guide, inform and consider development proposals within Coventry City Centre.

The AAP sits alongside the Council's Local Plan, providing greater detail around the policies set out in the Local Plan. The AAP provides a framework, which has been produced to support how the city centre will develop over 15-20 years, through setting out a number of strategic principles to follow. It identifies areas of regeneration, heritage assets and areas for development opportunities.

[7] Coventry City Council, Local Plan (adopted on the 6th December 2017)

[8] Coventry City Council Area Action Plan (adopted by the City Council on the 6th December 2017)

The Local Plan identifies a specific policy area associated with promoting the health and wellbeing of Coventry people. In order to achieve this the policy sets out several aims, one of which is to combat poor air quality and other pollutants. The AAP also highlights the importance of air quality on the natural environment, and states that the city-wide AQMA will support this with a view to making the city centre a more pleasant and healthier environment within which to live and travel. It is noted that issues such as poor air quality can be amplified in city centres, due to higher density development, higher concentrations of vehicles and less greenspace.

The source of NO_2 is primarily from the burning of fossil fuels, with vehicle emissions and traffic congestion having significant impacts. CCC is aware that attention needs to be paid to new developments adjacent to the Ring Road or alongside concentrations of public transport stops, which if not designed in an appropriate way could have significant impacts on public health.

In addition to committing to reduce its current NO_2 levels, Coventry is also entering a period of significant redevelopment within its city centre, and therefore it is crucial that the creation of excessive dust and dirt during the construction processes are mitigated. Adhering to construction environmental management plans (CEMP) will help to moderate adverse impacts from development processes. CCC is also identifying opportunities for sustainable energy sources for city centre buildings, this will reduce the reliance on fossil fuels. A further priority for CCC is providing investment in low emission vehicles and infrastructure, whilst also increasing active travel.

1.4. History of Air Quality in Coventry

Coventry City covers 100 square kilometres and has a population of approximately 330,000 residents. The city is near several strategic road network links, including the M6, M69, M45 and M42 motorways and the A45 and A46 dual carriageways. Pollution from road traffic is a significant contributor to the overall air pollution within Coventry. Other emissions come from commercial, domestic and industrial processes. Coventry is a smoke control area, and it regulates 85 industrial processes under the Environmental Permitting regime (such as petrol stations and dry cleaners).

In 2009, CCC produced the first screening assessment, a review of the air quality monitoring carried out within the city area, which was updated every year up to and including 2015 to comply with local air quality management obligations under Part IV of the Environment Act 1995. This report showed that within the Coventry AQMA there are several areas where air quality standards are exceeded. It should also be noted that significant developments within the city are having direct and indirect impacts on air quality, due to the resulting fluctuations of traffic flows. Therefore, CCC are reviewing monitoring locations and relocating diffusion tubes as required.

The 2015 Updating and Screening Assessment (USA) for CCC summarises the history of NO_2 concentrations between 1998 and 2014, and reports on how annual mean NO_2 concentrations compare to the national air quality objective. The key stages of the assessment include the following:

- In 1998, the main sources of air pollution were identified within CCC area. Following on from this base level information, CCC undertook monitoring of pollutant concentrations and provided a review and assessment of the monitoring data.
- An USA was undertaken, which identified two locations within Coventry that were assessed to be unlikely to achieve the annual mean air quality objective for NO_2, and in 2003 these areas were designated AQMAs.
- In addition to the USA, a Detailed Assessment was produced that predicted a further location was also unlikely to meet the NO_2 annual mean air quality objective. This was also designated as an AQMA in 2004.
- In 2005 local authorities had a deadline for achieving the annual mean air quality objective. However, in 2006 CCC produced another USA, which found that although the majority of pollutant levels in Coventry remained below the UK objectives, for NO_2, six more areas were found to be exceeding the UK annual mean air quality objective and needed Detailed Assessment.
- The Detailed Assessment was carried out and in 2007 and found that all six areas identified by the USA were exceeding the UK objective for annual mean NO_2. Consequently, DEFRA suggested aggregating the areas into a single AQMA. Following this, CCC consulted and determined to designate the whole of Coventry as an AQMA for annual mean NO_2. This was formally declared, becoming effective in late 2009.
- A Progress Report in 2010 indicated that there were still areas exceeding the NO_2 annual mean air quality objective.

- The Further Assessment produced in 2014 concluded that NO_2 levels in the city have not reduced and continued to exceed the national air quality objective, with exceedances primarily attributable to road traffic emissions.
- The Annual Status Report (2016) indicated that NO_2 levels were generally on a downward trend, but in some locations, still in exceedance.

1.4.1. Air Quality Management Area

As outlined above, the whole of the Coventry urban area has been declared as an Air Quality Management Area (AQMA) for annual mean NO_2 since 2009. The reasoning behind declaring the entirety of Coventry is to avoid a situation where targeted action in one geographic area simply shifts the problem somewhere else.

There has been a significant amount of work in Coventry aimed at continuing to reduce traffic congestion, improving low emission vehicle infrastructure and encouraging more sustainable methods of transport, all of which will have a beneficial impact on air quality.

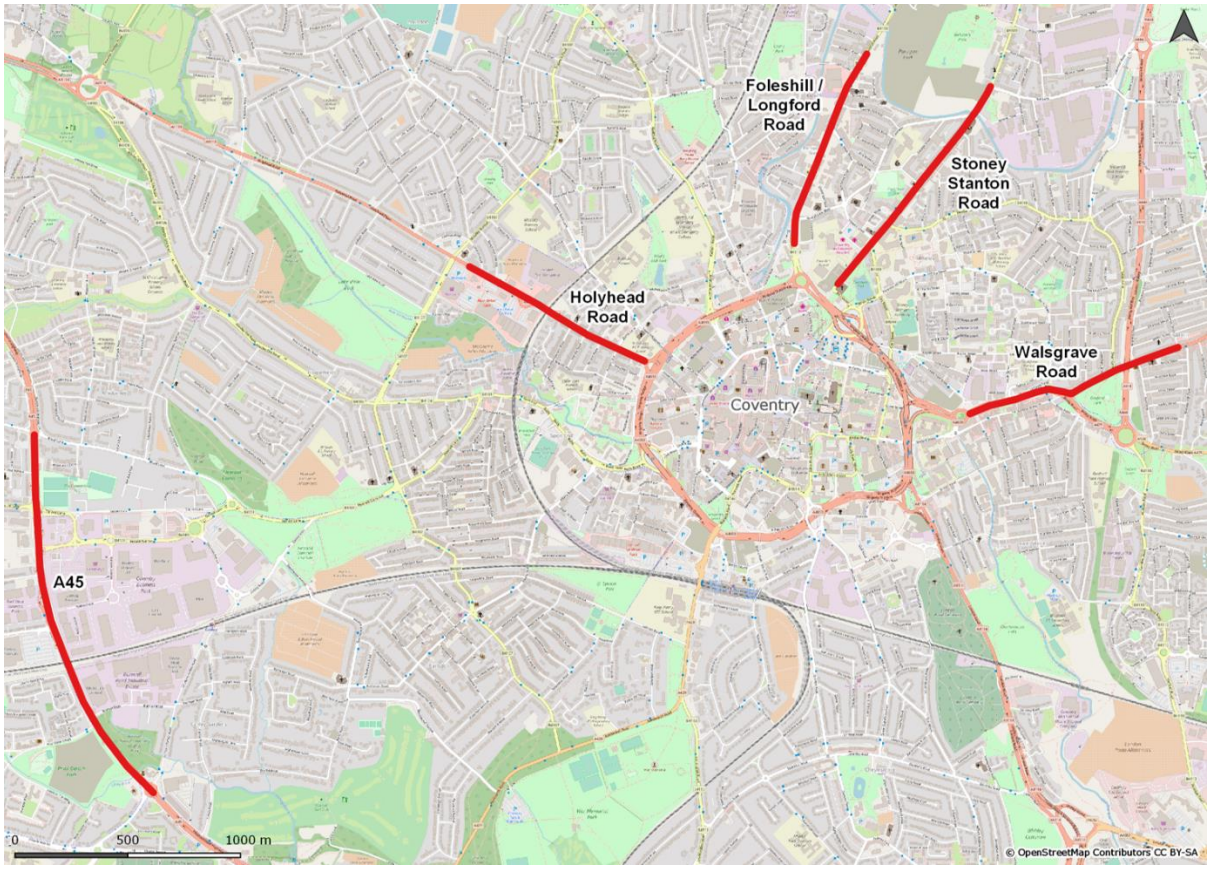
NO_2 is a significant air pollutant and a key issue within Coventry. This pollutant is primarily associated with road traffic emissions, particularly on busy roads or areas with significant congestion. The pollutant risk arises when people spend time near high levels of these pollutants. Such locations can include where people live, work or where they spend their leisure time, however CCC are most concerned with the air pollution experienced by people residing in housing near major arterial routes, where there are high traffic flows and queuing traffic (such as at junctions).

CCC has taken forward a number of measures during 2015/16 in pursuit of reducing congestion, improving pedestrian/cycle routes to key destinations and improving local air quality. Of the 42 measures to improve air quality, in 2016 CCC reported that a large number were completed or ongoing. These measures include a broad range of initiatives, including car share schemes, promoting low emission schemes, promoting travel alternatives, improving public information, traffic management, cycle network infrastructure, cycle hire schemes and improving vehicle fleet efficiency.

1.5. Key facts and figures (relevant to transport and air quality)

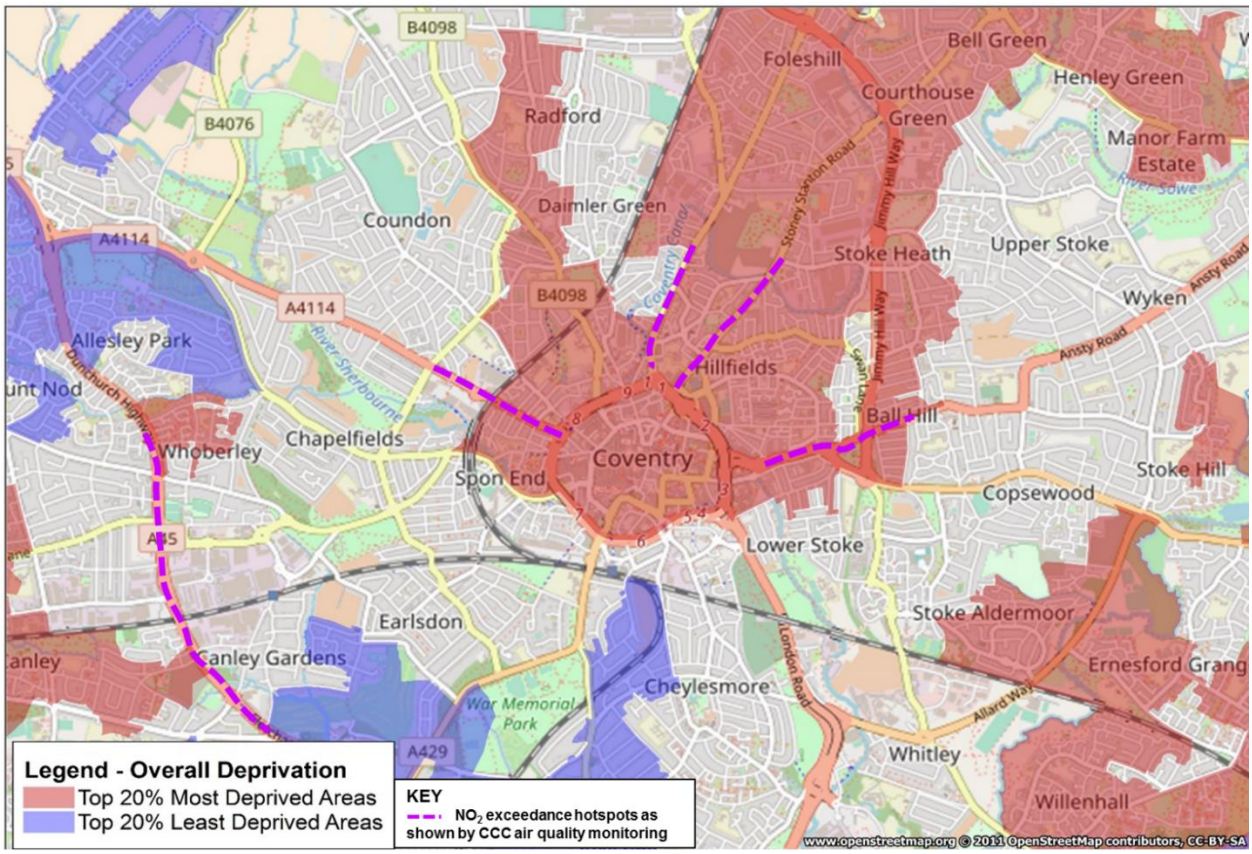
In Coventry, the main air quality issues identified to-date through the Local Air Quality Management (LAQM) process relate to residential properties that are located in close proximity to major arterial routes in the city, which experience high levels of congestion. Currently identified hotspots include sections of Holyhead Road, Walsgrave Road, Foleshill/Longford Road, Stoney Stanton Road and at certain junctions along the A45, as shown in Figure 2. These hotspots have been identified using air quality monitoring data in Coventry, including NO2 diffusion tube monitoring as well as two continuous monitoring sites in Coventry, which form part of the Automatic Urban and Rural Network (AURN) operated by Defra; Coventry Allesley (an urban background site) and Coventry Binley Road (an urban traffic site).

Figure 2 - NO_2 exceedance hotspots as shown by CCC air quality monitoring



The correlation between poor air quality and poor health is exacerbated, in the above-mentioned locations, as these locations are deprived parts of Coventry and people living in deprived areas are more susceptible to adverse impacts of poor air quality and poor health. Figure 3 shows that a significant percentage of the Coventry urban area is within the top 20% most deprived areas. Furthermore, many of the NO_2 exceedance locations fall within the top 20% most deprived areas. Statistics on unemployment also show a similar story and a significant percentage of the Coventry urban area is within the top 20% for unemployed.

Figure 3 - Deprivation statistics for Coventry



Source: *gov.uk (2015 deprivation statistics)*

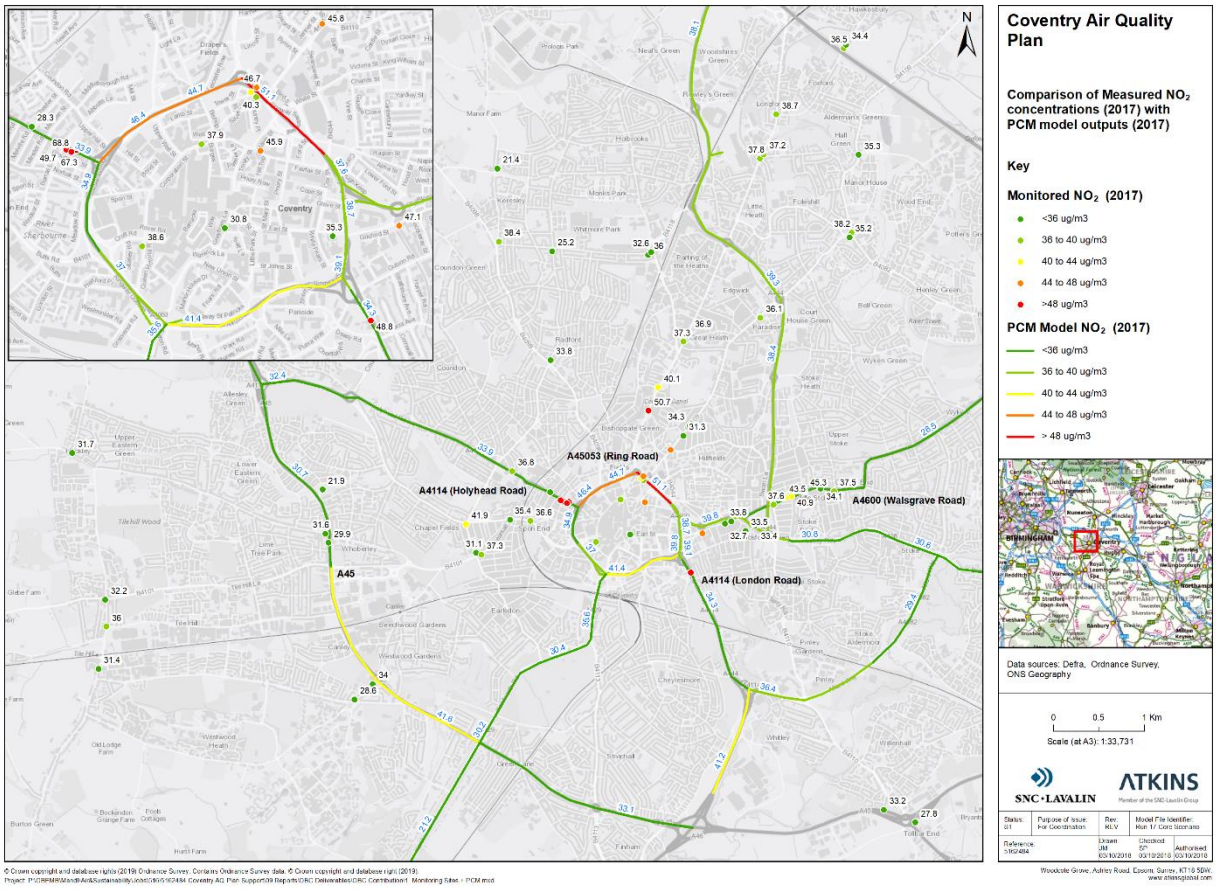
Furthermore, DEFRA has estimated annual mean NO_2 roadside concentrations, in 2017, using the Pollution Climate Mapping (PCM) model. The PCM model assess national compliance with EU limit values and the baseline projections represent the projected concentrations of NO_2 assuming no further action beyond the air quality measures that were committed by the reference year (2015). Projections for concentrations of NO_2 and oxides of nitrogen (NOx) across the UK in the years 2017 - 2030 inclusive, have been calculated as part of a PCM model for approximately 9,000 modelled road links. Measured annual mean NO_2 concentrations in 2017 from CCC monitoring, are shown in Figure 4 alongside estimated annual mean NO_2 roadside concentrations in 2017 from Defra's PCM model. This simple comparison suggests that:

- Along the section of Holyhead Road (A4114) immediately west of the ring road (A4053), measured annual mean NO_2 concentrations in 2017 (49.7 – 68.8 µg/m^3) are substantially higher than the estimated annual mean roadside concentration from the PCM model (33.9 µg/m^3). This section of road is heavily congested during peak hours and has a significant uphill gradient. Furthermore, the dispersion of pollutant emissions is thought likely to be inhibited by the presence of nearby buildings. These factors, which significantly influence both pollutant emissions and dispersion at this location, are not accounted for within the PCM model.
- Monitoring adjacent to the northern section of the ring road (A4053) began in 2017. The monitoring measured an annual mean NO_2 concentration of 46.7 µg/m^3 to the northwest of the ring road, which is similar to PCM model projections.
- Monitoring at a single site adjacent to London Road (A4114), to the southeast of the city centre, suggests that measured annual mean NO_2 concentrations (48.8 µg/m^3) are higher than the estimated annual mean roadside concentration from the PCM model (34.3 µg/m^3). Monitoring is located on the approach to a complicated interchange with the ring road – this section of road is congested during peak hours, which is not accounted for with the PCM model.
- Along the section of the Walsgrave Road (A4600) immediately east of the A444, measured annual mean NO_2 concentrations in 2017 (40.9 – 45.3 µg/m^3) are higher than the estimated annual mean roadside concentration from the PCM model (34.6 µg/m^3). This section of road is heavily congested

during peak hours. Furthermore, the dispersion of pollutant emissions is inhibited by the presence of nearby buildings on both sides of the road (i.e. a street canyon). These factors, which significantly influence both pollutant emissions and dispersion at this location, are not accounted for with the PCM model.

- There were measured exceedances of the annual mean NO_2 air quality objective at locations adjacent to Foleshill Road (40.1 – 50.7 µg/m^3), Stoney Stanton Road (45.8 µg/m^3), Queensland Avenue (41.9 µg/m^3), as well as within the city centre (45.9 µg/m^3) in 2017. None of these locations are however represented within the PCM model, hence, cannot be compared.
- No monitoring was undertaken in 2016, or in previous years, near the sections of the ring road (A4053) where the PCM model estimates the highest annual mean roadside NO_2 concentrations within Coventry, as there is no relevant exposure (e.g. residential properties) in this area. A number of monitoring sites were therefore installed in this area in September 2017, the results from which informed the Initial Evidence Submission and this Outline Business Case.

Figure 4 – Comparison of measured NO_2 concentrations (2017) with PCM model outputs (2017)



1.6. Wider policy benefits

Improving air quality can have direct and indirect impacts, which can benefit wider policies.

Air pollution particularly affects the most vulnerable in society, it is known to have more serious effects on vulnerable groups, for example the elderly, children and people already suffering from pre-existing health conditions such as respiratory and cardiovascular conditions. Studies have suggested that the most deprived areas of Britain bear a disproportionate share of poor air quality.

Air pollution also results in damage to the natural environment. NO_2 contributes to acidification and eutrophication of soil and watercourses, which impacts on animal and plant life and biodiversity. It also contributes to local ozone production which has public health impacts and damages agricultural crops, forests and plants. Air pollution has social costs and risks the potential for economic growth. It also impacts upon

people of working age which can have economic effects, for instance if they have to take days off work due to air pollution-related health problems. Poor air quality in the UK is estimated to have had a total cost of up to £2.7 billion, nationally, through its impact on productivity in 2012[9].

Reducing the use of petrol and diesel vehicles through innovative transport technologies and increasing active travel uptake, will not only improve air quality but will also positively impact on other policies. For example, some estimates suggest that physical inactivity is associated with higher mortality rate than smoking.

This will also help reduce traffic congestion as more people walk, cycle or use public transport, and will improve the health of the public as people become more active, relieving pressure on the healthcare sector.

1.7. Spending objectives

The quality of air is important for public wellbeing and the environment. The impact of public exposure to particulate matter alone has been estimated to reduce average life expectancy by around 6 months, in the UK, which imposes a cost to public health of over £16 billion a year[10]. There is a considerable amount of work being undertaken by CCC that has the potential to improve air quality whether directly or indirectly.

1.7.1. UK Government spending commitments

The UK Government is committed to taking action against poor air quality in urban areas, and the Government is determined to be at the forefront of vehicle innovation by making motoring cleaner. The link between improving air quality and reducing carbon emissions is particularly important and the UK Government will continue to develop solutions which reduce NO_2 and carbon. The Government is already committed to investing over £2.7 billion overall in air quality and cleaner transport, including:

- £1 billion – Investing nearly £100 million in the UK's charging infrastructure and funding the Plug In Car and Plug In Van Grant Schemes.
- £290 million – National Productivity Investment Fund. In the Autumn Statement 2016, a further £290 million was committed for reducing transport emissions, which includes £60 million for new buses and £40 million for bus retrofits, £50 million for a Plug In Taxi programme and £80 million for ULEV charging infrastructure.
- £11 million – Air Quality Grant. The Government has awarded over £11 million under the Air Quality Grant scheme to help local authorities improve air quality.
- £89 million – Green Bus Fund. The UK Government has invested a total of almost £89 million via the Green Bus Fund to help bus companies and local authorities in England to put over 1,200 new low carbon buses on the roads.
- £27 million – Clean Bus Technology Fund and Clean Vehicle Technology Fund. Since 2013, Government has awarded over £27 million to retrofit almost 3,000 of the oldest vehicles (mainly buses) including through the Clean Bus Technology Fund and the Clean Vehicle Technology Fund.
- £1.2 billion – Cycling and walking. In April 2017, the UK Government published its Cycling and Walking Investment Strategy which identifies £1.2 billion which may be invested in cycling and walking from 2016-2021.
- £100 million – National road network. Through the Road Investment Strategy, the UK Government has allocated a ring-fenced £100 million for an Air Quality Fund available through to 2021 for Highways England to help improve air quality on its network.

In the 2016 Autumn Statement, the UK Government also committed an additional £4.7 billion to 2020-2021 for research and development. This includes a new Industrial Strategy Challenge Fund to support the development of innovative technologies.

In July 2018, the Government published The Road to Zero Strategy which set its ambition to see at least half of new cars to be ultra-low emission by 2030. The proposals are outlined in the Strategy which also sets out plans to enable a massive expansion of green infrastructure across the country, reduce emissions from the vehicles already on the UK's roads, and drive the uptake of zero emission cars, vans and trucks. The aims of this strategy will be met primarily through the design and manufacturing of zero emission vehicles and ending

[9] Improving air quality in the UK: tackling nitrogen dioxides in our towns and cities, May 2017, Defra and DfT

[10] Valuing impacts on air quality, Defra, September 2015

the sale of new conventional petrol and diesel cars and vans by 2040. The outcome is for all cars and vans to be effectively zero emission by 2040.

The recent Clean Air Strategy documents how the sources of air pollution will be tackled and provides a more coherent framework to confront air pollution than currently exists. This strategy will be underpinned by nation-wide powers to control major sources of air pollution, and new local powers. In addition, it has been to public consultation allowing all interested parties to help shape the final strategy output.

1.7.2. Coventry City Council spending

Similar to some of the Government's investment priorities, CCC is working towards improving air quality and reducing road traffic emissions, through promoting uptake of low emission fuels and technologies, establishing and sharing best practice policies and developing various tools and resources.

Road schemes that commenced construction in 2013/14 ensured controls were put in place through the planning and construction process to limit and control emissions of dust and fumes. The schemes were designed to deliver improvements in terms of traffic flows, reducing congestion and improving air quality.

CCC is also improving walking and cycling accessibility, through ensuring these are considered in city developments. As part of the Coventry Station master plan, for example, a pedestrian tunnel has been incorporated into the design, this will create additional capacity in future and encourage more people to walk and use train services than drive. Improvements at the adjacent Ring Road junction have improved accessibility between the station and the city centre making it easier for pedestrians and cyclists to travel between the two.

Furthermore, CCC has continued the development of the Heatline District Energy System, which is an energy network that uses waste heat from the municipal waste incinerator to heat eight major buildings within the city centre, one of which is Coventry Cathedral. The scheme eliminates the need for gas boilers at these premises and makes full use of the waste heat using a 650m^3 thermal store. Carbon savings are around 1,300 tonnes per year with NO_X and particulate matter emissions from connected premises being reduced to zero.

In addition, CCC has secured funding from the Government sources listed above to implement a number of initiatives aimed at future-proofing the local transport network to accommodate low emission vehicles. This includes the installation of 39 rapid charging points for electric vehicles across the city, focussed on locations where taxis are going to require top-up charging. This project will be completed during 2019 and is intended to provide the charging infrastructure to make it easier for local taxi drivers to operate electric vehicles. This work has been supplemented by CCC securing £300,000 from OLEV for the installation of around 80 electric vehicle charging points in on-street locations in residential areas around the city. These areas are predominantly inner-city areas with limited off-street parking, and the charging points will remove one barrier to electric vehicle ownership for local residents. The third specific strand of work relates to the upgrading of the engines of the main local bus fleet operated by National Express, with over 100 buses being upgraded to Euro VI standard engines. The outcome of a further bid for £2.37 million, with National Express, for the purchase of ten electric buses, and the installation of the supporting charging infrastructure was confirmed to be successful in February 2019.

1.8. Evidence of the problems

The results of baseline air quality modelling undertaken to inform the OBC are summarised in Figure 5 and show the PCM links where an exceedance of the annual mean NO_2 EU limit value is modelled to occur in 2021, in the absence of any action. Furthermore, these results suggest that, in the absence of any action, the annual mean NO_2 EU limit value has the potential to continue to be exceeded going further forward into the future at certain locations, as shown in Appendix A.

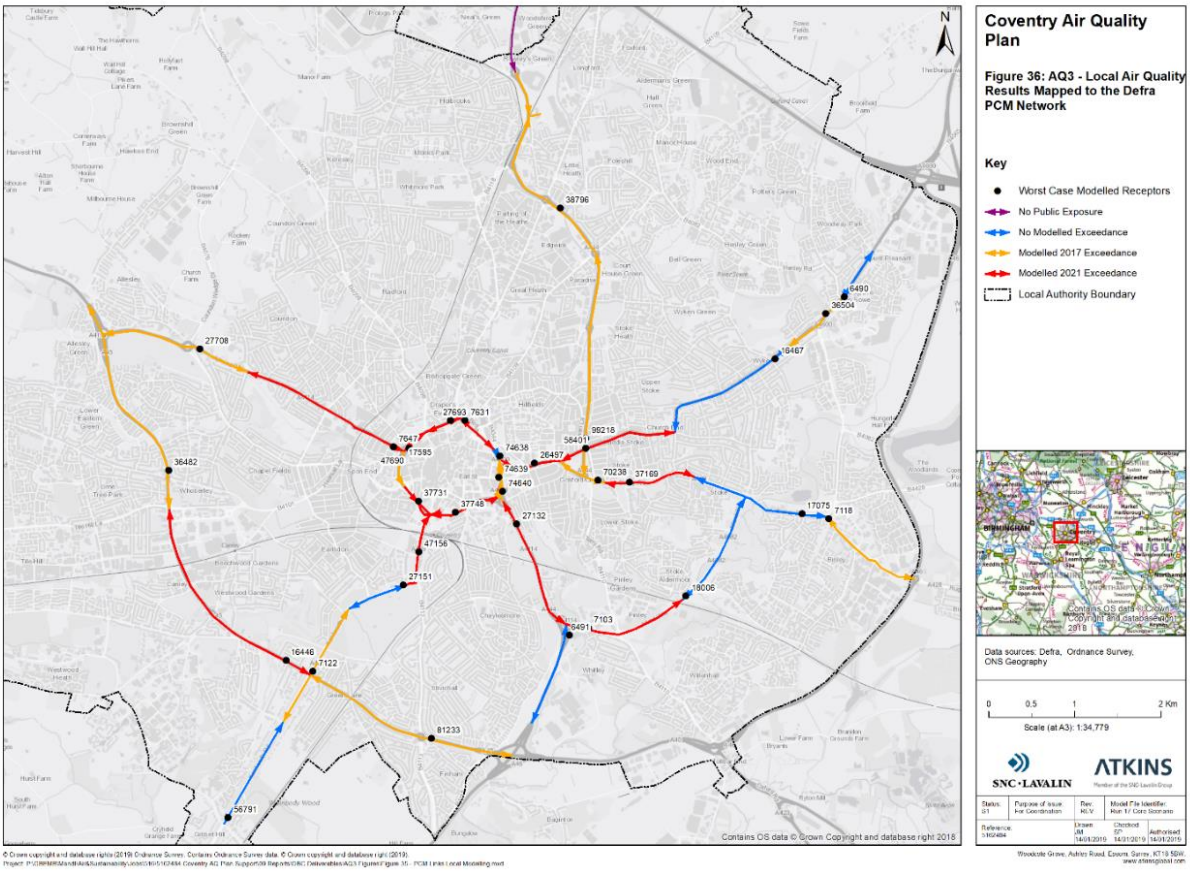
Furthermore, these results suggest that, in the absence of any action, the annual mean NO_2 EU limit value has the potential to continue to be exceeded going further forward into the future at certain locations, as shown in Appendix A. These locations can be summarised as follows:

- 7103 (A4082 London Road), with compliance projected to be achieved in 2023;
- 7631 (northeast section of A4053 Ring Road), with compliance projected to be achieved in 2026;
- 7647 (Holyhead Road), with compliance projected to be achieved in 2026;
- 26497 (Sky Blue Way), with compliance projected to be achieved in 2024;

- 27132 (A4114 London Road), with compliance projected to be achieved in 2023;
- 27693 (northwest section of A4053 Ring Road), with compliance projected to be achieved in 2022;
- 37169 (Binley Road), with compliance projected to be achieved in 2023;
- 37731 (southwest section of A4053 Ring Road), with compliance projected to be achieved in 2027;
- 37748 (southeast section of A4053 Ring Road), with compliance projected to be achieved in 2022;
- 47156 (A429 Kenilworth Road), with compliance projected to be achieved in 2022;
- 47690 (northwest section of A4053 Ring Road), with compliance projected to be achieved in 2023; and
- 58401 (A4600 Walsgrave Road), with compliance projected to be achieved in 2022.

A simple source apportionment exercise was undertaken for each of the PCM links described above based on the estimated contribution to NOx emissions on the nearest modelled road link, the results of which are shown in Appendix B. This indicative analysis suggests that road traffic emission sources contribute 50 to 62% of modelled annual mean NO_2 concentrations at those locations with modelled exceedances. Of this road traffic contribution, diesel cars make by far the largest contribution (44 to 56% depending on the location).

Figure 5 - Baseline modelling results showing locations of exceedances in the year 2021

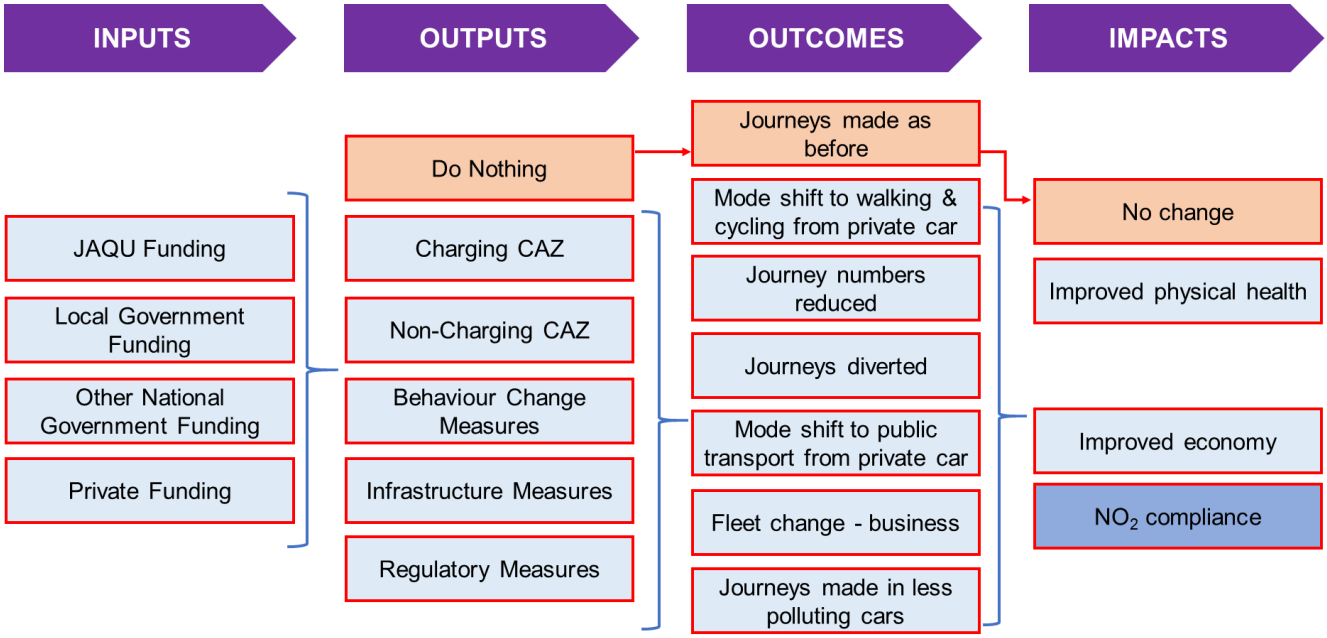


1.9. Theory of change and logic mapping for options

A logic map is a systematic and visual way of presenting the 'theory of change' underpinning a programme/policy; that is how expenditure and invested resources (inputs) generates activities (outputs) which are then expected to lead to changes in outcomes and impacts.

Figure 6 represents CCC's overall vision for change and the likely outcomes and impacts as a result.

Figure 6 - Logic map to represent Coventry City Council's overarching vision of change



1.10. Engagement

1.10.1. Engagement undertaken to date

Initial engagement has been undertaken during the preparation of the OBC as follows:

- Stakeholder workshops were held in October and December 2018, attended by a cross section of stakeholders from neighbouring local authorities, Transport for West Midlands and the freight, public transport and public health sectors;
- Presentation to the West Midlands Freight Council; and
- Presentation to the West Midlands Bus Operators Panel.

1.10.2. Future engagement

CCC plans to undertake a wider engagement from February 2019, providing stakeholders, residents and businesses with information on the contents of the preferred option and the opportunity to comment upon the proposed package of measures.

CCC will also undertake the required statutory consultations to deliver the preferred option (for example as required for TROs, etc.), as well as detailed consultation on the individual schemes contained within the package, as these progress through the development and implementation phases, subject to securing funding approvals for the package.

1.11. The Case for Change

1.11.1. Primary Objective

The primary objective is to deliver a scheme that leads to compliance with NO_2 concentration legal limits in the shortest possible time, considering:

- Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3?
- In which year is compliance achieved?
- Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option?
- Is the option compliant?

1.11.2. Secondary Objective

The secondary objectives of the plan for NO_2 compliance within the shortest possible time are as follows (see Appendices H and J for more detail):

- Does this option improve the overall economy and job prospects within Coventry?
- How does this option align with and support the strategic and wider air quality fit?
    - Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community
    - How does this option affect overall exposure and to what extent does it reduce overall exposure?
    - Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?
- Is there a well-developed supply side, who have the capacity and capability to deliver this option?
- Is this option affordable both in the short and long run?
- How achievable is this option given the existing market limitations and constraints?
- What is the overall distributional Impact of this option?
    - Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?
    - Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?
    - Is there a potential to insure some groups against the detrimental impacts of the option?
    - Does this option have an impact on health inequalities?
- Does this option provide value for money?

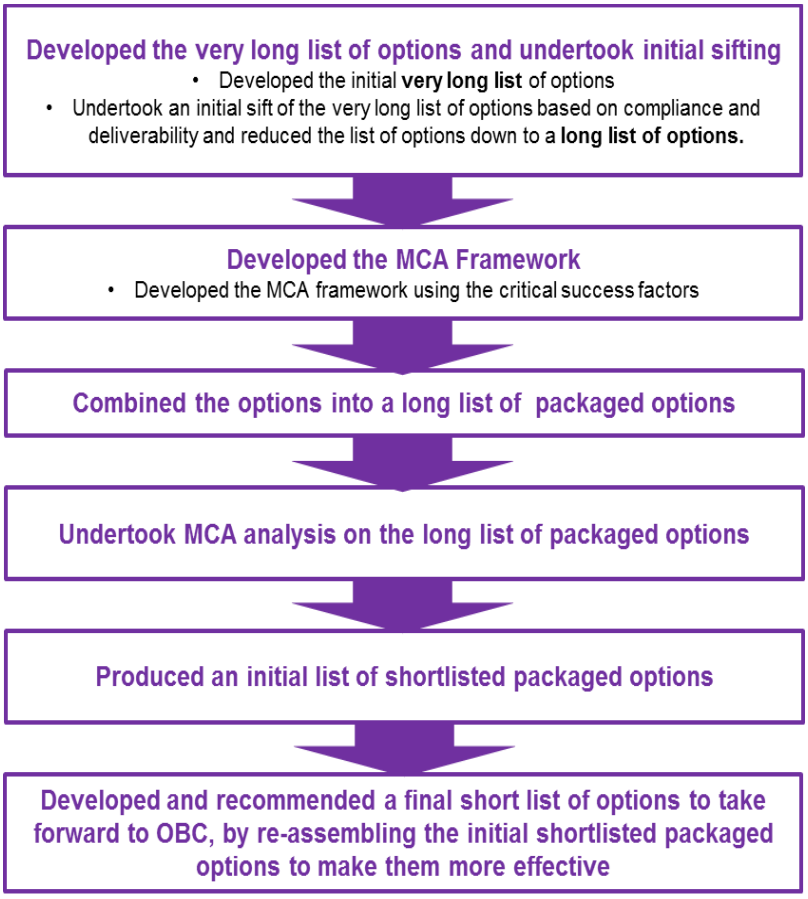
1.11.3. Identification of the Preferred Option

1.11.3.1. Shortlisting (SOC)

An initial option selection process was undertaken in the Strategic Outline Case (SOC), submitted to JAQU in March 2018, which identified a shortlist of measures including both charging and non-charging measures. The shortlist was developed assessing each of the potential options against a list of Critical Success Factors (CSFs) defined in accordance with guidance issued by JAQU.

The optioneering process took a long list of options at SOC stage and sifted them down to a shortlist to be taken forward for more detailed appraisal (described in detail in the Strategic Outline Case, March 2018). A multi-criteria framework (MCA) was applied to enable an assessment of the longlist of options against a range of key success factors and scheme requirements. Figure 7 shows an overview of the sifting process undertaken.

Figure 7 - Overview of the sifting process



Steps taken to determine final shortlisted options:

1. A wide ranging**, very long list of options** has been considered and developed by taking account of air quality issues within the Coventry urban area as well as ideas, thoughts and opinions from various departments within CCC and wider partners.
2. The wide ranging, **very long list of options** was filtered down to a **long list of options** based on deliverability, cost of implementation and the likelihood of the option helping to reduce NO_2 concentrations below the EU limit value in the shortest possible time.
3. To effectively reduce annual mean NO_2 concentrations in the Coventry urban area, many of the options would need to be implemented alongside other options to be successful. As such, Atkins combined the options into more appropriate and effective **packaged options** which complement each other.
4. A MCA framework was developed using the primary and secondary critical success factors as guided by the Joint Air Quality Unit (JAQU) as well as key objectives as identified within the Coventry Local Plan.
5. Each of the packaged options were scored against the MCA framework, with clearly recorded rationale and a shortlist of options was recommended to take forward to OBC stage. As part of this process, some of the options were re-packaged and combined to make them more effective at delivering reductions in annual mean NO_2 concentrations below the EU limit value. (A detailed description of the MCA framework and methodology can be found in appendices F and G).

Refinement from SOC to OBC:

1. The interim set of packaged options shortlisted for further analysis are set out in Table 1. The SOC assessment was based on interim air quality and traffic modelling. Since submission of the SOC, updated observed information relating to fleet composition, traffic volumes and air quality has been

incorporated into the models. The effectiveness of the interim shortlisted options was then tested through traffic and air quality modelling to determine the effectiveness in terms of achieving air quality improvements. The Clean Air Zone (CAZ D) charging option was shown to be the most effective charging mechanism in reducing NO_2 concentrations below the EU limit value in the shortest possible time. This option (DS2) is taken forward for detailed cost-benefit analysis as the benchmark option.

2. Options 1, 2, 3 and 4 shown in Table 1 when run through the updated models were found to perform less well than the CAZ D option in delivering compliance in the shortest possible time.
3. For each of options 1-4, through 'stacking' of the measures through the appraisal process we were able to identify the most effective combination to deliver compliance in the shortest possible time.
4. An iterative process was adopted to develop an option that consists of a package of measures – active travel interventions, taxi upgrade and bus retrofitting support, and road infrastructure improvements – that performed at least as well as the CAZ D option in achieving compliance in the shortest possible time. An option package (DS12a) consisting of the non-charging measures included in the interim shortlisted options with additional improvements to the road infrastructure designed to tackle exceedance hotspots was found to achieve reductions in NO_2 concentrations below the EU limit value in a similar timeframe to the CAZ D charging option.
5. The final shortlisted options taken forward for detailed economic appraisal consist of Option DS2 (a charging CAZ D) and Option DS12a (a package of non-charging measures). The components of Option DS12a are set out in section 1.11.3.3.

Table 1 – Summary of interim shortlisted options

Option No.	Option details
DN	Do Nothing
DS2 CAZ D Benchmark	A Coventry City wide CAZ D (+ Holyhead Road mitigation)
Option 1	CAZ A City wide + Travel Planning + Bus ticketing +Traffic performance + Holyhead Road mitigation + Marketing and communication
Option 2	CAZ A City wide + Travel Planning + Low emission LGV + Holyhead Road mitigation + Marketing and communication
Option 3	Travel planning + Low emission Taxis + Cycling infrastructure + Holyhead Road mitigation + Marketing and communication
Option 4	Traffic performance + Cycling infrastructure + Travel planning + Holyhead Road mitigation + Marketing and communication

1.11.3.2. Additional analysis undertaken to select the preferred option

Since submission of the SOC, the air quality modelling has been refined to incorporate updated traffic flow information, including updated Automatic Number Plate Recognition (ANPR) data on the vehicle fleet. This updated information also had an increased scope to cover an increased number of roads in Coventry. The latter point is considered particularly important, as CCC wishes to adopt and implement an action plan that does not just resolve the air quality problems on the modelled network as defined by JAQU, but also ensures that air quality improves on the wider local network as well.

The links identified through the modelling as being in exceedance in 2021 (the Do Minimum scenario) are primarily the main radial routes leading into the city centre, and the ring road connecting these around the central area.

The key requirement from the preferred option is to deliver compliance on these links without worsening air quality at other locations due to the displacement of traffic, and it is clear that a holistic approach involving a

range of measures will be required to do this – there is no "silver bullet" that will deliver a solution in a simple manner.

Options which were tested again included in summary (additional sensitivity tests were also undertaken):

- Do Minimum scenario: compliance achieved in 2029 (Holyhead Road last link to resolve);
- Benchmark scenario: CAZ D covering significant proportion of the city – compliance in 2024 taking account of assumptions on factors such as the upgrading of vehicles that are considered to be realistic for Coventry[11];
- Scenarios tested to select a preferred option: A number of other scenarios have been considered for comparison with the benchmark. Each scenario has had a different combination of measures included in an overall package and has had differing impacts upon achieving compliance.

This additional analysis shows that the exceedance locations generally driving the compliance year are Holyhead Road and a link on the ring road. Therefore, the priority when developing the preferred option has been, firstly, to address the NO_2 levels on Holyhead Road, which passes through a residential environment, and then, secondly, to do so on the other radial routes where exceedances have been modelled.

1.11.3.3. Preferred Option

The preferred option, to be appraised against the benchmark CAZ D option, which has emerged from this process comprises the package of measures described below (identified as Option DS12a).

Package of non-charging abatement measures – Option DS12a (Implementation Fund):

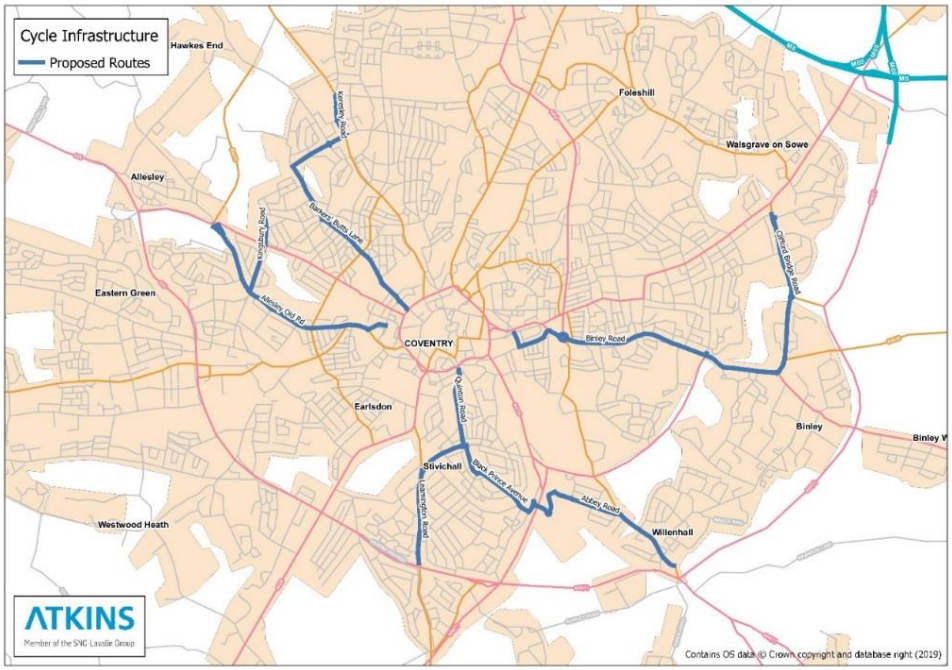
- **Taxi/Private Hire Vehicles** - Update to the CCC's taxi licensing policy to require the use of compliant low emission vehicles by taxi and private hire vehicle operators. The aim is that by the mid-2020's every taxi and private hire vehicle operating within Coventry will be a low or zero emission vehicle. This will be achieved through the extension of the Early Measures taxi upgrade support package (funding sought from Clean Air Fund), which has already demonstrated some success in encouraging drivers to upgrade their taxis by purchasing electric powered vehicles;
- **Buses** - Building upon the existing Coventry Bus Alliance, develop an Advanced Bus Quality Partnership within the city which will, amongst other objectives, have the aim of ensuring that all buses and coaches operating within the city are low or zero emission vehicles. The aim is to achieve a fully low or zero emission bus and coach fleet within Coventry by the mid-2020's;
- **Business fleets** - CCC is one of the largest fleet operators based in the city, with around 300 vehicles ranging from pool cars to refuse collection vehicles. CCC will progressively upgrade the fleet to low or zero emission vehicles, and the fleet procurement policy will be updated to reflect this approach. A review of the existing fleet and procurement programme has identified an opportunity to quickly upgrade around 50 vehicles to low or zero emission standard, and the action plan will therefore include funding to accelerate this programme. A similar funding programme will be made available to other local businesses, with fleet upgrade opportunities being identified through the business engagement programme (see below);
- **Cycle infrastructure** - Construction of four high quality segregated cycle routes to encourage cycling in the city, remove local car journeys off the network, and ease pressure on air quality hotspots such as Holyhead Road, Walsgrave Road and London Road (Figure 8);
- **Traffic management**: implementation of Dynamic Traffic Management through the use of pollution monitors and Variable Message Signing (VMS) to reroute traffic away from air quality hotspots and onto more suitable routes when required. The upgrade of all remaining

[11] Initial JAQU advice is that 64% of non-compliant cars and LGVs would be upgraded to a compliant vehicle by owners seeking to avoid paying a charge to enter the CAZ D area. However, the ability of people, or businesses, to be able to afford to trade in their older, non-compliant, vehicle for a newer, cleaner one should not be taken for granted, especially as the United Kingdom enters a period of economic uncertainty. A number of factors will influence the upgrade rate that can be achieved, included the amount of disposable income available to residents and businesses, the collapse in the second-hand market for older diesel vehicles (meaning that trade-in values for such vehicles are unlikely to be particularly generous), and a general disinclination for people to commit to major purchases during a period of economic uncertainty. Accordingly, it has been considered prudent to undertake sensitivity tests assuming a lower rate of upgrade.

outdated traffic signals across Coventry's key route network will enable full network control and coordination. This will enable 'green wave' opportunities as well as ramp metering of traffic on a route;

- **Mode shift**: A comprehensive package of travel planning initiatives for schools, businesses and communities across the city to support a mode shift away from single person private car trips. This is an extension of the work currently underway as part of the Early Measures programme, and would include the creation of a city-wide business engagement group;
- **Marketing and communications**: A comprehensive package of information and campaigns to underpin the mode shift opportunities and reinforce awareness of air quality issues and impacts.

Figure 8 – Extent of proposed segregated cycle routes

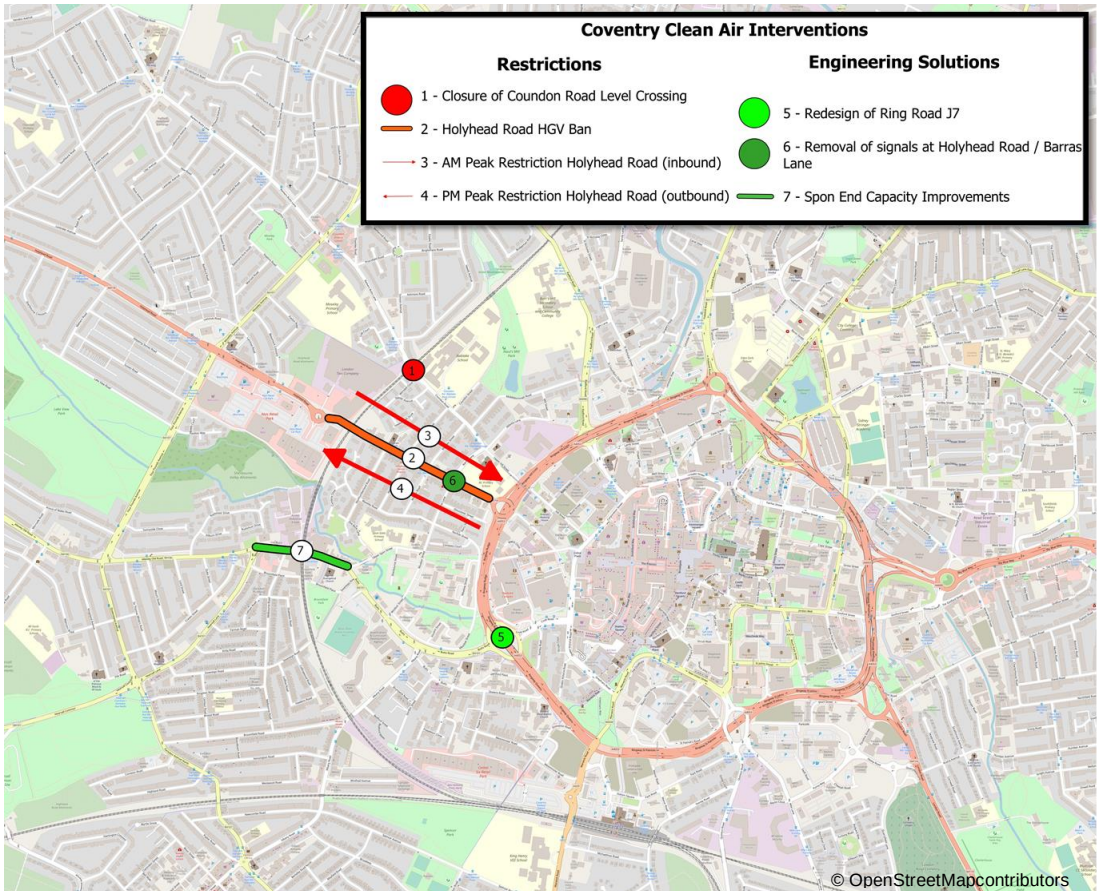


- **Holyhead Road specific abatement** (Implementation Fund)[12] - As previously noted, Holyhead Road has the largest current exceedance and therefore requires specific treatment. This is mainly focused on the relocation of traffic and queuing away from the air quality hotspot, and comprises the following possible traffic management and infrastructure projects (Figure 9):

  - Peak time restrictions for Holyhead Road at J8;
  - Removal of the traffic signalled junction of Holyhead Road and Barras Lane;
  - Closure of the Coundon Road level crossing (to enable removal of junction control above);
  - Heavy Goods Vehicle (HGV) ban on Holyhead Road between the railway bridge and J8 of the ring road;
  - Capacity improvements on the B4106 through Spon End (to allow for traffic transfer from Holyhead Road onto the Allesley Old Road route into the city from the west as part of the dynamic traffic management approach);
  - Upgrade of ring road J7 to further support additional traffic rerouting on the B4106 through J7 rather than J8 (Holyhead Road), and to enhance the walking and cycling routes from Spon End into the city centre, providing the capability to encourage more local journeys to be made on foot or by bike. This again is fundamental to supporting the dynamic traffic management approach on the western approaches to the city centre.

[12] It should be noted that alternative sources of funding are being sought for these infrastructure improvements, including an allocation of £5.8 million towards the Spon End scheme from the Transforming Cities Fund, which has been secured from the West Midlands Combined Authority.

Figure 9 – Holyhead Road specific abatement



- **Clean Air Fund**: It is recognised that the preferred option may result in additional costs being incurred by some businesses and organisations and CCC will seek funding from the Clean Air Fund to mitigate these impacts.

The intention is that the bulk of these measures would be implemented by 2021 (City of Culture Year), although some elements, particularly those involving infrastructure changes, will be subject to phased implementation[13].

The compliance date that can be achieved through the implementation of the preferred option is 2024, which matches the forecast compliance date for the CAZ D benchmark scenario. It should be noted that the preferred option is considered to offer the best balance between achieving NO_2 compliance in the shortest possible time and supporting achievement of the CCC vision for Coventry by contributing to meeting public health, economic and transport objectives.

CCC consider Option DS12a to offer the best solution in terms of balancing air quality improvements and achieving social and economic objectives. Although the preferred option incurs a higher initial cost the package of non-charging measures include investment in the Coventry's transport infrastructure, which will benefit residents and the local economy over the longer term. Option DS12a has the potential to have a transformational impact on how residents move around the city through long-term behaviour change and from the implementation of high quality walking and cycling infrastructure that has lasting benefits. This generates positive economic benefits and does not impose an additional cost on income constrained residents. At the same time achieving air quality compliance in a similar timeframe to the benchmark CAZ D option.

[13] The Spon End will be delivered by 2022 due to likely land acquisition requirements.

Traffic modelling results demonstrate the positive longer lasting traffic impacts compared with the CAZ D option. Furthermore, the road infrastructure and traffic interventions contained in Option DS12a effectively target exceedance hotspots.

The CAZ D charging option imposes a considerable cost on residents and the business community. The distributional impact analysis shows that there is a relatively a high proportion of income deprived areas within the CAZ and across Coventry more generally. The cost of paying the CAZ charge, relative to incomes, dis-proportionately falls on dis-advantaged social groups that have non-compliant vehicles and for who affordability is an issue. These residents are constrained in their ability to afford upgrade options and therefore would effectively be forced to pay the charge, at least in the near term.

2. Economic Case

2.1. Introduction

The purpose of the Economic Case of the OBC is to identify the preferred option which optimises the value for money by considering the Net Present Value (NPV) of the short-listed options. The costs and benefits of each option are assessed in detail. These are considered together with distributional analysis to identify the preferred option.

CCC is required to implement a Local Air Quality Action Plan to deliver improvements to air quality in Coventry within the shortest time possible and to ensure that the city is compliant with national and international air quality targets. The Plan brings together local measures to deliver immediate action to improve air quality and health, with support for cities to grow, while delivering sustained reductions in pollution and a transition to a low emission economy. Where there are the most persistent pollution problems, this could be supported by restrictions to encourage only the cleanest vehicles to operate in the city.

This Economic Case evaluates the options identified by CCC to reduce air pollution in Coventry. The Economic Case assesses the benefits and costs, and distributional impacts of the final shortlisted options to identify a preferred solution.

2.2. Option Identification

The optioneering process took a long list of options at SOC stage and sifted them down to a shortlist to taken forward for more detailed appraisal (described in s.1.11 of the Strategic Case chapter). As the primary objective is to achieve air quality compliance in the shortest possible time only options that performed at least as well as the benchmark option (CAZ D) should be taken forward for cost-benefit analysis at OBC stage. An iterative process was undertaken to develop a package of measures that was at least as effective as the CAZ D option in terms of compliance timescales. The final shortlisted options taken forward for detailed economic appraisal in this OBC consist of Option DS2 (a charging CAZ D) and Option DS12a (a package of non-charging measures). A summary of the components of Option DS12a are set out in Table 2 and discussed in more detail below.

Table 2 – Summary of final shortlisted options

Option No.	Option details
DN	Do Nothing
DS2 CAZ D Benchmark	A Coventry CAZ D: charging all classes of non-compliant vehicles that enter or move within the CAZ boundary.
DS12a	This scenario includes a range of interventions listed below: • Travel planning • Cycling infrastructure • Taxi upgrade support – including financial and licencing incentives • Bus retrofit support – CCC to work with bus operators to incentivise retrofits • CCC vehicle fleet upgrade to low or zero emission vehicles • Traffic Signal Optimisation • Holyhead Road mitigation • Spon End scheme • Junction 7 improvement Inner Ring Road

Do-Nothing

As per JAQU guidance, CCC are required to take forward a Do-Nothing option to OBC Stage. We have, therefore, used the current available information to understand the impacts of the Do-Nothing option on the NO_2 exceedances in Coventry. As shown above, a Do-Nothing option will result in a number of locations not being compliant with NO_2 exceedance levels in the shortest possible time.

Benchmark CAZ D Coventry City wide

As per JAQU guidance, CCC are required to take forward a benchmark charging Clean Air Zone (CAZ) option to OBC Stage. We have, therefore, used the current available information to understand the impacts of CAZ options on NO_2 exceedances and concluded that the benchmark option should be a CAZ D with a perimeter around the centre of Coventry where air quality problems are the worst, as this is the lowest level of CAZ which is forecast to bring Coventry into compliance in the shortest possible time. The current evidence suggests that CCC can achieve compliance in between the years 2023 and 2026 by implementing this option. The year of compliance is presented as a range depending on the upgrade response and reflects uncertainties related to air quality impacts, explained in more detail in the Air Quality Modelling Report (AQ3).

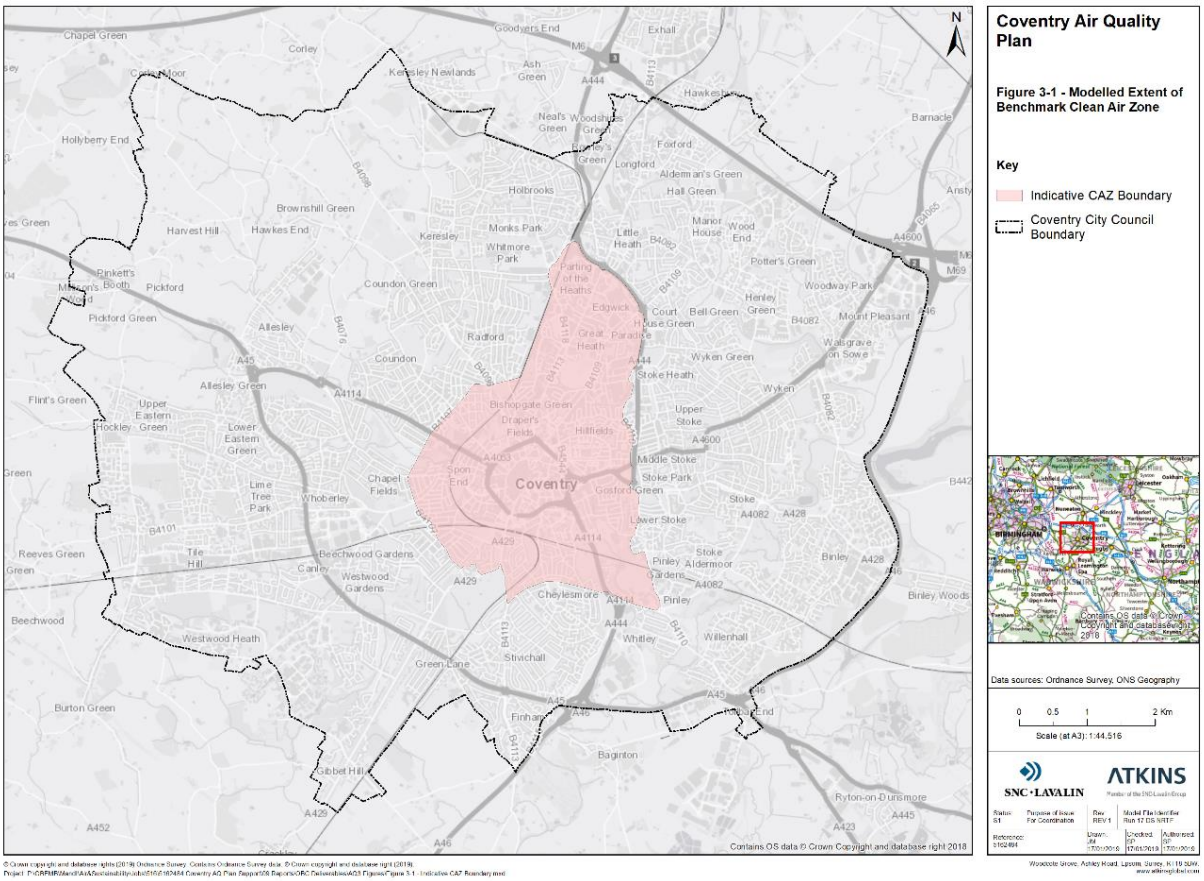
The benchmark CAZ considered consists of a Class D CAZ (i.e. affecting buses, coaches, taxis, private hire vehicles, LGVs, HGVs and private cars) with a daily toll of £12.50 for Cars and LGVs and £100 for HGVs, buses and coaches to enter the zone (Table 3).

Table 3 – CAZ D charge and penalty charge by vehicle type

	Car	LGV	HGV	Bus	Taxi
CAZ D charge	£12.50	£12.50	£100	£100	£12.50
Penalty Charge (if paid within 14 days)	£60	£60	£120	£120	£60
Penalty Charge (if paid after 14 days)	£120	£120	£200	£200	£120

The extent the CAZ is shown in Figure 10.

Figure 10 - Modelled Extent of CAZ D



Option DS12a - Travel planning + 4 new cycle routes + taxi upgrade, bus retrofit and CCC vehicle fleet upgrade + traffic performance + Holyhead Road mitigation + road infrastructure improvements at Spon End and the inner ring road, junction 7 + Marketing and communication

The option has been developed to promote active travel and mode shift to reduce the number of car trips in the city through intensive travel planning and with the provision of 4 new high-quality cycle routes. The option targets non-compliant buses by encouraging retrofitting vehicles with compliant low emission engines, or ULEVs. This option also targets non-compliant taxis by supporting the upgrade to electric (and possible retrofit) CCC will offer support and financial incentives to bus operators and taxi drivers. The volume and flow of traffic at exceedance hot-spots is reduced by a combination of mitigation measures along Holyhead Rd, Spon End and Junction 7 on the inner ring road. The flow of traffic is further improved through signal optimisation and reduces congestion and lowers emissions. The current evidence suggests that CCC can achieve compliance by 2024 by implementing this option.

Table 4 – Package of measures included in Option DS12a

Preferred option DS12a	Package of abatement measures
Travel Planning	Personal Travel Planning: intensive engagement with households city wide
	Workplace Travel Planning: intensive engagement with employers city wide
	School Travel Planning: intensive engagement with schools city wide
Cycling Infrastructure	High quality cycle infrastructure along 4 routes
Low emission taxi upgrade support	Taxi compliance scheme: financial support for taxi drivers to encourage upgrade of vehicles to low emission engines; taxi licence changes to improve fleet emissions and implementation of 40 electric vehicle charging points
Low emission bus retrofit support	Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes
CCC and business vehicle fleet retrofit	CCC will progressively upgrade the fleet to low or zero emission vehicles. A similar funding programme will be made available to other local businesses.
Traffic performance measures	City wide traffic signal technology upgrade, traffic signal optimisation and additional VMS
Road infrastructure improvements and Holyhead Road mitigation measure	Capacity improvements at Spon End
	Redesign of Ring Road J7
	Closure of Coundon Road level crossing
	Removal of signals at Holyhead Road/ Barras Lane
	HGV ban on Holyhead Road between railway line and J8
	Peak time restrictions on Holyhead Road (inbound AM, outbound PM)
Marketing and Communications	Implementation of a targeted marketing and communications strategy

Travel Planning

Implement intensive personal, workplace and school travel planning across the city. To include universities, hospitals and major employers, affecting some 50,000 employees, and 125 schools across Coventry. Additionally, personal travel planning will be rolled out across the city, concentrating first on communities living along and using the routes with NO_2 exceedances. As we are aware private car trips are significant contributors on the ring road. Evidence from 'Early Measures' work indicates that effective travel planning can reduce a significant percentage of the car trips including 2.9% school trips, 4% of commuter trips and a further 4% of community car trips. Therefore, the potential positive impact of travel plans can be substantial as the existing mode share of car is large.

The measure would focus on encouraging mode shift from car to public transport, walk and cycle modes as well as encourage the use of low emission vehicles through car clubs and use of mobile technology.

Cycling infrastructure

Develop a focused provision of 'first class' cycling facilities along the key corridors toward the key destinations, including the largest employers and education establishments within the Coventry urban area. This is likely to have the largest impact in the minimum time. We currently know that the mode share of cycling is low in the Coventry urban area, therefore, the potential for improvement is significant, which we have seen in other parts of the UK including London. A Cyclists' Public Affairs Group study has demonstrated that modest increases in cycling could readily reduce transport sector emissions by 6% of the total in Great Britain.[14] Furthermore, the improvements in cycling facilities would complement the travel planning measures as it is likely to encourage the uptake of cycling, hence reducing car trips.

Low emission taxi upgrade support

There are currently 859 CCC licensed Hackney Carriages (HC) operating in Coventry and very few of them are Euro 6 compliant, although a small number of electric taxis are being introduced to the fleet through the Early Measures programme. Early air quality modelling indicates that HC are significant contributors to NO_2 exceedances in the Coventry area, largely due to their age and the many trips undertaken by the HC daily. Evidence from 'Early Measures' work suggests that if we are able to replace 100 of the existing HC using electric HC, we can potentially reduce the NO_2 contribution from HC by up to 10%. To maximise the air quality impacts of this intervention we will provide support and financial incentives to upgrade with the aim of upgrading half of the fleet, 429 vehicles. Additional measures of taxi improvements will be achieved via licensing restrictions. The scheme will include the implementation of 40 electric vehicle charging points.

Low emission bus retrofit support

CCC will support bus upgrades to Euro VI standards prioritising buses travelling along exceedance routes and in the city centre. CCC will continue to work with bus operators and provide financial incentives to support upgrades. Additional bus measures include improving passenger facilities at roadside waiting locations. This intervention would complement the travel planning measure as it is likely to encourage the uptake of public transport and a mode shift away from private cars.

CCC and business fleet upgrade

CCC will progressively upgrade the fleet to low or zero emission vehicles, and the fleet procurement policy will be updated to reflect this approach. A review of the existing fleet and procurement programme has identified an opportunity to quickly upgrade around 50 vehicles to low or zero emission standard, and the action plan will therefore include funding to accelerate this programme. A similar funding programme will be made available to other local businesses, with fleet upgrade opportunities being identified through the business engagement programme.

Traffic performance measures

Take a more strategic approach to road works/improvements as well as install and update traffic control systems using more intelligent programming, including the use of SCOOT systems. This will include the introduction of city wide traffic signal technology and VMS systems. Evidence detailed in CCC's 'Early Measures' bid indicates that more intelligent programming of traffic systems can reduce congestion by up to 4%. This measure would therefore have the potential to reduce NO_2 exceedances along key hotspot routes as current evidence indicates congestion issues along key routes.

Road infrastructure improvements and Holyhead Road mitigation measure

Implement infrastructure and traffic management measures to significantly reduce vehicle trips and congestion along key exceedance hot-spot areas, including Holyhead Road. As the forecast exceedances on Holyhead Road are not mitigated by even the benchmark CAZ D option, the strategy will be to reduce traffic levels through a package of infrastructure improvements that will enable the diversion of traffic onto other more suitable routes, complemented by modal shift through the other measures included in this option. The package includes:

- Capacity improvements at Spon End

[14] https://ec.europa.eu/transport/road_safety/specialist/knowledge/pedestrians/promote_cycling_and_bicycle_helmets_or_not/promoting_cycling_changes_to_expect_en

- Redesign of Ring Road J7
- Closure of Coundon Road level crossing
- Removal of signals at Holyhead Road/Barras Lane
- HGV ban on Holyhead Road between railway line and J8
- Peak time restrictions on Holyhead Road (inbound AM, outbound PM)

Marketing and communication

Implement a targeted marketing and communications strategy across the Coventry area. This would include travel behaviour change and promote active travel modes, hence, complementing the other measures within this option. This measure would improve the effectiveness of all the measures in this option.

2.3. Economic Appraisal Methodology

2.3.1. Overview of approach and assumptions

This section provides an overview of our approach to the economic analysis. JAQU's Option Appraisal Guidance states that only shortlisted options that pass the CSF and those that are likely to lead to compliance in the shortest possible time will be accepted. Each option identified should be taken forward for a detailed assessment of the costs and benefits. The results are intended to allow the identification of a preferred option based on achieving compliance is the shortest possible time, its economic value for money (VfM) and distributional impacts. Therefore, the appraisal below provides two net present value (NPV) figures: one for the CAZ D charging Option DS2 and one for Option DS12a, consisting of a package of non-charging measures and road infrastructure improvements.

The air quality modelling results show that Options DS2 and DS12a are the two options that achieve compliance in the shortest possible time. The results show that both options can potentially achieve compliance by around 2024. There is considerable uncertainty associated with each option, therefore it's appropriate to view the point of compliance as a range rather than at a single point in time. The likely time range for compliance for Option DS2 is 2023-26, depending on the vehicle upgrade response rates. The forecast compliance year for Option DS12a is 2024.

An economic methodology report is provided separately, which includes a more detailed guide to the analysis. JAQU have provided guidance regarding the appraisal of CAZ options. This provides a steer for many of the key data inputs and assumptions that have framed the analysis undertaken. The key documents that have provided this guidance include:

- Options Appraisal – Guidance (2017) (and preceding versions of this guidance)
- National data inputs for Local Economic Models (2017)

The analysis is also underpinned by the following general assumptions:

- Each impact associated with each CAZ option is assessed relative to a 'do nothing' baseline
- All impacts are presented in real terms with a Price Year of 2018
- A lifetime approach has been adopted (rather than an annualised approach) and all impacts are assessed over a 10-year appraisal period from 2021-30
- All impacts are discounted to 2018 applying Green Book discount factor of 3.5%

The methodology developed has been designed to be consistent with the JAQU guidance. However, in some cases we have sought additional steps and assumptions where the study team felt that additional approaches were warranted. The results of the economic appraisal are presented in the following sections.

2.3.2. Scope of economic impacts assessed

A CAZ will impact various parts of the environment, economy and society. The economic analysis seeks to quantify and value as many of these impacts as possible given the time, resource and modelling methodologies available. The scope of impacts considered in this analysis are:

- Air quality emissions
- Greenhouse gas impacts
- Traffic flow and other impacts on transport users
- Fuel and operating cost impacts – indirect tax effect
- Welfare costs of trip cancellation and vehicle upgrades, including scrappage and transaction costs
- Cycling and active travel impacts
- Charge revenue
- Implementation costs

The general approach to calculating economic impacts is as follows:

Total Economic Impact = Volume x Unit Economic Value

For example, in the case of air pollutant emissions, volume can be tonnes of NOx and associated economic values are damage costs per tonne of NOx. In the case of traffic impacts, values of time are applied to changes in journey times. This framework allows us to present our calculations in the format given in Table 5.

Table 5 – Key calculations and data sources

Impact.	Volume	Unit of economic value
Air Quality Emissions	Output of air quality modelling for each option, utilising the EfT toolkit	PM2.5 and NOx damage costs provided by JAQU
GHG Emissions	Combining numbers of vehicles upgraded, average vkm travelled per annum with average emissions factors per km travelled	BEIS Carbon Prices
Traffic flow and other transport user impacts	Outputs from transport models for each option	Values of time and operating costs provided by WebTAG databook
Fuel and operating cost impacts – indirect tax impacts	Traffic flow related changes – outputs from transport model for each option Vehicle upgrade related changes – Change in vehicle fleet defined by CCC ANPR data and JAQU behavioural responses. Combined with average vkm travelled per annum and average fuel consumption per km	Vehicle operating costs, fuel prices and indirect taxation rates from WebTAG Fuel consumption rates from JAQU CO2 emissions rates. Fuel prices provided by BEIS and indirect taxation rates from WebTAG
Welfare loss due to trip cancellation	Transport modelling outputs and response assumptions providing number of trips affected	Half the CAZ charges proposed by CCC
Welfare impact of vehicle upgrade (including scrappage and transaction costs)	CCC ANPR data and JAQU behavioural responses to define number of non-compliant vehicles upgraded	Vehicle prices, depreciation rates and transaction costs from JAQU guidance

Cycling and active travel	Estimates of the number of additional cycling trips and the number of existing trips experiencing improved journey quality	DfT Active Mode Toolkit valuations of health, absenteeism and journey quality benefits of increased and improved cycling
Charge revenue	Transport model outputs of the number of non-compliant vehicles by vehicle type paying the charge (estimated as the number crossing the boundary inbound)	Daily charge per vehicle
Implementation Costs	Labour and equipment required	Unit costs for labour, monitoring equipment etc

2.4. Results of Cost Benefit Analysis

The results of the economic analysis are presented below.

2.4.1. Air Quality Impacts

The impact on affected populations by a change in NOx and PM emissions as a result of the implementing the options. Calculating the economic impact is dependent on the output of air quality and transport models which provide air quality outputs for the baseline and the two options for NOx and PM2.5. The marginal impact on air pollution of each option has been calculated (in tonnes of pollutant) and combined with the air pollution damage costs provided by JAQU, which convert emissions into monetised health impacts to estimate the total benefit (in damage costs saved) for each option.

The monetised impact of the change in air quality is presented in Table 6. It is estimated that the CAZ D charging scheme will generate a benefit of £13.7million over the ten year appraisal period, this is less than the Option DS12a, which will generate £14.8million of benefits.

Table 6 – Monetised Air Quality Impacts

Impact	Option DS2 CAZD	Option DS12a non-charging
Cumulative difference in NOx emissions 2021-2030 (tonnes)	-1,049	-1,156
NOx damage costs 2021-2030 (£/tonne)	£7,321 - £8,749	£7,321 - £8,749
NOx change (£000s)	**6,515**	**7,197**
Cumulative difference in PM emissions 2021-2030 (tonnes)	-64	-69
PM damage costs (£/tonne)	£131,275 - £156,886	£131,275 - £156,886
PM change (£000s)	**7,154**	**7,602**
Aggregate PV of air quality impacts (£000s)	**£13,669**	**£14,799**

(Cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018, £000s)

2.4.2. Greenhouse Gas Impacts

Changing travel behaviours in response to clean air measures will have an impact of Greenhouse Gas emissions, particularly CO2. In response to a charging CAZ, vehicle owners will upgrade vehicles, cancel their journeys, or take a different route avoiding the CAZ charging area. Option DS12a will affect the number of vehicle journey's by encouraging mode shift to active modes and smooth the flow of traffic in key exceedance hotspots. This will have an impact on fuel consumption and in turn on the emissions of GHG's. The marginal impact of each option has been calculated for upgraded vehicles and for the resulting number of vehicle kilometres and then valued using BEIS carbon prices as specified by JAQU.

The monetised impact of the change in GHGs presented in Table 7. It is estimated that the Option DS2 will generate a benefit of £3.8million over the ten year appraisal period, this is less than Option DS12a, which will generate £4.2million.

Table 7 – Monetised GHG Impacts

Impact	Option DS2 CAZD	Option DS12a non-charging
Cumulative difference in CO2 emissions 2021-2030 (tonnes)	-64,578	-72,457
BEIS Carbon Prices 2021-2030 (£/tonne)	£70 - £81	£70 - £81
GHG impacts (£000s)	**£3,781**	**£4,227**

(Cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018, £000s)

2.4.3. Traffic Flow Impacts and Other Transport User Benefits

Where vehicle owners cancel journeys, avoid the zone or switch modes, can lead to changes in traffic flows and congestion within the clean air zone. Travel times and vehicle operating costs will be affected by the changes in traffic flows. Trip and trip time data was provided from the transport model. DfT's WebTAG guidance has been applied to monetise the impact on journey times and vehicle operating costs.

In response to a CAZ charge, the transport modelling assumes that a proportion of vehicle owners will upgrade their vehicle, with some switching fuel type from diesel to petrol. Additionally, the CAZ charge will affect the number of journeys within the CAZ area: some will cancel journeys, take a different route or pay the charge. This is reflected in journey times and vehicle operating costs to the user. DfT's Transport User Benefits Assessment (TUBA) software has been used to assess the impact on transport economic efficiency (TEE).

Under Option DS12a, a number of vehicle trips within the Coventry urban area will be reduced by drivers switching modes to walking and cycling in response to the provision of new cycling infrastructure and intensive travel planning interventions. Analysis was carried out to estimate the number of car trips reduced as a result of the cycling and travel planning measures. This was fed into the traffic model to estimate the impact on traffic flows. Additionally, changes to traffic signalling (Scoot) and to the road infrastructure in key exceedance areas will affect the flow of traffic in and around Coventry. TUBA software was used to estimate the monetary value of these impacts together with the impacts resulting from the road infrastructure improvements.

The monetised impacts of the options on traffic flows and the subsequent costs and benefits experienced by transport users is presented in Table 8. A major component of the disbenefits to users in Option DS2 is the cost associated with paying the CAZ toll charge. Including the effects of this cost to drivers of non-compliant vehicles it is estimated that Option DS2 will generate a disbenefit of £81.8million to transport users over the ten year appraisal period. In contrast, Option DS12a generates a benefit of £25.8million. This is largely due to the reduction in vehicle trips and congestion resulting from mode switch to cycling and walking, and in response to traffic management measures.

Table 8 – Transport User Impacts (TUBA)[15]

Impact	Option DS2 CAZD	Option DS12a non-charging
Transport User Impacts (£000s)	**-£81,758**	**£25,819**

Notes: +ve values denote a benefit; -ve values denote a dis-benefit;

(Cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018, £000s

2.4.4. Fuel and Operating Cost Impacts – Indirect Tax

Option DS2 will affect the behaviour and travel choices of drivers. Some will change from a diesel to petrol vehicle or purchase a compliant, more fuel efficient vehicle, others will re-route to avoid the charge. This change of behaviour will result in savings or additional costs. This includes both changes in fuel consumption and the associated cost, and change in operating and maintenance costs.

Both the Option DS2 and Option DS12a will also cause changes to the fuel and operating costs experienced by drivers in Coventry as a result changes in traffic volumes and conditions resulting from the measures.

The impact of changes in traffic conditions and rerouting on fuel and operating costs for transport users are captured in the TUBA assessments of traffic flow and other transport user impacts for each option, as reported in the previous section.

The fuel and operating cost implications of a vehicle upgrade are amongst the impacts considered by drivers in deciding to purchase a new vehicle and are therefore captured in the welfare costs of vehicle upgrade discussed in the next section.

In addition to the implications for transport users, changes in fuel expenditure impact on the indirect tax revenue received by government, particularly due to change in fuel duty receipts.

The indirect tax impacts of fuel and operating cost changes associated with changes in traffic conditions and rerouting were estimated through the TUBA assessment for each option. For Option DS2, the indirect tax implications of changes in fuel consumption due to vehicle upgrades were estimated on the basis of a change in annual fuel expenditure, accounting for the number of vehicles upgraded and the impact on fuel efficiency and fuel type, combined with average taxation rates on fuel.

The monetised impact of the indirect tax impacts of Option DS2 and Option DS12a are presented in Table 9. It is estimated that Option DS2 will result in a net tax loss of £3.9million to the exchequer and Option DS12a will cause a £7.3 million loss

[15] These results are based on traffic modelling outputs and use data generated from the CASM Transport Model as inputs to assess the economic impacts.

Table 9 – Fuel Change and Operating Cost Impacts[16]

Impact	Option DS2 CAZD	Option DS12a non-charging
Indirect tax loss due to changes in traffic volumes and conditions	-£2,366	-£7,267
Indirect tax loss due to vehicle upgrade	-£1,583	n/a
Indirect tax impacts (£000s)	**-£3,949**	**-£7,267**

(Cumulative discounted impact (PV) from 221-30, 2018 prices, discounted to 2018, £000s)

2.4.5. Welfare Costs of Trip Cancellation and Vehicle Upgrade

Where vehicle users avoid the CAZ, cancel journeys or switch mode, there will be a cost for the user associated with not being able to take their first preference. The transport modelling and associated TUBA assessment described above reflect the impacts of rerouting and changes in mode but not of trip cancellation. In the case of 'cancelled' journeys, the cost arises because the vehicle user will not undertake the activity planned at the destination (e.g. a leisure trip to the city centre). The vehicle user will therefore miss out on the utility / value that they would have gained from that trip, which is captured by this impact category. This is valued as half the charge to reflect the welfare loss associated with the CAZ and is estimated to cost £12.3million.

Other vehicle users will respond to the CAZ charge by upgrading their vehicles to be compliant which also involves a welfare loss. Vehicle owners will make the decision to purchase a new vehicle on the basis of the cost of upgrade and perceived benefits of the new car including factors such as fuel costs, comfort, quality, depreciation and resale value and, in an area with a CAZ, the impact on charges to be paid.

Of those upgrading as a result of the CAZ some would see sufficient benefit in the upgrade to be on the verge of upgrading even without the charge, whilst others would not have been considering an upgrade and would perceive very limited additional benefit to upgrading other than CAZ compliance. The latter category of vehicle owner would therefore experience the full cost of the upgrade (without offsetting perceived benefits) as a result of the CAZ.

In line with the Rule of Half approach to economic appraisal, it has therefore been assumed that the welfare loss associated with upgrading to a newer vehicle earlier as a result of the CAZ is on average half of the net cost of the upgrade[17]. The consumer welfare loss associated with upgrading earlier is estimated to be £47.2million, demonstrating that there is a considerable cost to drivers associated with having to upgrade their vehicles.

Those upgrading their vehicles will also experience a transaction cost. This represents the time taken searching for and buying the vehicle and has been estimated on the basis of the estimated number of vehicle upgrades made early as a result of the CAZ and JAQU guidance on the transaction cost per vehicle. This is a modest additional cost estimated at £0.4 million over the ten year appraisal period.

The increased turnover of fleet resulting from vehicle upgrades in response to the CAZ also has an additional welfare impact of increasing the rate of scrappage (on the assumption that the total fleet size stays the same). This results in some vehicles being scrapped sooner and at a lower age and therefore with greater residual

[16] These results are based on traffic modelling outputs and use data generated from the CASM Transport Model as inputs to assess the economic impacts.

[17] Estimated as the purchase cost net of the resale value after 2 years

welfare value (estimated on the basis of vehicle age and depreciation rates). This additional welfare loss is estimated at a net impact of £5.1million.

The economic impact of the welfare loss associated with trip cancellation and vehicle upgrades caused by introducing a CAZ charge is presented in Table 10. It is estimated that the combined effect will be a cumulative welfare disbenefit of £64.8million over the ten year appraisal period.

Table 10 – Welfare Loss due to Trip Cancellation and Vehicle Upgrade[18]

Impact	Option DS2 CAZD
Welfare loss – cancelled trips	-£12,251
Welfare loss – upgrade vehicle	-£47,175
Vehicle Scrappage Costs	-£5,081
Transaction Costs	-£374
Welfare impacts of trip cancellation and vehicle upgrade (£000s)	**-£64,881**

(Cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018, £000s)

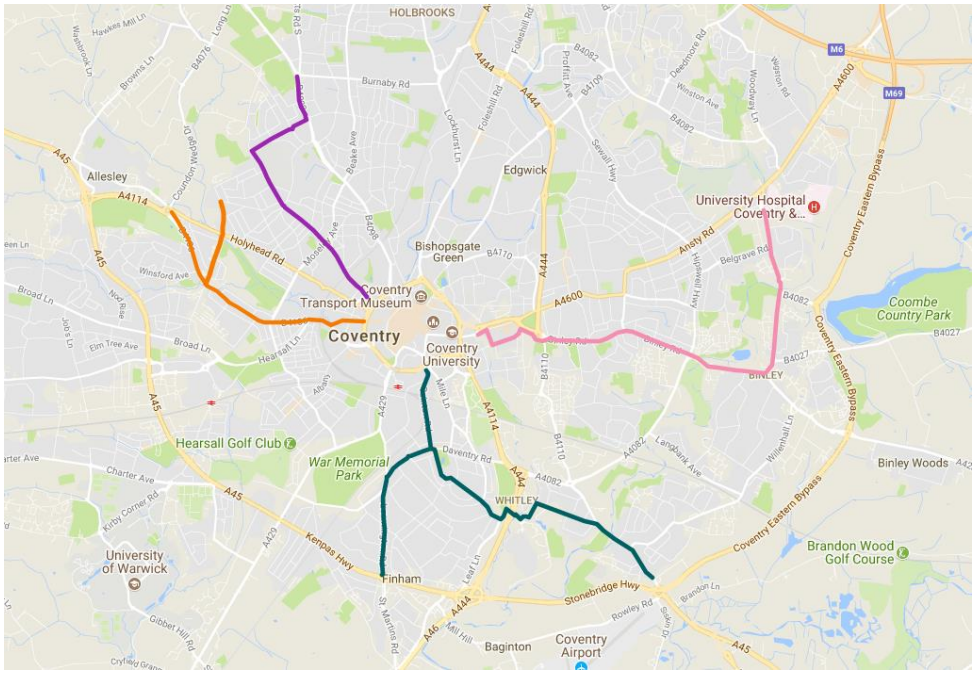
2.4.6. Cycling Impacts

As part of Option DS12a, significant improvements will be made to the cycling infrastructure in Coventry. Four new high quality cycle routes will be implemented to encourage mode shift to more sustainable modes. Extensive personal, workplace and school travel planning will be rolled out across the Coventry area. This will provide support for active travel and aim to reduce the number of car trips by promoting alternatives such as car sharing and public transport. Travel planning will complement the provision of cycling infrastructure enhancing the take up by new cyclists.

The scale of four proposed cycling routes are shown in Figure 11.

[18] *These results are based on traffic modelling outputs and use data generated from the CASM Transport Model as inputs to assess the economic impacts.*

Figure 11 – Proposed new cycling routes[19]



- The orange route, from Allesley to the ring road is approximately 4.2km in total
- The purple route from Keresley is approximately 3.7km
- The pink route from Coventry Hospital is approximately 6km
- The blue route from the south of the city is approximately 6.7km in total

Option DS12a will increase the number of new cyclists and reduce the number of vehicle trips as a result of these new routes.

Option DS2 will also increase cycling and reduce traffic as drivers deciding to change mode to make a journey by bike rather than pay the CAZ charge.

For both options, the economic impact of reducing vehicle trips has been estimated from the traffic modelling. Benefits arising from the reduction in car trips are captured within the TUBA assessment (as described above). To avoid double counting, only the additional impacts on health, absenteeism, less accidents and from journey quality are included here. DfTs Active Travel toolkit, incorporating assumptions from the Health Economic Assessment Tool (HEAT) was used to estimate these impacts.

The economic impacts for cyclists of implementing new cycle routes is presented in Table 11. It is estimated that the cycling component of Option DS12a will result in a benefit of £7million, the majority of these benefits result from health impacts (c£4.4million). The additional cycling prompted by Option DS2, has an estimated benefit of £3.6 million (again mainly reflecting health impacts, £2.7 million)

[19] This is a slightly different version of the map of cycling routes presented in s.1.11.3.2. of the Strategic Case to enable colour coding and visual identification of the 4 cycle routes.

Table 11 – Cycling Impacts

Impact	Option DS2 CAZ D	Option DS12a non-charging
Journey Quality	n/a	£1,402
Physical Activity	£2,679	£4,428
Absenteeism	£903	£1,123
Accidents	£18	£27.5
PV of cycling benefits (£000s)	**£3,601**	**£6,981**

(Cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018, £000s)

2.4.7. Implementation and Operating Costs

Alongside costs to vehicle owners, there will also be costs for implementing and operating the charging infrastructure and for monitoring and enforcement for the implementing authority under Option DS2. The implementation and operating costs amount to £43 million (PVC) in appraisal terms over the ten year appraisal period.[20]

For Option DS12a, costs are associated with the implementing the cycling infrastructure, travel planning, the traffic signal technology upgrade and additional VMS, taxi licencing changes and support for taxi upgrades, traffic management measures and road infrastructure improvements. These costs are drawn from estimates developed for the Financial Case, which presents costs of the two options in more detail. Capital and operating costs for Option DS12a are £73million (PVC)[21] in appraisal terms over the ten year appraisal period.

Option DS12a requires significantly more investment in new transport infrastructure, technology and staff required for travel planning engagement. Costs for Option DS2 are restricted to the cost of the CAZ charging infrastructure.

[20] The CAZ charging infrastructure will be decommissioned when it becomes redundant as compliance is achieved and there are few or no non-compliant vehicles. It is anticipated that decommissioning will occur around 2028.. The last 2 years of the 10 year appraisal period will therefore not include any CAZ related costs. For use in the economic appraisal, the costs presented in the Financial Case are converted to 2018 prices (by removing standard inflation and assuming no real growth in prices) and converted to market prices (through the use of the WebTAG indirect tax uplift factor of 1.19 and discounted).

[21] The difference from the costs presented in the Financial Case are because of discounting, rebasing and are in market values.

Table 12 – Capital and Operating Costs

Cost component	Option DS2 CAZ D	Option DS12a non-charging
Total cost (PVC)	**£43,298**	**£73,299**

(Cumulative discounted impact (PV) from 2021-30, 2018 market prices, discounted to 2018, £000s)

2.4.8. CAZ D Revenue

For Option DS2, revenue will be generated for CCC from the CAZ toll charges. It represents the other side of the costs to transport users, therefore it is a transfer from drivers of non-compliant vehicles to CCC. Over the ten year appraisal period this amounts to a considerable amount. The revenue generated from toll charges is much higher in the earlier years when there are a relatively high number of non-compliant vehicles and tails of rapidly as drivers upgrade their vehicles. Modelling indicates that by 2027 there will be a negligible amount of non-compliant vehicles and the charging infrastructure could be decommissioned in 2028. It is estimated that the revenue generated amounts to £44 million, expressed in appraisal terms[22].

Table 13 – CAZ D Revenue[23]

Benefit component	Option DS2 CAZ D
Revenue from CAZ D toll charges	**£43,811**

(Cumulative discounted impact (PV) from 2021-30, 2018 market prices, discounted to 2018, £000s)

2.4.9. Comparing the Options - Net Present Value

By combining the costs and benefits we are able to compare the overall net present value (NPV) of the two options. This indicates the overall value for money of each option and allows a comparison of the two options from an economic perspective. On economic grounds the non-charging Option DS12a performs better than the benchmark Option DS2. The NPV of Option DS12a is -£29 million (Table 14); for Option DS2 the NPV is -£129 million (Table 15). The costs and benefits of each option are shown in more detail graphically in Figure 12 and Figure 13 and in Table 14 and Table 15.

For both options the costs outweigh the benefits. This is not surprising given the focus of the scheme is to improve air quality. The cost for implementing and maintaining the CAZ D charging infrastructure is the main cost component of Option DS2. Consequently, the costs associated with this option are lower than Option DS12a. Improvements to the road layout, traffic management and specific interventions designed to target high exceedance areas make up a large part of the costs for Option DS12a. The cycling infrastructure is also a sizeable component. However, Option DS12a generates a higher level of benefits and does not impose additional costs on transport users.

Benefits associated with air quality improvements are of a similar magnitude for both options, though slightly higher under Option DS12a, due to the higher reduction in vehicle kms over the appraisal period. Welfare loss resulting from upgrading vehicles and vehicle scrappage represents a sizeable disbenefit for drivers under

[22] This value differs to the presentation of revenue in the Financial Case for a number of reasons. For consistency with the rest of the appraisal, values are discounted, expressed in market values, assume 100% of charges are paid directly (without PCNs) and consider impacts over 253 twelve-hour weekdays in the year (rather than 365 twenty-four hour days in the Financial Case).

[23] These results are based on traffic modelling outputs and use data generated from the CASM Transport Model as inputs to assess the economic impacts.

Option DS2. In contrast, positive transport user benefits and additional health benefits resulting from mode shift to active modes combine to give an overall positive economic benefit for Option DS12a.

From an economic perspective Option DS12a is the preferred option.

Table 14 – Option DS12a Net Present Value

Impact	Option DS12a
Impacts on transport users *(including traffic impacts and associated indirect tax impacts)*	£18,552
Benefits from increased cycling	£6,981
Air quality and CO2 benefits	£19,027
Implementation Costs	-£73,299
NPV (£000s)	**-£28,739**

Notes: +ve values denote a benefit; -ve values denote a dis-benefit

(£000s, cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018)

Figure 12 – Option DS12a Net Present Value by Component

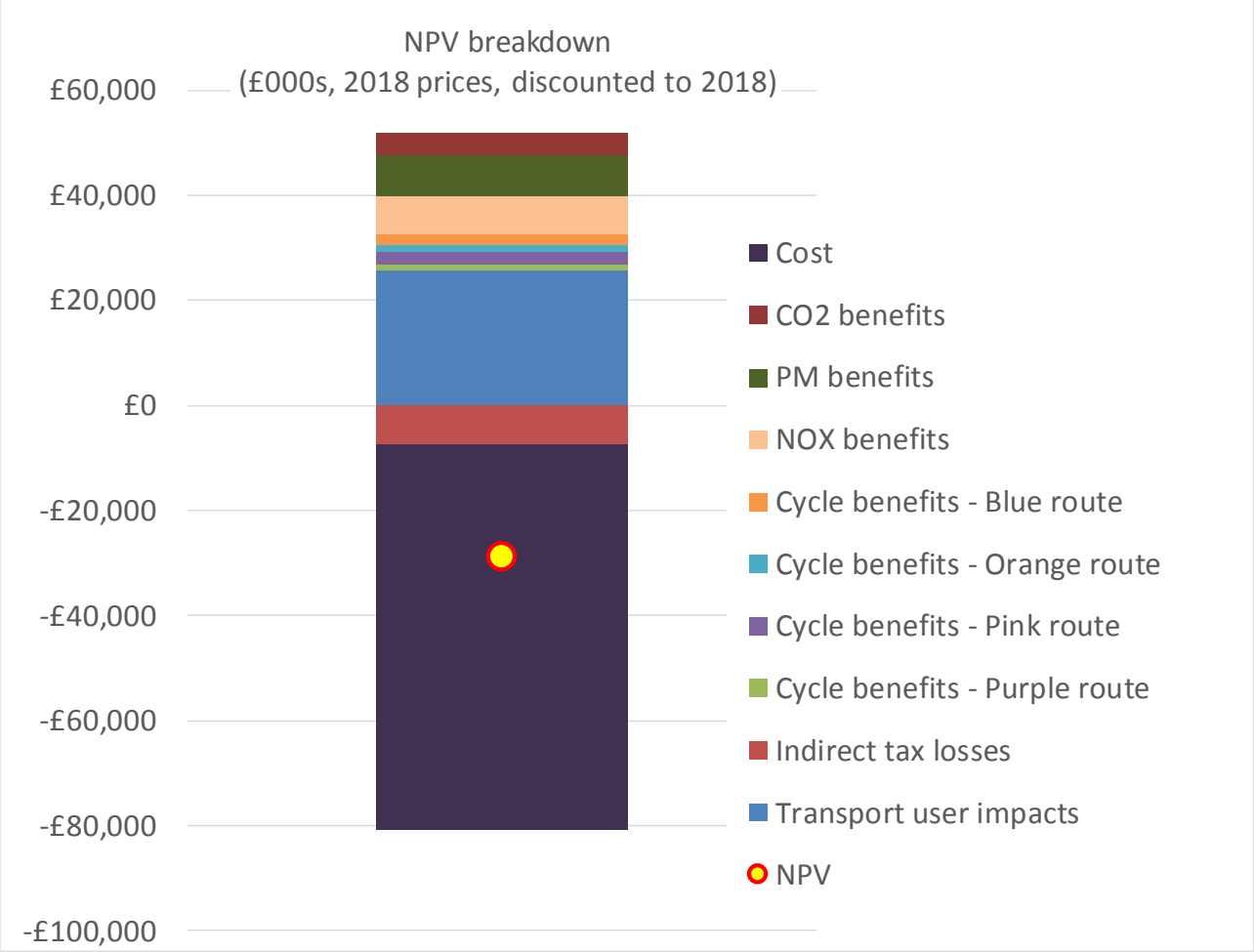


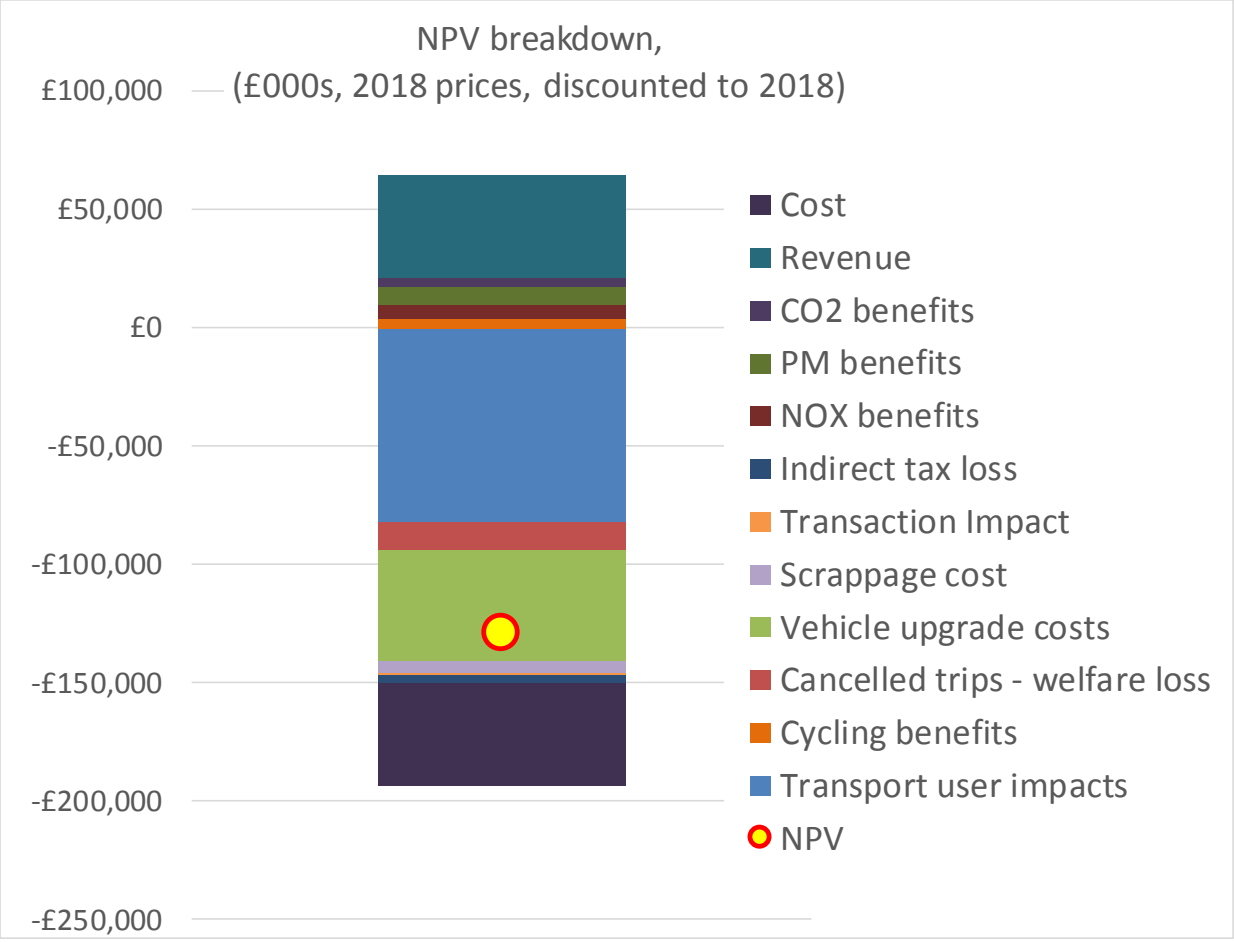
Table 15 – Option DS2 Net Present Value

Impact	Option DS2 CAZ D
Impacts on transport users *(including traffic impacts, CAZ charge, cancelled trips, vehicle upgrades and cycling impacts)*	-£146,987
Air quality and CO2 benefits	£17,449
CAZ revenue	£43,811[24]
Implementation Costs	-£43,298
NPV (£000s)	**-£129,024**

Notes: +ve values denote a benefit; -ve values denote a dis-benefit

(£000s, cumulative discounted impact (PV) from 2021-30, 2018 prices, discounted to 2018)

Figure 13 – Option DS2 Net Present Value by Component



[24] This value differs to the presentation of revenue in the Financial Case for a number of reasons. For consistency with the rest of the appraisal, values are discounted, expressed in market values, assume 100% of charges are paid directly (without PCNs) and consider impacts over 253 twelve-hour weekdays in the year (rather than 365 twenty-four hour days in the Financial Case).

2.4.10. Sensitivity Tests

A number of tests have been undertaken to understand the sensitivity of the NPV of the options to key underlying assumptions. Table 16 provides a summary output for a range of sensitivity tests for Option DS2 as follows:

- Implementation costs: low (5%) and high (45%) optimism bias assumptions allowance i.e. 1/3 and 3 times the central allowance[25]
- Emissions costs: low and high air quality damage (+/-20% of central JAQU damage costs) and carbon prices (BEIS low and high rates)
- Vehicle price depreciation rates: annual depreciation rate set to min and max value seen over the 10-year appraisal period (affecting vehicle upgrade and scrappage impacts)
- Uplift from unique vehicles observed in ANPR to assumed annual unique vehicles: low and high: Low (1/3 of the central uplift from ANPR to annual) and High (3 times the central uplift)

Table 16 – Option DS2 Sensitivity Tests: Net Present Value (discounted to 2018, 2018 prices, £000s)

Area of uncertainty	Description	Low	Central	High
Implementation costs	Low (5%) and High (45%) Optimism Bias allowance	-£124,781	-£129,024	-£141,753
Emissions Damage Costs & Carbon Prices	Low and High Costs (+/- 20% damage costs and BEIS low/high assumptions)	-£124,400		-£133,648
Scrappage Costs and Vehicle Upgrade Welfare impacts	Each annual depreciation rate set to min and max value seen over the 10-year appraisal period	-£124,563		-£134,639
Number of unique vehicles affected by CAZ	1/3 and 3 times the central uplift from ANPR to annual	-£113,774		-£174,775

* +ve values denote benefits / -ve values denote dis-benefits/cost.

Table 17 provides a summary output for equivalent sensitivity tests for Option DS12a as follows:

- Implementation costs: low (15%) and high (45%) optimism bias assumptions
- Emissions costs: low and high air quality damage (+/-20% of central JAQU damage costs) and carbon prices (BEIS low and high rates)

Table 17 – Option DS12a Sensitivity Tests: NPV (discounted to 2018, 2018 prices, £000s)

Area of uncertainty	Description	Low	Central	High
Implementation costs	Low (5%) and High (45%) Optimism Bias	-£22,775	-£28,739	-£46,632
Emissions Damage Costs & Carbon Prices	Low and High Costs (+/- 20% damage costs and BEIS low/high assumptions)	-£23,666		-£33,813

* +ve values denote benefits / -ve values denote dis-benefits/cost.

[25] Except for the back office expenditure which was treated as IT and therefore attributed a higher optimism bias of 105%. As for the core Optimism Bias allowance, the sensitivity tests applied 1/3 (35%) and 3 times (315%) the central OB allowance rate were

2.5. Distributional Analysis

Distributional impacts (DIs) consider the variance of transport intervention impacts across different social groups. The analysis of DIs is mandatory in the appraisal process and undertaken in accordance with WebTAG guidance Unit A4.2 and JAQU guidance for Distributional and Equalities Impact Analysis. Both beneficial and /or adverse DIs of transport interventions are considered, along with the identification of social groups likely to be affected.

The DI process involves three stages: Screening; DI Assessment; and Appraisal of Impacts, as outlined in Table 18:

Table 18 - Distributional Impact Assessment process

Stage		Description	Output
Screening	1	Identification of likely impacts for each indicator	Screening Proforma
Full appraisal	2	Assessment: • Confirmation of the area impacted by the transport intervention (impact area) • Identification of social groups in the impact area (such as transport users, people living in those areas affected by the scheme) • Identification of amenities in the impact area	DIs social groups statistics and amenities affected within the impact area
	3	Appraisal of impacts: • Core analysis of the impacts (including providing an assessment score for each indicator based on a seven-point scale – large beneficial to large adverse) • large beneficial (✓✓✓) • moderate beneficial (✓✓) • slight beneficial (✓) • neutral (*0*) • slight adverse (×) • moderate adverse (××) • large adverse (×××)	Appraisal tables

The three stages have been undertaken in full as part of the DI assessment. The screening determined that the following indicators were likely to be impacted by both options and therefore require a full appraisal:

- Air Quality;
- Affordability;
- Changes in traffic flow as a proxy for changes in noise levels and perception of severance and
- Accessibility

The appraisal considered the affect the charging non-compliant vehicles within Clean Air Zone (CAZ D) boundary, otherwise known as Option DS2 and the measures set out in Option DS12a, which are listed earlier in this report.

The assessment stage of the DI report used socio-demographic mapping to determine areas with high proportions of vulnerable groups and amenities in the impact area. This mapping is included in Appendix I.

2.5.1. Appraisal – Air quality

Air quality modelling was undertaken for an agreed core area to determine the change in emissions by LSOA (lower super output area) for each of the options. Quantitative analysis of the air quality modelling results was undertaken for each scheme option to determine the distribution of benefits for each income quintile and for children.

2.5.1.1. Option DS2

There is one LSOA with increased emissions, for Option DS2, although this is considered imperceptible (<0.4µgm^{-3}), all other LSOAs deliver reduced emissions, with ranging magnitude. Due to this, the net proportion of the population receiving an impact to air quality were within 5% of the proportion of the population for each considered vulnerable group. WebTAG guidance defines this to be a moderate beneficial impact for all groups. A further qualitative analysis has been undertaken to determine the impact of the magnitude reduction, which supports the quantitative results.

2.5.1.2. Option DS12a

Option DS12a causes all LSOAs to deliver reduced emissions, with ranging magnitude. Due to this, the net proportion of the population receiving an impact to air quality were within 5% of the proportion of the population for each considered vulnerable group. WebTAG guidance defines this to be a moderate beneficial impact for all groups. A further qualitative analysis has been undertaken to determine the impact of the magnitude reduction, which shows that the majority of changes in emissions are small (0.4-2µgm^{-3}), over LSOAs in each income group and for LSOAs with the 20% highest proportion of children. Due to this, the overall impact is lessened and has been determined to be slight beneficial for each vulnerable group.

2.5.1.3. Summary assessment

The distribution of benefits across each income quintile and for children is shown in Table 19. This takes into account both the quantitative and qualitative analysis of the air quality modelling.

Table 19 - Summary assessment for air quality

Option	Income Quintile 1	Income Quintile 2	Income Quintile 3	Income Quintile 4	Income Quintile 5	Children	Are impacts evenly distributed?	Key impacts
DS2	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Yes	LSOAs observing improvements in air quality distributed across all income groups and areas with high proportions of children.
DS12a	✓	✓	✓	✓	✓	✓	Yes	LSOAs observing improvements in air quality distributed across all income groups and areas with high proportions of children.

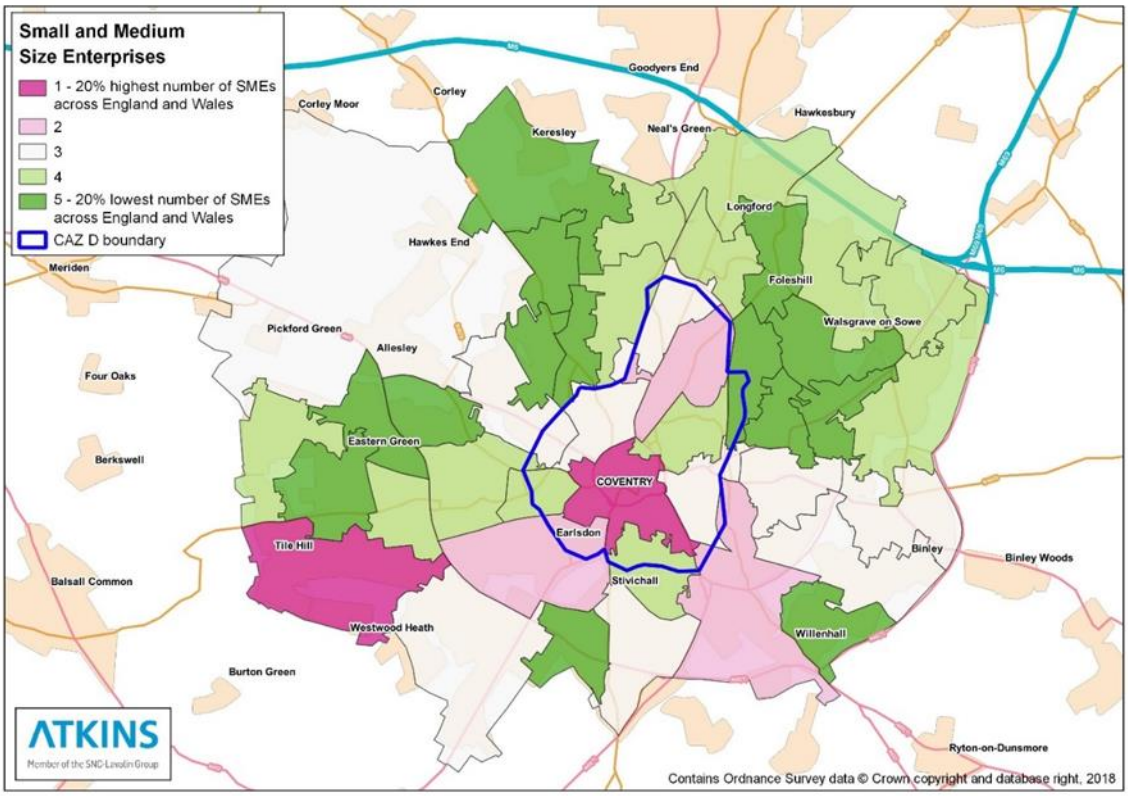
2.5.2. Appraisal – Affordability for businesses

This affordability assessment has been carried out qualitatively based on the knowledge of the distribution of businesses within the area and where there are a high number of micro, small and medium enterprises (SMEs).

2.5.2.1. Option DS2

Figure 14 shows the distribution of SMEs within Coventry, there are a high proportion of SMEs around Tile Hill and within Coventry City Centre. It is likely there will be adverse impacts to businesses that travel to and from the city centre as they will be forced to pay the charge in order to travel into the City. Therefore, there is likely to be a significant impact on those businesses residing within the city centre as they will be charged for travelling within and travelling back into the city centre where the business is based. Furthermore, any businesses based outside of the city which want to travel within the city will have adverse affordability impacts.

Figure 14 – Quintiles showing the distribution of micro, small and medium businesses within Coventry



2.5.2.2. Option DS12a

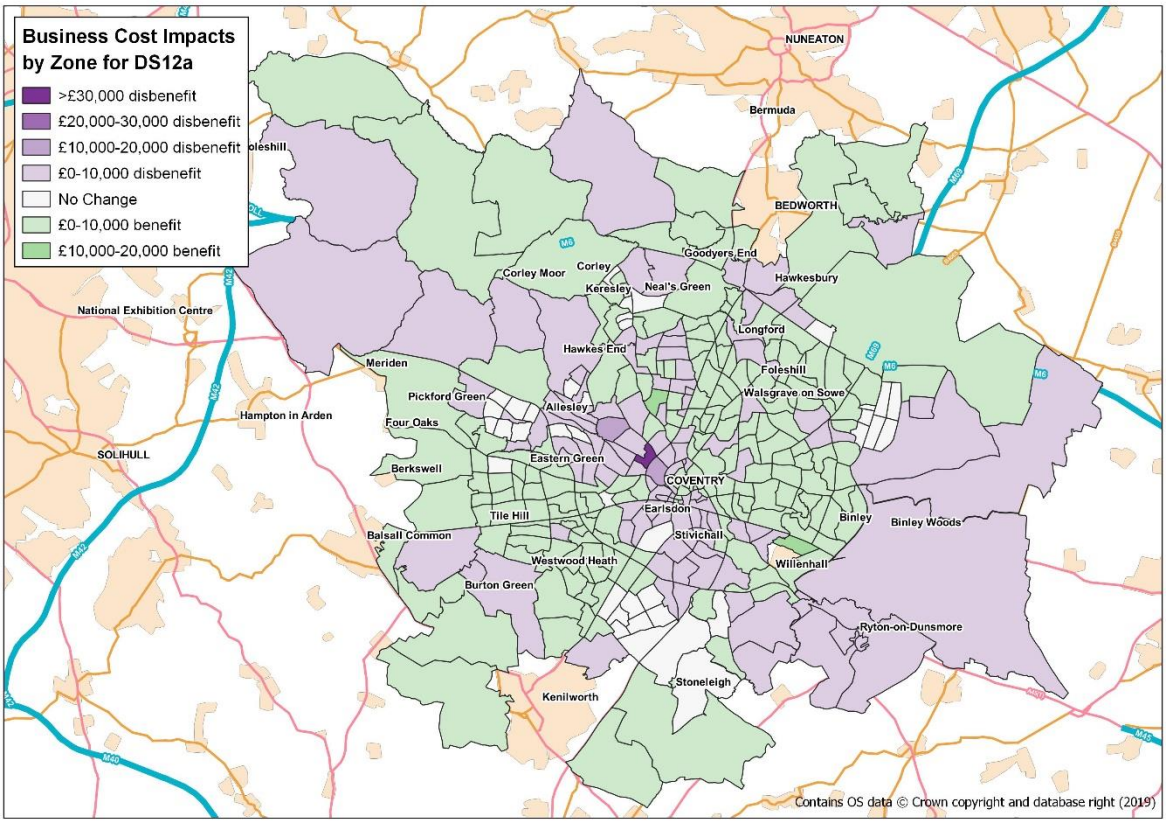
Considering the distribution of the affordability impact of businesses, it is noted that some of the measures included within Option DS12a will have an adverse impact on businesses. These include peak time restrictions on Holyhead Road at J8 and a HGV ban on Holyhead Road between the railway bridge and Junction 8 on the Ring Road. These measures are likely to adversely impact on businesses who use Holyhead road to travel into and from Coventry city centre. This would consequently cause traffic to divert around, impacting on costs to the business due to increase in time to travel and increased vehicle operating costs, as shown in Figure 15

There are a high number of SMEs based within the city centre area, which may also use Holyhead Road to travel to and from the City Centre. The restrictions on Holyhead Road are likely to have costs on the business due to increase in time to re-route and vehicle operating costs.

Figure 15 shows there are also business affordability benefits in areas, including near Tile Hill where there is a high proportion of SMEs. This is likely to be as a result of the traffic management, capacity improvements and upgrades included within the Option DS12a measures causing affordability benefits for businesses due to

quicker travel times and consequent lower vehicle operating costs due to reduced engine idling as a result of less congestion. This is likely to outweigh the disbenefits for the Holyhead Road mitigations and therefore the overall outcome is **slight beneficial.**

Figure 15 - Business affordability impacts by origin zone across the impact area for Option DS12a



(Given in intervals of £10,000)

2.5.2.3. Summary assessment

Overall for Option DS12a there are predominantly slight beneficial affordability impacts for businesses, although there could be some adverse impacts due to restrictions on certain roads. For Option DS2 there are predominantly large adverse impacts for outside of the CAZ D boundary.

2.5.3. Appraisal – Affordability for households

This affordability assessment is based on the charges (public transport and tolls (i.e. the charge)) and the vehicle operating costs (VOC). The appraisal has been carried out assessing 'commuting and leisure' trips separately. Only internal to internal trips, within a 'core' assessment area which covers Coventry and the wider area are calculated using 10-year appraisal TUBA outputs, which in turn take data from the CASM model.

2.5.3.1. Option DS2

Table 20 shows the shows the overall impacts as a result of the options based on the 10-year TUBA outputs including vehicle operating costs, public transport costs and the CAZ D charge. An overall assessment has been calculated by understanding whether there are overall benefits or disbenefits and then comparing the

proportion of benefits/disbenefits to the overall proportion of the population in that income quintile[26], quintile 1 being the 20% most income deprived residents and quintile 5 the 20% least deprived.

The overall impacts for Option DS2 are dominated by the CAZ D charge and therefore, there are adverse impacts across all income quintile due to the affordability impacts of introducing a charge. Whilst the overall impacts are distributed evenly, there is also consideration that a charge is likely to have a greater effect on those within the most income deprived areas.

Table 20 - Total affordability impacts across all income quintiles for Option DS2

	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Assessment	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse

2.5.3.2. Option DS12a

Table 21 shows the overall impacts as a result of the options based on the 10-year TUBA outputs including vehicle operating costs and public transport costs. An overall assessment has been calculated by understanding whether there are overall benefits or disbenefit and then comparing the proportion of benefits/disbenefits to the overall proportion of the population in that income quintile.

The disbenefits associated with Option DS12a are likely to be associated with increases in vehicle operating costs which could be due to re-routing to avoid the peak time restrictions on Holyhead Road. However, the disbenefits are small compared to the benefits. The benefits could be associated with vehicle operating costs savings due to decongestion due capacity improvements, traffic management and mode shift due to improved cycling infrastructure.

Table 21 - Total affordability impacts across all income quintiles for Option DS12a

	Income Quintile					
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
Assessment	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial

2.5.3.3. Summary Assessment

Option DS2 has moderate adverse affordability impacts for all income quintiles. Therefore, the overall impact is **moderate adverse**. For Option DS2 it is important to consider the impact charging non-compliant private vehicles may have on those living within and around Coventry. There are a number of areas within the most income deprived quintiles and therefore, may be most affected by paying a charge, the cost of upgrading a vehicle and cost of shifting to public transport.

Option DS12a has beneficial impacts across all income quintiles, there are moderate beneficial impacts for income quintiles 1 (the most income deprived) to 3, and income quintile 5 (the least income deprived). Therefore, the overall impact is **moderate beneficial.** There are no charging measures included within Option DS12a, therefore, it is expected that the main affordability impacts will be on vehicle operating costs and mode shift to public transport. Furthermore, while encouraging cycling through improved infrastructure has no

[26] A component of the Index of Multiple Deprivation (DCLG, English Indices of Deprivation 2015) specific to income deprivation was used to determine the average income deprivation of each LSOA in England and Wales. These were split into quintiles, quintile 1 having the 20% most income deprived LSOAs and quintile 5 the 20% least income deprived LSOAs.

specific impact on accessibility, it is important to consider the initial cost of purchasing a bike for those who are the most income deprived.

2.5.4. Appraisal – Traffic impacts: Noise and accidents

Accident analysis was screened-out in the first stage of the assessment, but traffic impacts have been appraised for noise impacts. A qualitative assessment was undertaken based on AADT data showing the changes in traffic flow (of greater than 10%) on a link by link basis within the study area. The noise assessment considered the impact to each income quintile and children.

2.5.4.1. Option DS2

Analysis of the traffic flow data showed that the majority of the links with reduced flow occurred within the CAZ D boundary and increased flow outside of the boundary, as shown in Figure 16 and Figure 17. This is due to people rerouting to avoid the charge.

Figure 16 – Changes in flow of >10% due to Option DS2 and the income quintiles of LSOAs

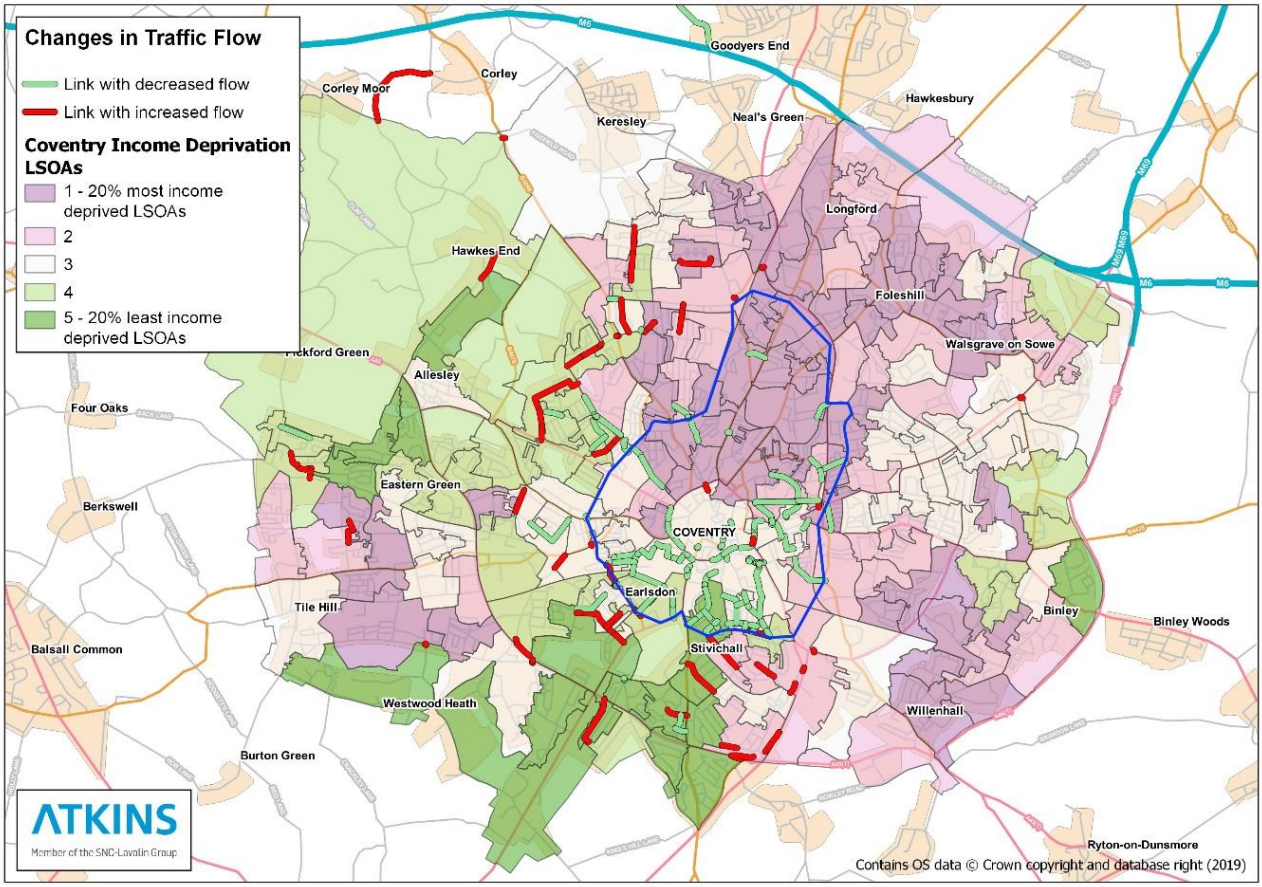
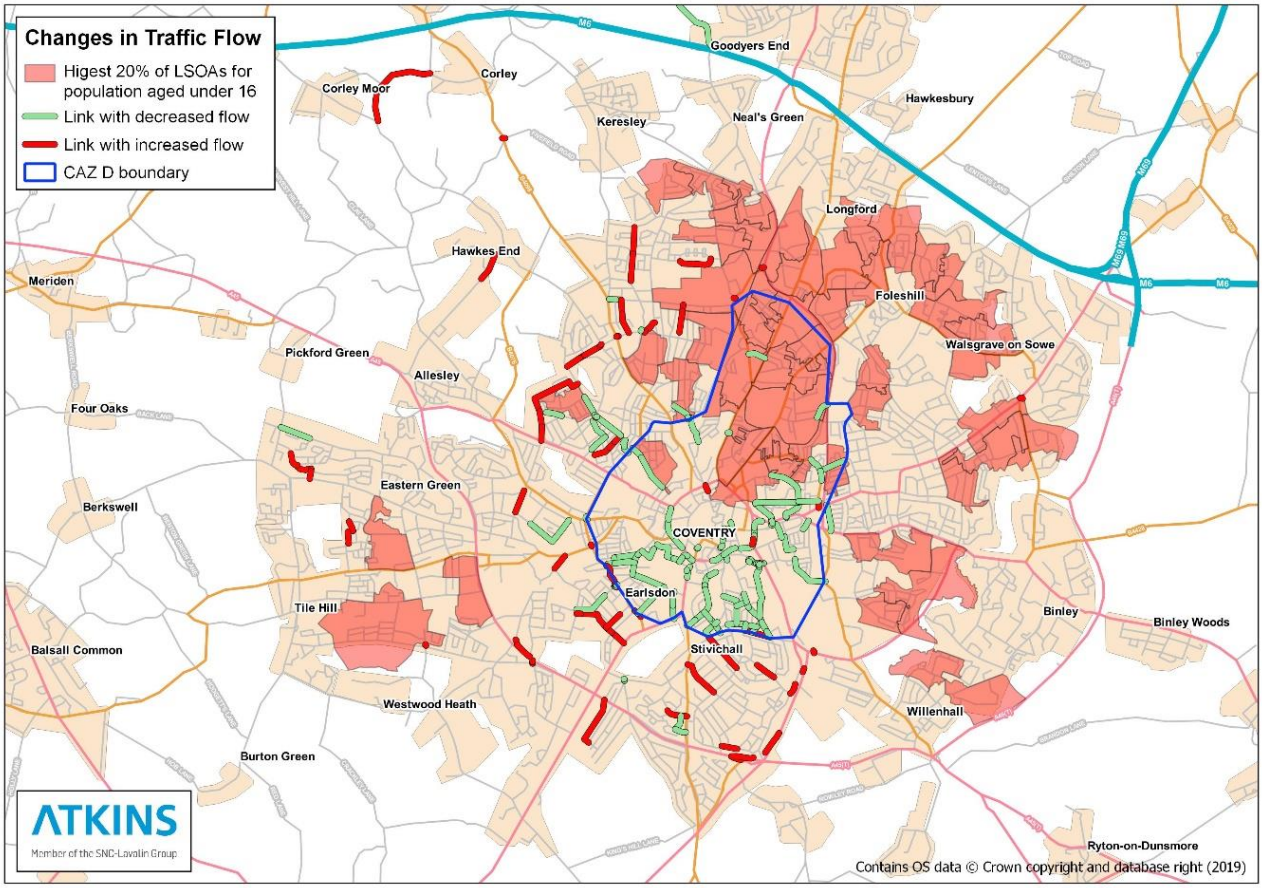


Figure 17– Changes in flow of >10% with Option DS2 and LSOAs with highest proportion of children



The location of the changes in traffic flow were compared with LSOAs with high proportions of each income group and children to determine if there is a significant change in traffic flow within these areas. This qualitative analysis showed that there is a slight beneficial impact to income quintiles 1 and 3 and a slight adverse impact to income quintile 4 due to the changes in traffic flow.

2.5.4.2. Option DS12a

Analysis of the traffic flow data showed that most of the changes in traffic flow occur to the west of the city centre, some with increased flows and others with decreased, as shown in Figure 18 and Figure 19.

Figure 18 – Changes in flow of >10% with Option DS12a and income quintiles of LSOAs

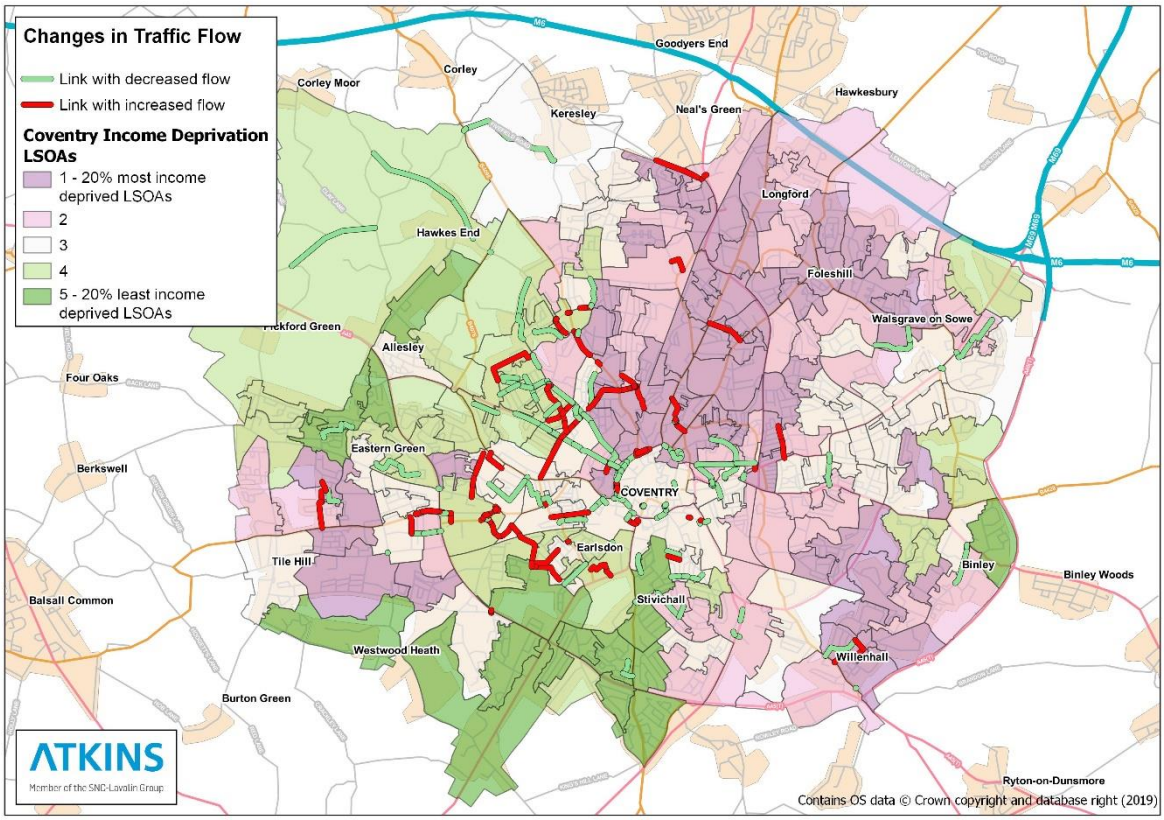
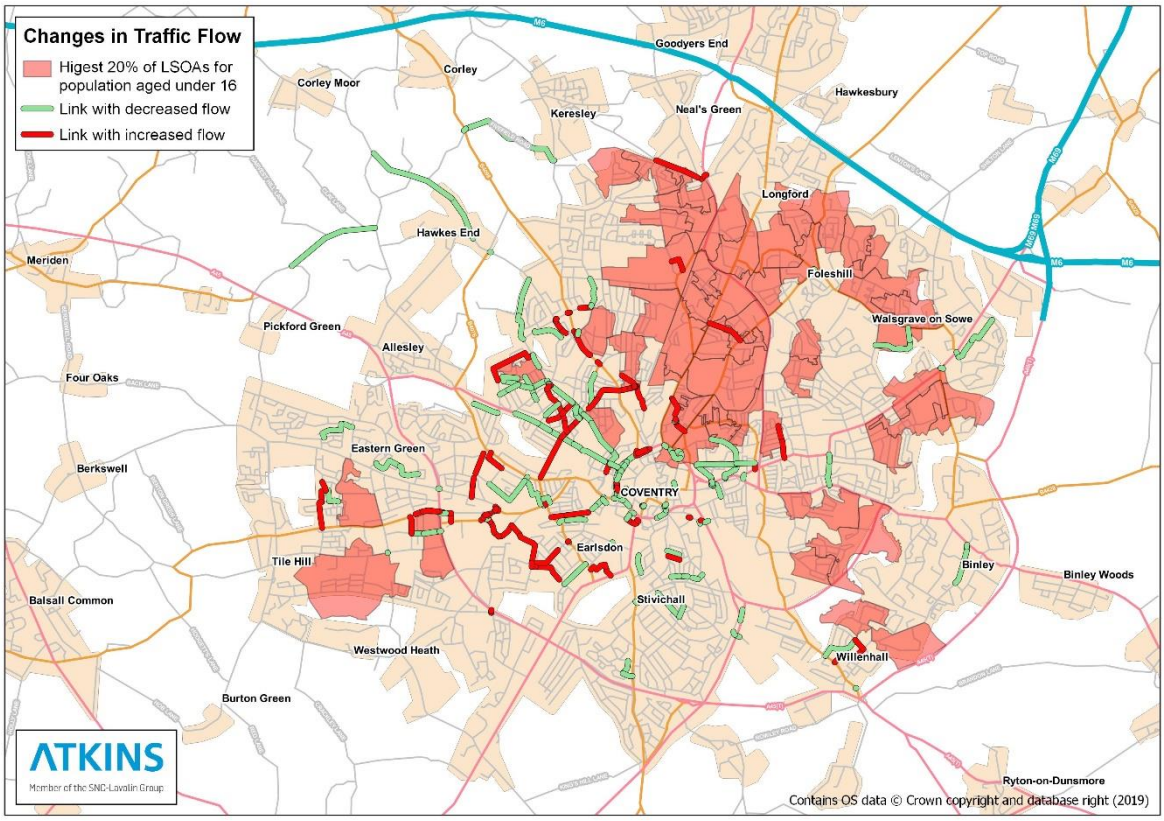


Figure 19 - Changes in flow of >10% with Option DS12a and LSOAs with highest proportion of children



The location of the changes in traffic flow were compared with LSOAs with high proportions of each income group and children to determine if there is a significant change in traffic flow in any of these areas. This qualitative analysis showed that there is a slight beneficial impact to children and a slight adverse impact to income quintile 1 due to the changes in traffic flow.

2.5.4.3. Summary assessment

The distribution of benefits across each income quintile and for children is shown in Table 22, following the qualitative analysis of the flow data for both options.

Table 22 - Summary Assessment for Noise

Option	Income Quintile 1	Income Quintile 2	Income Quintile 3	Income Quintile 4	Income Quintile 5	Children	Are impacts evenly distributed?	Key impacts
DS2	✓	0	✓	×	0	0	No	Changes in traffic flow are distributed across all LSOAs, with some accruing increases and others decreases.

DS12a	×	0	0	0	0	✓	No	Changes in traffic flow are distributed across all LSOAs, with some accruing increases and others decreases.

2.5.5. Appraisal – Traffic impacts: Accessibility

2.5.5.1. Option DS12a

Measures within Option DS12a include traffic restriction and capacity improvements. These measures are expected to have very little impact on accessibility as there is unlikely to be any significant impacts on public transport facilities and hence minimal impact on accessibility.

The closure of the level crossing on Coundon Road is one of the measures that could have an impact on accessibility. There is one bus route that runs down Barker's Butt Lane and Coundon Road (where the level crossing is closing), with a number of bus stops along this road. Currently the bus will be re-routed along Holyhead road and therefore, people using this service may be affected. This may particularly affect those without access to a car and those with disability and health issues. Holyhead road is close to Barker's Butt Lane/ Coundon Road and it is likely some people will need to walk further to access a bus to get to amenities. However, the exact extent of the re-routing as a result of this measure is unknown at this stage.

2.5.5.2. Summary assessment

The distribution of benefits over each vulnerable group determined from the assessment of the traffic flow data is shown in Table 23.

Table 23 - Accessibility summary table

Option	Elderly (over 65)	Children (under 16)	No car house-holds	Disabled people	Women	Black and minority ethnic	Income quintile 1	Are impacts evenly distributed?	Key impacts
DS2	0	0	0	0	0	0	0	Yes	There are minimal impacts to accessibi-lity.
DS12a	0	0	0	0	0	0	0	Yes	There are minimal impacts to accessibi-lity.

2.5.6. Summary appraisal of distributional impacts

Table 24 and Table 25 show how each of the impacts of both Options DS12a and DS2 are distributed amongst the income deprivation quintiles. Overall, most indicators are distributed evenly across all income quintiles. Whilst both options show beneficial impacts for air quality, there are beneficial impacts for affordability for Option DS12a and adverse impacts for Option DS2.

There are no significant impacts for accessibility across all income quintiles. Noise levels may have some slight adverse and beneficial impacts across difference income quintiles, however, none of the impacts are expected to be more than slight.

Table 24 - Option DS2 Distribution of measures across income quintiles

	Distributional impact of income deprivation					Are the impacts evenly distributed?	Key impacts – Qualitative statements
	0-20%	20-40%	40-60%	60-80%	80-100%		
Accessibility	0	0	0	0	0	Yes	There are not expected to be any significant impacts on accessibility.
Air Quality	✓✓	✓✓	✓✓	✓✓	✓✓	Yes	There are positive reductions in air quality emissions across all areas and income deprivations.
Noise	✓	0	✓	×	0	No	There are slight beneficial impacts for the most income deprived quintile as there is expected to be significant decreases in traffic flow.
User Benefits	××	××	××	××	××	Yes	There are expected to be moderate adverse impacts across all income quintiles for user benefits.
Affordability	××	××	××	××	××	Yes	There are expected to be moderate adverse affordability impacts for all income quintiles.

Table 25 - Option DS12a Distribution of measures across income quintiles

	Distributional impact of income deprivation					Are the impacts evenly distributed?	Key impacts – Qualitative statements
	0-20%	20-40%	40-60%	60-80%	80-100%		
Accessibility	0	0	0	0	0	Yes	There are not expected to be any significant impacts on accessibility.
Air Quality	✓	✓	✓	✓	✓	Yes	There are positive reductions in air quality emissions across all areas and income deprivations.
Noise	×	0	0	0	0	No	There are expected to be some increases in traffic flow for the most income deprived quintile but not significant impacts for all other quintiles.
User Benefits	✓✓	✓✓	✓✓	✓	✓✓	No	There are expected to be moderate beneficial impacts across the most deprived income quintile.
Affordability	✓✓✓	✓✓	✓✓	✓	✓✓	No	There are expected to be beneficial impacts across all quintiles, which large beneficial impacts in the most deprived income quintile.

Table 26 shows the overall impacts of each of the indicators. Option DS12a has beneficial impacts for air quality, user benefits and affordability. Whereas, Option DS2 has beneficial impacts for air quality and adverse impacts for user benefits and affordability. Whereas for both options there are expected to be no significant impacts on accessibility, noise and severance.

Table 26 - Overall impact for each indicator for Options DS2 and DS12a

Overall Impact		
Indicator	**DS2**	**DS12a**
Accessibility	0	0
Severance	0	0
Noise	0	0
Air Quality	✓✓	✓
User Benefits	××	✓✓
Affordability	××	✓✓

2.6. Preferred Option

Benefits associated with air quality improvements are of a similar magnitude for both the options appraised in this economic case, with both options forecast to achieve compliance in a similar timeframe. From an economic perspective Option DS12a has a higher NPV. Implementation and operating costs are higher for Option DS12a than for Option DS2 due to wide range of interventions and transport infrastructure improvements. However, when set against the lower nominal value of costs for implementing and maintaining the CAZ charging infrastructure under Option DS2 these costs can be viewed as an investment that generates significant economic returns. Whereas under Option DS2 the costs do not generate net economic benefits. Though it should be recognised that Option DS2 generates significant revenues for CCC, which could be reinvested for the benefit of the city. However, this revenue is essentially a transfer payment from transport users to the Council.

Under Option DS2 drivers of non-compliant vehicles incur a large cost from the CAZ toll that outweighs any benefits from improved journey times and reduced congestion. Under Option DS12a transport users do not directly incur additional costs; they benefit from reduced congestion and smoother traffic flows resulting in journey time improvements. Additionally, the cycling and active travel measures will encourage a shift to more sustainable modes and generate longer term behaviour change that has lasting benefits for Coventry.

The DI analysis demonstrates that there is less of a negative impact on the business community and residents in the more deprived areas. With some of the most deprived areas being within the CAZ boundary. Whilst both options show beneficial impacts for air quality, overall there are beneficial DI impacts under Option DS12a and adverse impacts for Option DS2, particularly for the affordability and user benefit indicators.

Based on the analysis, from a social and economic perspective, Option DS12a performs better than Option DS2. Option DS12a is considered the preferred option.

3. Financial Case

3.1. Introduction

The Financial Case assesses the potential financial impacts to CCC of the two option packages. This includes the costs associated with walking and cycling measures, junction improvements for the preferred option. For the CAZ D option, of setting up, running and enforcing a CAZ in Coventry. As outlined in the Economic Case s.2.2, the results of the traffic and air quality modelling that have been undertaken indicate that:

- The CAZ D (DS2) benchmark scheme implements charges on all vehicles (cars, light good vehicles, heavy goods vehicles, taxis, coaches and buses) that do not meet the defined emission standards. This scheme is likely to deliver compliance with the EU limit values for air quality by 2023-26. Based on these forecast compliance timescales, it is assumed there will no revenue collected after 2027.
- The non-charging scheme (Option DS12a) assumes a range of non-charging measures with targeted sustainable travel infrastructure, vehicle bans on key corridors, travel planning and additional measures designed to support the upgrade of taxis and retrofit of buses. This option is forecast to deliver compliance with the EU limit values for air quality by 2024.

The purpose of this Financial Case is to assess the costs involved in developing and implementing the two options and to support the application for drawdown from the DEFRA Implementation Fund and the Clean Air Fund (CAF). This Financial Case summarises the costs for each option, and in the case of the CAZ D benchmark scheme, it also summarises the forecast revenue associated with the scheme.

In summary, the Financial Case focuses on:

- Capital and operational expenditure for each of the options;
- Funding sources for each option's expenditure and the funding bids that have been prepared to allow delivery and operations of the intervention and affordability of each scheme;
- Revenue generation estimates from the operation of the CAZ D; and
- The net operational position of the schemes.

Each of the options are summarised in turn, starting with the Option DS2, followed by Option DS12a.

3.2. Option DS2 CAZ D Benchmark: Project Costs

3.2.1. Introduction

The costs for introducing and maintaining the CAZ D are split into two categories:

- Implementation costs (capital costs); and
- Operating and maintenance costs.

Where available, these costs were derived using local information and data. Some of the costs (e.g. costs of signs) were derived by using benchmark costs per item and estimating the number of assets required, based on the assumed cordon boundary and the associated likely infrastructure that would be required.

Details on how each cost was estimated are summarised in Table 27, with further details set out in the financial model. Whilst the majority of costs are determined by the size/area of the CAZ, some operational costs such as the transaction costs, are calculated using the forecast traffic volumes. It has been assumed that CCC will be eligible to reclaim any Value Added Tax (VAT) that it is subject to, therefore all costs presented here are exclusive of VAT.

3.2.2. Treatment of Risk

At this stage a quantified risk assessment (QRA) has not been undertaken, but as the scheme progresses this will be a key requirement, and CCC will look to undertake one at the earliest opportunity.

Optimism bias (OB) has been applied based on WebTAG recommendations. At Outline Business Case stage, WebTAG recommends OB is applied at 15% for road projects and 105% for IT projects (derived from the midpoint between the recommendations for stages 1 and 3).

3.2.3. Option DS2 - CAZ Scheme Implementation Costs

Implementation costs are the expenses required for the initial design and set-up of the CAZ. CCC will procure the civil engineering contractors and technology suppliers via existing Framework Agreements.

As set out in Table 27, the installation costs have been summarised as four key categories, as follows:

- Design – this includes the costs of designing the CAZ;
- Cameras and installation – there will be costs associated with the purchase and installation of cameras that are required to enforce the CAZ. These cameras are required to capture the number plates of vehicles and check the associated details in order to identify those that fail to meet the emission standards and are thereby required to pay the charge;
- IT systems/ back office support – this includes the provision of IT equipment for staff to monitor and process payments, as well as set up costs to allow the processing of payments;
- Signage – signs will be required on all roads that provide entry points at the CAZ boundary. These include Strategic Roads and local roads. The former have a higher cost associated with them as they include power supply.
- Marketing and communications – development of a Communications Plan, which will outline the on-going engagement campaign;
- Scheme monitoring activities – the on-going monitoring tasks associated with the Local Air Quality Action Plan (CAP) will require the installation of some infrastructure.

In addition, the assumptions made about the decommissioning costs at the end of the scheme have been included.

Table 27 – Option DS2: CAZ D Implementation Cost Estimates – Key Assumptions

Cost Item	Description	Costing Method	Key Assumptions
Design	Design and implementation costs, including Communications Plan	Includes development of local plans, communications & marketing.	High level assumption made at this stage.
Cameras and installation	Number of cameras	Per unit cost assumption in conjunction with the proposed CAZ area	Estimated 300 cameras required, based on number of roads crossing the cordon. This is likely to be a combination of fixed and mobile cameras rather than a watertight cordon. Camera cost derived from CCC rates.
IT Systems/ back office support set up	Control room - equipment		Assumed costs/ high level cost estimate.
Signage	Estimated from number of roads crossing the CAZ cordon.	Number of roads crossing the cordon * cost per sign (plus additional allowance for advance warning signs and additional entry signs).	120 roads cross the cordon. Assumed at least 2 signs per road, plus a further 70 for additional entry signs and assumed a further 60 advance warning signs are required. Standard CCC signage cost rates applied. Includes maintenance allowance for first 5yrs.

Table 28 summarises the estimated costs for each of the implementation cost item categories. The base costs are summarised as 2018 prices. Inflation has been added at a rate of 2.5% per annum to reflect the proposed expenditure profile. As per the WebTAG guidance, OB has been added to each item at 15%, with the exception of the IT systems/ back office set up costs, which have OB added at a rate of 105%. The total implementation cost is estimated to be £24,201,490 for Option DS2, including inflation and OB.

Table 28 – Option DS2: CAZ D Implementation Cost Estimates

Cost Item	Base Cost (2018 prices, £000s)	Base Cost inc. Inflation to Reflect Spend Profile (£000s)	Optimism Bias (£000s)	Total Cost (nominal, £000s)
Scheme Design	2,000	2,076	311	2,387
Cameras & installation	15,998	16,807	2,521	19,328
IT Systems/ back office support set up	1,000	1,051	1,103*	2,154
Signage	275	289	43	332
TOTAL COSTS	**19,273**	**20,223**	**3,979**	**24,202**

**NB OB has been applied at 105% (the midpoint between the WebTAG recommended rates for stages 1 and 3).*

3.2.4. Decommissioning

It is assumed that the CAZ infrastructure will be decommissioned at the end of 2027, since the scheme is forecast to achieve air quality compliance by 2026 at the latest, and for this reason the last year of charging revenue is assumed to be 2027.

The decommissioning costs relate to the removal of scheme infrastructure and at this stage these are assumed to be £4.31m (nominal prices, including OB).

3.2.5. Option DS2: CAZ D Operating and Maintenance Costs

Operating and maintenance costs are the on-going costs required to maintain the CAZ scheme on an annual basis. The following categories of operating costs have been defined:

- Signage and camera maintenance – required for the maintenance of the road signs and cameras associated with the CAZ;
- Back office/ enforcement – annual maintenance charge to support the back office;
- Communications and marketing – annual costs required once the scheme is up and running;
- CAZ monitoring and evaluation – to understand how the scheme is performing;

The key assumptions that have been utilised in developing the operating and maintenance cost estimates are summarised in Table 29.

Table 29 – Option DS2: CAZ D Operating and Maintenance Costs Estimates – Key Assumptions

Cost Item Category	Description	Costing Method	Key Assumptions
Signage & camera maintenance	Annual maintenance for CAZ related signage & cameras in 2026 (since maintenance costs for the first 5yrs included in set up costs)	Annual maintenance figure 2026-30 derived from 50% of implementation maintenance cost assumption (as this included an allowance for management).	Maintenance costs for first 5 years included in set up costs.

Back office/ enforcement		This initial estimate of £1.5m p.a. for first 5yrs, followed by £1m p.a. in 2026-27, will need reviewing throughout the duration of the scheme as it depends how many non-compliant vehicles we have, and of those what the likelihood of payment vs enforcement follow up is.	Assumed costs/ High level assessment made which is assumed to include all costs, including staff costs
Communications & marketing	Media liaison, advertising, responding to general queries.	Based on a proportionate approach with the knowledge that the London ULEZ Marketing & Comms budget is £5.1m.	Assumed costs/ High level assumption
AQ Monitoring	Assumed 1 FTE	Assumed 1 FTE with £30K p.a. salary. Annual allowance for monitoring 50 traffic sites, @£400 per site. Annual allowance for monitoring NO_2 at 35 sites, @£50 per tube/ site.	Assumed 1 FTE at £30K p.a. for the 10 year scheme duration, plus annual collection costs associated with traffic & AQ data

Table 30 summarises the estimated (nominal) costs for each of the operating and maintenance cost item categories. This includes an allowance for a sinking fund, whereby any unforeseen risks that are realised during the operation of the scheme can be mitigated. The total operating and maintenance cost, inclusive of OB is estimated to be £17,109,762 for Option DS2.

Table 30 – Option DS2: CAZ D Operating and Maintenance Cost Estimates

Cost Item Category	Base Cost (2018 prices, £000s)	Base Cost inc. Inflation to Reflect Spend Profile (£000s)	Optimism Bias (£000s)	Total (nominal, £000s)
Signage & camera maintenance	180	219	33	252
Back office/ enforcement	9,500	10,958	1,644	12,602
Communications & marketing	1,700	1,886	283	2,169
AQ Monitoring	518	624	94	718
Sinking fund	1,190	1,369	-	1,369
TOTAL COSTS	**13,087**	**15,057**	**2,053**	**17,110**

(Expressed as 10 year totals)

3.2.6. Option DS2 Cost Summary

The total costs, including both capital and operating, decommissioning and maintenance costs, for Option DS2 are estimated to be **£45.6million,** inclusive of both inflation at 2.5% per annum (added as per the proposed expenditure profile) and OB. This assumes that the costs associated with the monitoring of air quality will be incurred throughout the ten year duration of the scheme, even though air quality compliance is envisaged by 2026 at the latest.

3.2.7. Sinking Fund

A sinking fund will be established to provide mitigation against any unforeseen risks that are realised throughout the operation of the scheme. It is assumed that the target of the fund is 10% of the operating costs (note: OB has not been added to this figure) and will be incurred throughout the 10 year scheme duration.

The sinking fund will be protected within the CAZ accounts at Coventry to ensure that it is available as a contingency fund for any risks that are realised throughout the operation of the scheme.

3.3. Option DS2: CAZ D Revenues

This section describes the revenue forecasts from charging non-compliant vehicle owners who enter the CAZ. The intention is that revenues will be utilised to promote and initiate improving air quality within Coventry City.

3.3.1. CAZ D Revenue Assumptions

Option DS2 assumes that vehicles that do not meet the required emission standard are charged a fee. The fee assumptions for the non-compliant vehicles are summarised within Table 31.

Table 31 – Option DS2: CAZ Charge and Penalty Charge by Vehicle Type

Vehicle	Car	LGV	HGV	Bus	Taxi
CAZ Charge	£12.50	£12.50	£100	£100	£12.50
Penalty Charge (if paid within 14 days)	£60	£60	£120	£120	£60
Penalty Charge (if paid after 14 days)	£120	£120	£200	£200	£120

The charges are set at varying levels for different vehicle types to reflect the contribution that each vehicle type makes to air pollution, and to ensure that the vehicles with the highest emissions are incentivised to comply with the standard.

As taxis are charged at the same rate as cars, there is no distinction between cars and taxis in the financial analysis. All taxis are captured under the 'car' vehicle type.

This charge structure also reflects the fact that in general, the majority of the traffic comprises of cars, even though they make a smaller contribution to air pollution on a vehicle basis. However, HGVs, make up a smaller proportion of the total traffic, but make a larger contribution to air pollution on a per vehicle basis.

It is possible that charges may be adjusted to reflect additional research as the scheme becomes more advanced.

It is assumed that the charge levels remain constant in current prices levels, thereby actually falling in real terms throughout the duration of the scheme. The charge is assumed to be a daily charge, so vehicles that have entered will not have to pay twice for re-entering on the same day.

The CASM transport model was used to forecast the number of non-compliant vehicles that cross the CAZ cordon in both the Do-Minimum and Option DS2 scenarios. The number of non-compliant vehicles that cross the cordon in the CAZ D scenario was multiplied by the charge level per vehicle to estimate the revenue generated by the scheme. Table 32 summarises the forecast annual non-compliant trips crossing the cordon in 2021 in the CAZ D scenario. It is based Annual Average Daily Traffic (AADT) estimated in the CASM model. Table 33 presents estimates of the number of non-compliant trips for subsequent years. Calculations have been derived by applying JAQU upgrade assumptions.

Table 32 – Option DS2: CAZ D annualised non-compliant vehicle trips that incur a charge in 2021

	Car	LGV	HGV	Total
Non-compliant	528,155	360,985	37,960	927,100

It is estimated that the number of non-compliant vehicles entering the CAZ will reduce over time due to the following:

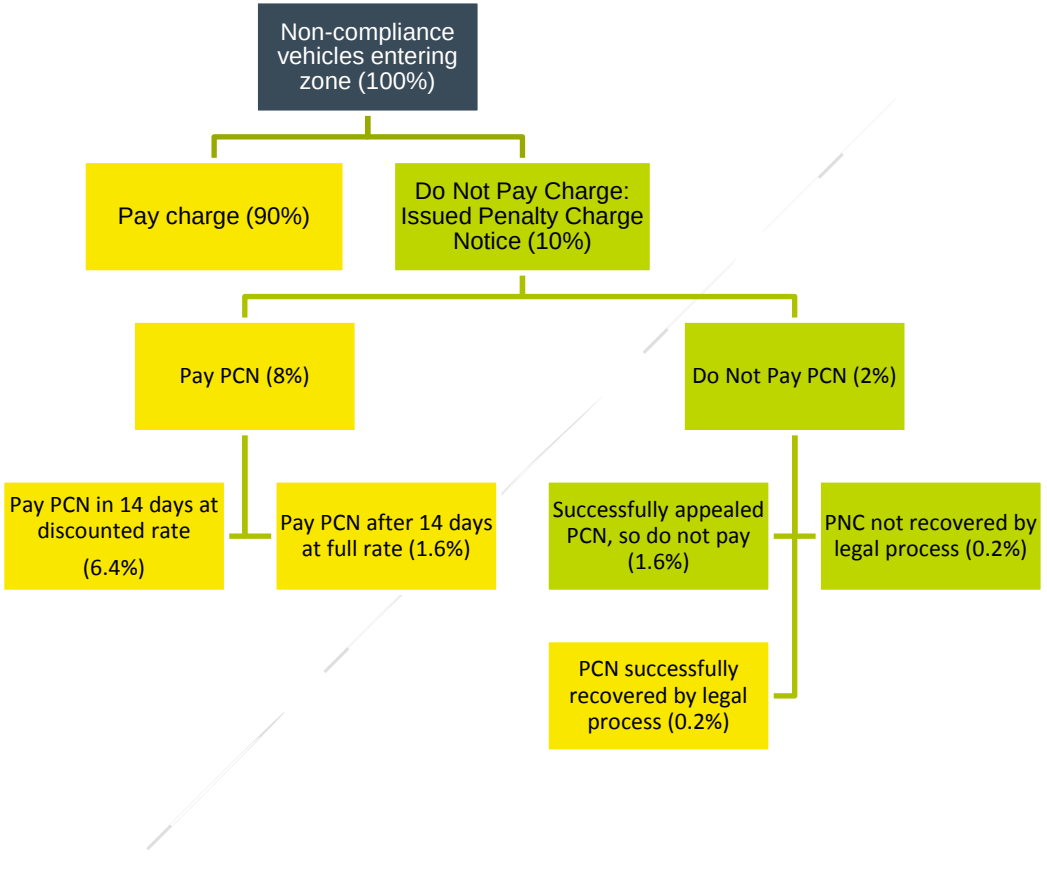
- The charge incentivises vehicle owners to exchange their non-compliant vehicle for a compliant vehicle earlier than they would have without the scheme; and
- Older, non-compliant vehicles will gradually be replaced over time with (newer) compliant vehicles.

For these reasons, the revenues that are collected throughout the operation of the CAZ scheme are expected to decrease each year. The year on year proportion reduction in non-compliant trips is assumed to be consistent with a linear interpolation of vehicle trips as derived from the traffic modelling.

3.3.2. Penalty Charges

Penalty charges are effectively fines paid by users who do not pay the daily CAZ charge within the pre-determined timeframe. It is assumed that these users will be subject to a penalty charge notice (PCN) and required to pay a fine. The assumed penalty charge rates are summarised in Table 31, with the associated assumptions about the penalty charges set out in Figure 20.

Figure 20 - Coventry CAZ D Revenue Charging Assumptions



3.3.3. Option DS2: CAZ D Benchmark Revenue Forecasts

In 2021 it is estimated that the revenues Option DS2 are £19.2m, reducing to £8.4m in 2027 as more vehicles achieve compliance with the emission standards and are therefore exempt from the charging. Table 33 summarises how the revenue generation estimates for Option DS2 have been derived over the duration of the CAZ scheme. Note, as it is assumed that de-commissioning will occur in 2027, no revenues are included post 2027.

Table 33 – Option DS2: Coventry CAZ D Revenue Generation Summary (nominal prices, £000s)

Option DS2 (CAZ D)	Year of CAZ Operation										
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	10 year Total
No. Non-Compliant Trips (000s)	927	840	753	665	578	491	403				4,657
No. Paying CAZ Charge (000s)	834	756	677	599	520	442	363				4,191
CAZ Charge Income (£'000s)	£13,419	£12,167	£10,915	£9,663	£8,410	£7,158	£5,906				£67,638
No. Contravening CAZ Charge (000s)	93	84	75	67	58	49	40				466
No. Paying PCN (000s)	74	67	60	53	46	39	32				373
CAZ Penalty Charge Income (£'000s)	£5,763	£5,221	£4,680	£4,138	£3,596	£3,054	£2,513				£28,965
TOTAL CAZ Income (£'000s)	£19,182	£17,388	£15,594	£13,800	£12,006	£10,212	£8,418				£96,602

3.3.4. Financial Appraisal

The financial appraisal involves comparing Option DS2 costs and revenues over a 10 year period to determine the scheme's net financial position. As summarised in Table 34, this indicates that over the 10 year lifespan of the scheme, the revenue generated from it is greater than the expenditure required to set up and operate the scheme.

Table 34 – Financial Appraisal Summary of Option DS2 (£000s)

Total Scheme Costs (over 10 years)	(£000s, nominal prices)
Implementation costs	-24,201
Revenue	96,603
Operation & maintenance costs	-15,741
Decommissioning costs	-4,309
Sinking fund	-1,369
Net cash flows	**50,983**

-ve values are costs; +ve values represent revenue income

The financial profile for Option DS2 is summarised in Table 35. This indicates that the costs of implementing the scheme are forecast to be £24.2m, which is less than the opening 2 years' net cash flows, which are forecast to be £30.6m.

While operating and maintenance costs are assumed to decrease over time, in recognition of the lower non-compliant trip levels in later years and the associated reduction in marketing and communications expenditure. In addition, revenues are forecast to decrease over time due to increased user compliance. In conclusion revenues are greater than costs throughout the forecast scheme ten year period, resulting in net positive cash flows throughout the scheme evaluation period.

Table 35 – Option DS2: CAZ D Scheme Financial Profile (nominal prices, £000s)

All Costs in £'000s	Year of CAZ Operation												
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Capital Costs	-£1,179	-£23,023	£0										-£24,201
Operating & Maintenance Costs			-£2,912	-£2,541	-£2,214	-£2,203	-£2,258	-£1,796	-£1,582	-£76	-£78	-£80	-£15,741
Revenue			£19,182	£17,388	£15,594	£13,800	£12,006	£10,212	£8,418	£0	£0	£0	£96,602
Decommissioning Costs									-£4,309				-£4,309
Sinking Fund			-£253	-£221	-£193	-£192	-£196	-£156	-£138	-£7	-£7	-£7	-£1,369
Net Cash Flow	**-£1,179**	**-£23,023**	**£16,017**	**£14,626**	**£13,188**	**£11,406**	**£9,552**	**£8,260**	**£2,390**	**-£83**	**-£85**	**-£87**	**£50,983**

3.3.5. Option DS2 Funding

Based on the DEFRA funding guidelines, CCC will be applying for the DEFRA Implementation Fund to support the CAZ in Coventry. The delivery of this scheme is not dependent on any other funding.

Under Option DS2, the total Implementation Fund request would be £24,201,490. It is assumed that £1,178,750 of the Implementation Fund would be drawn down in 2019 (to fund ongoing scheme design), with all remaining funds drawn down in 2020.

The impact on people who live and work in Coventry is significant for DS2 and therefore in order to mitigate the impact of the CAZ D, we would be looking to encourage residents etc to stop using their non compliant vehicle – either through purchase of a compliant vehicle, or to move to alternative transport modes. This application would be through the Clean Air Fund (CAF) which is a competitive pot to mitigate impacts of measures implemented to improve air quality.

A high level summary of the number of people affected within the CAZ is shown below and relates back to the distributional impacts details in this report. Based on these assumptions, the CAF funding request could be in the region of £100 million as there are significant disbenefits on residents, businesses/employees and visitors. This would cover both 20b and 20c in the CAF guidance.

- The CAZ area covers approximately:
  - 80,000 residents
    - Of which almost half are classed as the most deprived quintile
  - 52,000 employees
  - 3,610 SMEs registered
- Almost 17,000 LGV's registered in the city

Type	% likely to require support to upgrade vehicle etc	Possible support per household/company etc
Low income residents within CAZ area	45-65%	£1,000
Residents within CAZ (not in lowest income quintile)	10-40%	£500
Low income residents within city boundary, but outside of CAZ	20-50%	£1,000
Hackney Carriage owners	85-95%	£5,000
Employees within CAZ (via travel planning engagement)	20-35%	£1,000
Employees within city boundary, but outside of CAZ (via travel planning engagement)	10-30%	£1,000
LGVs registered within CAZ to low income households or SMEs	75-95%	£5,000
LGVs registered to low income households or SMEs within city boundary, but outside of CAZ	30-75%	£5,000

This assumes that all of the operational and maintenance costs associated with the scheme will be covered by the revenue generated from the charging of non-compliant vehicles, and as such are not included in Table 36 and Table 37, which summarise the funding requested along with the forecast spend profile.

Table 36 – Coventry Clean Air Zone – Option DS2 Funding Sources

	Implementation Fund
Funding (nominal, £000s)	£24,201

Table 37 – Coventry Clean Air Zone - Option DS2 Spend Profile

	2019	2020	2021	Total
Implementation Fund (nominal, £000s)	£1,179	£23,023	-	£24,201

Assuming the funding is successful, there would be no funding gap.

3.3.6. Option DS2 Accounting

The overall scheme cashflow, showing income and expenditure projections over the ten year scheme is summarised in Table 38. This assumes that all capital costs (shown as expenditure) will be covered by either the Implementation Fund or the Clean Air Fund, which for the purposes of the balance sheet are shown as income (and thus this differs to Table 34, which shows the overall cost profile).

It is assumed that all operating and maintenance costs, including the de-commissioning costs and sinking fund will be paid for by CCC utilising the non-compliant charging revenue. This demonstrates the affordability of the scheme.

Table 38 – Option DS2 Accounting Statement

All Costs in £'000s	Year of CAZ Operation												
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Capital Costs	-£1,179	-£23,023	£0										-£24,201
Operating & Maintenance Costs			-£2,912	-£2,541	-£2,214	-£2,203	-£2,258	-£1,796	-£1,582	-£76	-£78	-£80	-£15,741
Implemenatation Fund	£1,179	£23,023	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£24,201
Clean Air Fund Grant													£0
Revenue			£19,182	£17,388	£15,594	£13,800	£12,006	£10,212	£8,418	£0	£0	£0	£96,602
Decommissioning Costs									-£4,309				-£4,309
Sinking Fund			-£253	-£221	-£193	-£192	-£196	-£156	-£138	-£7	-£7	-£7	-£1,369
Net Cash Flow	**£0**	**£0**	**£16,017**	**£14,626**	**£13,188**	**£11,406**	**£9,552**	**£8,260**	**£2,390**	**-£83**	**-£85**	**-£87**	**£75,184**

3.3.7. Sensitivity Tests

The following sensitivity test was undertaken in an attempt to understand the impact of key costs assumptions, as summarised in Table 39.

Table 39 – Sensitivity Test Summary Table

Area of Sensitivity	Test Description	Key Impacts
Non-compliant vehicle charge reductions	Charge reduced from £12.50 to £8 per day for cars & LGVs. Charge reduced from £100 to £50 per day for HGVs and buses. Penalty charges are reduced.	Revenues reduce by £72.8m over the duration of the CAZ scheme.

3.3.8. Summary

Cost and revenue forecasts for Option DS2 indicate that the revenues generated from operating the CAZ D scheme exceed the setting up and operation of the scheme.

The surplus is significant and would potentially provide CCC with an opportunity to reinvest revenues to make further air quality improvements. It should be noted however that in order to deliver the primary CSF, monies would need to be made available through the CAF to help enact the improvement of the fleet to ensure compliance. Without this support, upgrade expectations are unlikely to be met, and therefore revenue is raised at the expense of improvements in air quality.

3.4. Option DS12a: Project Costs

3.4.1. Introduction

The costs for introducing and maintaining Option DS12a, are split into two categories:

- Implementation (capital) costs; and
- Operating and maintenance costs.

Where available, these costs were derived using local information and data. Details on how each cost was estimated are summarised in the following tables, with further details set out in the financial model. It has been assumed that CCC will be eligible to reclaim any Value Added Tax (VAT) that it is subject to, therefore all costs presented here are exclusive of VAT.

3.4.2. Treatment of Risk

At this stage a quantified risk assessment (QRA) has not been undertaken, but as the scheme progresses this will be a key requirement, and CCC will look to undertake one at the earliest opportunity.

Optimism Bias (OB) has been applied based on WebTAG recommendations.[27] At the Outline Business Case stage, WebTAG recommends OB is applied at 15% for road projects and 105% for IT projects (based on the midpoint between the stage 1 and 3 recommendations).

[27] TAG Unit A1.2: Table 8 Recommended optimism bias uplifts for different projects at different stages of the life of a transport project.

3.4.3. Option DS12a: Implementation Costs

The implementation costs for this option includes the expenditure required for the initial design and the implementation of supporting infrastructure and services. It is assumed that CCC will procure the civil engineering contractors and technology suppliers via existing Framework Agreements.

The implementation costs for each of the measures proposed within this option are summarised in Table 40:

Table 40 – Option DS12a: Implementation Cost Estimates – Key Assumptions

Description of Measure	Costing Method	Key Assumptions
City wide traffic signal technology upgrade	Number of junctions on the KRN that require upgrading * by typical junction upgrade cost	Approximately 100 junctions on the KRN that require upgrading. Assumed upgrade cost per junction £65,000.
Additional VMS	Number of VMS required * cost per sign	Assumed 30 VMS required. Assumed cost per VMS of £35,000 (includes installation, posts & 5 year warranty).
CCC vehicle fleet upgrade	Number of vehicles * cost per vehicle	Assumed that at least 50 vehicles will be upgraded
Incentive for taxi drivers to encourage upgrade of vehicles	50% of black cabs * upgrade costs as taken from Coventry AQ measures	Assumed 50% of fleet upgrading over 3 years at cost to CCC of £5,000 per vehicle.
Implementation of 40 electric vehicle charging points for taxis	Based on implementation cost estimates from contractors	Costs assume O&M costs for 10yrs
Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	High level cost estimates provided by TfWM	Calculated by CCC from existing bus operations
Travel planning package city wide	Based on CCC unit costs for household, employee and schools	Assumed 3,000 household TP developed, with number of schools and businesses within the City Centre targeted.
High quality cycle infrastructure along 4 routes	Coundon & Binley developed cost of £950,000/ km based on initial assessment of route. An equivalent rate per km applied to the other routes.	An equivalent rate per km applied to the other routes.
Capacity improvements at Spon End	There is an existing outline design estimate for this - with total scheme cost estimate is £9.7m,	CCC already have committed funding of £5.8m, so assumed £3.9m needed.
Redesign of Ring Road J7	High level cost estimate	
Closure of Coundon Road level crossing	High level cost estimates	Expenditure split over 2yrs
Removal of signals at Holyhead Road/ Barras Lane	High level cost estimates	
HGV ban on Holyhead Road between railway line and J8	Estimate number of signs required, plus consultation.	Assumed cost per sign of £200-400 (assuming goes onto existing posts, varies on size)
Peak time restrictions on Holyhead Road (inbound AM, outbound PM)	High level cost estimates	Expenditure split over 2yrs

NB the costs summarised in this table are in 2018 prices, exclusive of OB

Table 41 summarises the estimated implementation costs for each of the measures proposed in Option DS12a. Inflation has been added at a rate of 2.5% per annum to reflect the proposed expenditure profile. Optimism bias (OB) has been added to each measure, as per the WebTAG guidance. The total implementation (nominal) cost, including OB, is estimated to be £64,763,075 for Option DS12a.

Table 41 – Option DS12a Implementation Cost Estimates

Description of Measure	Base Cost (2018 prices, £000s)	Base Cost inc. Inflation to Reflect Spend Profile (£000s)	Optimism Bias (£000s)	Total Cost (nominal, £000s)
City wide traffic signal technology upgrade	£6,500	£6,829	£1,024	£7,853
Additional VMS	£1,050	£1,103	£165	£1,269
CCC vehicle fleet upgrade	£900	£946	£142	£1,087
Incentive for taxi drivers to encourage upgrade of vehicles	£4,290	£4,600	£690	£5,290
Implementation of 40 electric vehicle charging points for taxis	£1,600	£1,697	£255	£1,951
Bus retrofit to minimum Euro 6, with some waiting facilities improved on key routes	£2,465	£2,621	£393	£3,014
Travel planning package city wide*	£2,100	£2,336	£350	£2,687
High quality cycle infrastructure along 4 routes	£19,450	21,011	£3,152	£24,163
Capacity improvements at Spon End**	£3,900	£4,270	-	£4,270
Redesign of Ring Road J7	£8,000	£8,405	£1,261	£9,666
Closure of Coundon Road level crossing	£1,500	£1,602	£240	£1,843
Removal of signals at Holyhead Road/ Barras Lane	£100	£105	£16	£121
HGV ban on Holyhead Road between railway line and J8	£20	£21	£3	£24
Peak time restrictions on Holyhead Road (inbound AM, outbound PM)	£750	£801	£120	£921
Marketing and Communications	£500	£525	£79	£604
Decommissioning	-		-	-
TOTAL COSTS	**£53,125**	**£56,873**	**£7,890**	**£64,763**

(Expressed as 10yr totals, £000s)

*Note: Travel planning package costs are assumed to be incurred annually until AQ compliance is achieved.

** No additional OB has been added to the Spon End capacity improvements as the outline design cost estimates included OB at 25%

3.4.4. Decommissioning

It is assumed that the infrastructure associated with Option DS12a will remain and continue to be operational at the end of the ten year scheme period, in 2030. For example, the cycle infrastructure

will remain in place and continue to be operational at the end of the 2030. Whilst travel planning packages may cease to be operational, this shouldn't incur a cost. Therefore, no decommissioning costs have been added to the cost of Option DS12a.

3.4.5. Option DS12a Operating and Maintenance Costs

Operating and maintenance costs are the on-going costs required to maintain Option DS12a on an annual basis. The following categories of operating costs have been defined:

- **Communications and marketing** – annual costs required once the scheme is up and running;
- **AQ monitoring and evaluation** – to understand how the scheme is performing;

The key assumptions that have been utilised in developing the operating and maintenance cost estimates are summarised in Table 42.

Table 42 – Option DS12a Operating and Maintenance Costs Estimates – Key Assumptions

Cost Item Category	Description	Costing Method	Key Assumptions
Communications & marketing	Media liaison, advertising, responding to general queries.	Based on a proportionate approach with the knowledge that the London ULEZ Marketing & Comms budget is £5.1 million.	High level assumption of £150,000 p.a for the first 5yrs of the scheme operation
AQ Monitoring	To monitor how the scheme is performing.	Assumed 1 FTE with £30K p.a. salary. Annual allowance for monitoring 50 traffic sites, @£400 per site. Annual allowance for monitoring NO_2 at 35 sites, @£50 per tube/ site.	Assumed 1 FTE at £30K p.a. for the 10 year scheme duration, plus annual collection costs associated with traffic & AQ data
Operating & Maintenance of schemes	To cover O&M costs throughout the duration of the scheme	10% of all capital expenditure	Assumed to be 10% of capital cost total (exc electric charging points for taxis as this already includes O&M)

Table 43 – Option DS12a Operating and Maintenance Costs Estimates summarises the estimated costs for each of the operating and maintenance cost item categories. This includes an allowance for a sinking fund, whereby any unforeseen risks that are realised during the operation of the scheme can be mitigated. Inflation has been added at a rate of 2.5% per annum to reflect the proposed expenditure profile. OB has been added to each item, as per the WebTAG guidance.

The total operating and maintenance (nominal) cost, inclusive of OB is estimated to be £8,738,776 for Option DS12a. This assumes that the costs associated with the air quality monitoring will be incurred throughout the ten year duration of the scheme, even though air quality compliance is envisaged to be achieved by 2024.

Table 43 – Option DS12a Operating and Maintenance Costs Estimates

Cost Item Category	Base Cost (2018 prices, £000s)	Base Cost inc. Inflation to Reflect Spent Profile (£'000s)	Optimism Bias (£000s)	Total Cost (nominal, £000s)
Communications & marketing	£750	£849	£127	£976
AQ Monitoring	£518	£624	£94	£718
O&M of transport schemes	£5,153	£5,518	£828	£6,345
Sinking fund	£642	£699	-	£699
TOTAL COSTS	**£7,062**	**£7,690**	**£1,049**	**£8,739**

(Expressed as 10yr totals, in £000s)

3.4.6. Sinking Fund

A sinking fund will be established to provide mitigation against any unforeseen risks that are realised throughout the operation of the scheme. It is assumed that the target of the fund is 10% of the operating costs (note, OB has not been added to this figure).

The sinking fund will be protected within accounts at Coventry to ensure that it is available as a contingency fund for any risks that are realised throughout the operation of the scheme.

3.4.7. Total Costs for Option DS12a

As summarised in Table 44, the total cost estimates for Option DS12a are **£73,501,851** inclusive of both inflation at 2.5% p.a. to reflect the proposed expenditure profile, and OB.

Table 44 – Option DS12a Total Costs Estimates (Expressed as 10yr totals, £000s)

Cost Item Category	Base Cost (2018 prices, £000s)	Base Cost inc. Inflation to Reflect Spent Profile (£'000s)	Optimism Bias (£000s)	Total (nominal, £000s)
Capital Costs (Implementation)	£53,125	£56,873	£7,890	£64,763
Operating & Maintenance Cost (includes sinking fund)	£7,062	£7,690	£1,049	£8,739
TOTAL COSTS	**£60,187**	**£64,563**	**£8,939**	**£73,502**

The profile of this expenditure is summarised in Table 45.

Table 45 – Option DS12a Financial Profile (nominal prices, £000's)

All Costs in £'000s	Year of Option DS12a Operation												
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**Total**
Capital Costs		-£32,505	-£17,591	-£13,467	-£390	-£400	-£410	£0	£0	£0	£0	£0	-£64,763
Operating & Maintenance Costs			-£1,202	-£1,208	-£1,214	-£1,221	-£1,228	-£390	-£392	-£393	-£395	-£397	-£8,040
Sinking Fund			-£104	-£105	-£106	-£106	-£107	-£34	-£34	-£34	-£34	-£35	-£699
Net Cash Flow	**£0**	**-£32,505**	**-£18,897**	**-£14,779**	**-£1,710**	**-£1,727**	**-£1,744**	**-£424**	**-£426**	**-£428**	**-£430**	**-£432**	**-£73,502**

3.4.8. Option DS12a: Funding

Based on the DEFRA funding guidelines, CCC will be applying for both the DEFRA Implementation Fund and the Clean Air Fund, to support Option DS12a in Coventry. The delivery of this scheme is not dependent on any other funding.

Under Option DS12a, the total Implementation Fund request would be £71,550,578. This includes all of the capital and operational and maintenance costs throughout the scheme's duration. It is assumed that this would be drawn down in 2020. A further £1,951,273 would be requested from the Clean Air Fund, which is also assumed to be drawn down in 2020.

A breakdown of the funding requested is summarised in Table 46, along with the forecast spend profile.

Table 46 – Option DS12a Funding Sources

	Implementation Fund	Clean Air Fund
Funding (nominal, £'000s)	£71,551	£1,951

Assuming the funding is successful, there would be no funding gap. Delivery of the Spon End scheme assumes a partial contribution from the Implementation Fund with the remaining funding already committed. This is the only financial interdependencies with other projects/parties identified at this stage.

The Clean Air Fund application would be submitted through category 20b. Coventry currently has a large HC fleet which are mostly non compliant with Euro V1 emissions standards. CCC taxi licensing changes are in progress, which will see emission standards tightened up. Funding from the Implementation fund is included help taxi operators/drivers to upgrade to vehicles which would continue to meet the revised licensing requirements. However, it is noted that one of the barriers to electric taxis in particular is scarcity of charge points/range anxiety. The CAF request is for £1.951 million to install 40 electric taxi charge points at key layover locations to ensure that the capacity of the charge point network continues to enable rather than restrict the cleaning of the taxi fleet that has been identified as a key contributor to NO2 in the city. This includes maintenance and operation for 10 years.

This application is an extension to existing OLEV funding for taxi charge points that is currently in construction in Coventry. This can be quickly procured via an extension to the existing charge point framework, and can be completed by the end of 2020. Without this funding, the take up of electric taxis will be impacted, with a knock on impact that taxi drivers may end up out of employment due to not having a vehicle that is compliant with CCC taxi licensing requirements.

The accounting summary, assuming the Implementation Fund covers the cost of the scheme in its entirety, is summarised in Table 47.

Table 47 – Option DS12a Accounting Statement

All Costs in £'000s	Year of Option DS12a Operation												
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Capital Costs		-£32,505	-£17,591	-£13,467	-£390	-£400	-£410	£0	£0	£0	£0	£0	-£64,763
Operating & Maintenance Costs			-£1,202	-£1,208	-£1,214	-£1,221	-£1,228	-£390	-£392	-£393	-£395	-£397	-£8,040
Implementation Fund		£31,297	£18,154	£14,779	£1,710	£1,727	£1,744	£424	£426	£428	£430	£432	£71,551
Clean Air Fund		£1,208	£743	£0									£1,951
Sinking Fund			-£104	-£105	-£106	-£106	-£107	-£34	-£34	-£34	-£34	-£35	-£699
Net Cash Flow	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**

3.4.9. Summary of Cost Assessment

Option DS12a is estimated to cost £73,501,851 in total to implement. This is higher than Option DS2, for which the total cost estimate is £45,619,829 (Table 48). This is to be expected given the wide package of measures included with Option DS12a. Additionally, much of the costs are investments in road and cycling infrastructure, which will remain in place for the long term, benefitting the residents of the Coventry. The vast majority of costs for Option DS2 relate to the implementation and operation of the CAZ charging infrastructure.

Table 48 – Summary of Costs Estimates (Expressed as 10yr totals, nominal prices, £000s)

	Option DS2 CAZ D	Option DS12a
Capital Costs (Implementation)	£24,201	£64,763
Operating & Maintenance Cost (includes sinking fund)	£17,110	£8,739
Decommissioning costs	£4,309	-
TOTAL COSTS	**£45,620**	**£73,502**

Note: OB has been applied at 15% and 105%; as per OBC WebTAG recommendations.

4. Commercial Case

4.1. Procurement Process

In order to meet the very challenging timescales associated with this project, procurement will need to take account of any additional grant award conditions required by JAQU as well as any lead in times for local governance processes.

There are a wide range of OJEU compliant regional and national frameworks which are available for CCC to access (e.g. West Midlands Highway Alliance Professional Services Framework (PSF), Eastern Shires Purchasing Organisation (ESPO), Crown Commercial Services (CCS) framework) as well as access to CCC's Direct Labour Organisation (DLO).

All procurement will be subject to the CCC's robust Procurement and Commissioning governance process, which requires that all procurement commissions greater than £1 million per annum be approved by the Council's Cabinet, and all Contract values less than this sum be reviewed by the Council's Procurement Panel and Board as appropriate. The Council's Rules for Contracts will be followed as well as full OJEU rules where thresholds are met and no frameworks are available.

4.2. Proposed Measures

A range of works and services need to be procured to deliver the Preferred Option. When considering implementation and operation of the Preferred Option, the following activities require procurement:

- traffic management;
- professional services;
- design and build civils works;
- traffic technology upgrade;
- roadside technology (ANPR cameras, Variable Message Signs, Pollution sensors);
- vehicle conversion; and
- operations (staffing, provision of control room facilities)

In addition, the Preferred Option will require procurement of the following works and services:

- Cycle parking and infrastructure;
- EV charging points;
- Travel planning advice and initiatives; and
- Continued upgrading of taxis following Early Measures

In the first instance, the capability and capacity of our in-house teams will be considered to deliver elements, subject to having the necessary funding. However, it is already known that there will be some aspects which (if included in the shortlisted option), will require access to specialist skills from external partners and stakeholders. Where possible, local suppliers will be used.

Given the time pressures, where appropriate CCC will look to utilise existing procurement routes, including existing frameworks to minimise risk to delivery timescales.

4.3. Strategic Procurement Options

The measures set out will be subject to the EU procurement principles and the Council's Rules for Contracts. There is therefore a requirement that they be tendered competitively and that the process be transparent, non-discriminatory and ensures the equal treatment of bidders.

In compliance with the principles, there is also the expectation that the procurement(s) will be advertised widely enough for interested bidders to be aware of the contract(s). Where individual requirements are above the EU thresholds, then the full Public Contract Regulations 2015 will be adhered to.

Where appropriate frameworks are available and offer CCC value for money, use will be made of these to expedite timescales for delivery across all Contracts. To that end, there are four key procurement routes available to deliver the works and services required under the Preferred Option;

- **Council's Rules for Contracts**
    1. Subject to the estimated value of the contract, sub-OJEU threshold requirements can be procured through competitive tendering, competitive negotiation or direct order.
- **Internal Frameworks**
    2. The Professional Services Framework – established in collaboration with Warwickshire County Council – provides access to a range of professional service solutions. Early Measures Smarter Travel Advice services were procured through this Framework.

    3. Similarly, the Council's Direct Labour Organisation (DLO) is able to deliver required works. Where capacity or capability inhibits the use of the DLO, the DLO is able to run competitive tenders on behalf of CCC through the Civils Engineering Framework.
- **External Frameworks**
    4. A number of external frameworks are in place for goods and/or services, enabled for use by Local Authorities. Standard, tailorable, terms and conditions and contract documents greatly reduce the procurement timescales. Examples of available external frameworks include a range of Crown Commercial Services (CCS) frameworks and Eastern Shires Purchasing Organisation (ESPO) frameworks.
- **Open tender via the Official Journal of the European Union (OJEU)**
    5. Competitive tenders in line with Public Contract Regulations 2015 are required for works, goods and services contracts valued above the thresholds. Contracts in the form of Deeds must be prepared in Legal Services and sealed formally for the Council and witnessed by an authorised signatory.

A summary of the contract value procedural rules can be found Table 49.

Table 49 – Contract value procedural rules

Estimated Contract Value	Procedure To Be Followed
£4,551,413+ (Works)*	OJEU procurement procedure
£181,302+ (Goods & Services)*	OJEU procurement procedure
£50,000 - OJEU thresholds	Council's Rules for Contracts – competitive tenders
£10,000 - £49,999	Council's Rules for Contracts – competitive quotations
<£10,000	Council's Rules for Contracts – no competitive quotations required
**OJEU thresholds correct at January 2019 (updated January 2018 and amended biennially in January).*	

A summary of the required procurement tasks and identified, preferred procurement routes can be found in Table 50.

Table 50 - Summary of Procurement Tasks

Procurement Item	Procurement Route
Professional Services	Existing frameworks (CCC and external)
Highways Works	DLO or existing frameworks subject to capacity
Traffic signal technology upgrade	Existing contract
Variable Message Signs	Existing frameworks (external)
Roadside pollution sensors	Existing frameworks (external)
ANPR cameras	Existing frameworks (external)
Operations (enforcement officer(s) staffing)	CCC recruitment / existing frameworks
Vehicle Conversion – bus retrofit to Euro 6	Existing frameworks (external)
Cycle parking and infrastructure	Grant deployment (schools, businesses etc)
Cycle parking and infrastructure	Competitive tender (sub-OJEU)
EV charging points	Existing frameworks (external)
Travel planning advice and initiatives	Existing frameworks (CCC)
Electric taxi uptake	Grant deployment

4.3.1. Contract Type

A range of Contracts will be required due to the varying nature of the projects required for the plan, including the use of Frameworks which will come with their own, albeit tailorable, terms and conditions.

Professional services

A number of professional services frameworks exist that can be utilised for a wide variety of requirements. Internally, the Shared Professional Services framework was awarded in June 2017 and expires May 2021. The Crown Commercial Services (CCS) RM3745 Management Consultancy framework was awarded in September 2017 and runs through to September 2021. Similarly, the ESPO 664 Consultancy Services framework was awarded in April 2017. This framework expires in April 2019 but ESPO have confirmed that a 2-year extension will be enacted, taking the framework through to April 2021.

Highways England awarded the Specialist Professional and Technical Services (SPATS) framework in 2016, which expires in February 2020 that can also be utilised. Engagement with Highways England has confirmed that they are working on the next follow-up framework.

Traffic signal upgrade technology/VMS

The CCS RM1089 Traffic Management Technology 2 framework was awarded 31 October 2016 and runs through to 31 October 2020. The second iteration of the framework following the expiration of the original, it is highly likely that a further framework will be awarded to run from November 2020.

Taxi charge points

The ESPO 636 Vehicle Charging Infrastructure framework was awarded in July 2017 and expires in June 2019, though ESPO have confirmed that they will utilise the first 12-month extension option under the framework, taking the framework through to June 2020, and review again as to whether to take up the final 12-month option at a later date.

Highway works

The first port of call for Highway Works will be the Council's Direct Labour Organisation (DLO). Where capacity or capability inhibits the use of the DLO, the DLO is able to run competitive tenders on behalf of the Council through the Civil Engineering Framework. This framework was awarded in October 2016 and is due to expire 30 September 2020.

4.3.2. Contract Length

For capital works resulting in an asset requiring ongoing maintenance (e.g. Variable Message Signs, pollution detectors etc), an ongoing Maintenance Contract may be required. For service or works contracts, the Contract length will be until completion of the initial contract deliverables identified in the respective specification. Call Off Contracts under Frameworks (internal or external) are limited in duration to the length of the Framework Agreement itself.

The maximum length of any given framework under the Public Contracts Regulations 2016 is 4 years. With regards to Call Off Contract length, the maximum length of a Call Off Contract under a framework is equal to the maximum length of the framework, regardless of when the Call Off is awarded. I.e. a 4 year contract can be awarded under a framework (assuming the framework was 4 years in length), a day prior to framework expiry if need be.

4.3.3. Payment Mechanisms

Payment mechanisms will be dependent on the individual Contract undertaken and will form part of each individual measures procurement strategy. Unless otherwise agreed, payment terms will be in accordance with the Council's standard terms of payment.

The Council's standard terms of payment are 30 days from the date payment is due, receipt of invoice or delivery of goods and/or service whichever is the later.

Where the Contractor enters into a sub-Contract with a supplier or Contractor for the purpose of performing its obligations under the Contract, it shall ensure that a provision is included in such a sub-contract which requires payment to be made of all sums due by the Contractor to the sub-Contractor within a specified period not exceeding 30 days from the receipt of a valid invoice.

4.3.4. Risk Allocation and Transfer

With regards to the delivery of the plan and the programme of projects supporting it, risk will be held by CCC and that compliance with NO_2 legal objectives is the responsibility of the local authority.

Contracts issued will endeavour to transfer risk where possible to minimise risk to CCC. Risks will be flagged and managed by the Air Quality programme board. Key procurement risks include; delays or challenges to procurement, supplier goes out of business/fails to deliver on time.

4.3.5. Human Resources Issues

No relevant personnel, people management or trade union implications – including the Transfer of Undertakings (Protection of Employment Regulations 2006 (TUPE) – have been identified for this project.

The Preferred Option is composed of a programme of projects that will require project management expertise for delivery and resource for staff to enforce proposed measures which does not currently exist within CCC. Therefore, revenue costs will be factored into the final cost and presented within the Financial Case.

4.3.6. Contract and Budget Management

Key to the successful delivery of the Council's contracts are high-quality project management skills, with cost control expertise and sufficient support services. These are required from project conception through to tender, award and post-award contract management.

4.3.7. External Consultants

Where it is necessary to undertake work via external consultants, appropriate procurement routes will be identified. The following information will determine the routes we will be required to consider, all of which have varying timescales:

- Type of contract (Goods/Services, Goods/Services and Design etc)
- Level of spend on requirements
- Suitability of existing frameworks
- Specialist nature (e.g. where there are very few supplier options)

5. Management Case

This Management Case sets out the framework that CCC will use to deliver the programme of measures to achieve compliance. Effective delivery will rely on accurate and achievable programme plans with clear stage boundaries. This will enable timescales and delivery to be managed effectively by setting key milestones and evaluating progress against baseline targets. This is an approach established through existing programme delivery across a range of transport programmes. In line with JAQU guidance, the Management Case builds on the SOC by making recommendations about the optimal solution to the following issues:

- Governance structure during the implementation and operational phases, including key management roles/responsibilities.
- Evaluation and monitoring processes with associated benefits realisation.
- Risk management and mitigation (including risk register).
- Realistic and achievable project plan with appropriate level of detail.

5.1. Strategic Roles/Key Stakeholders

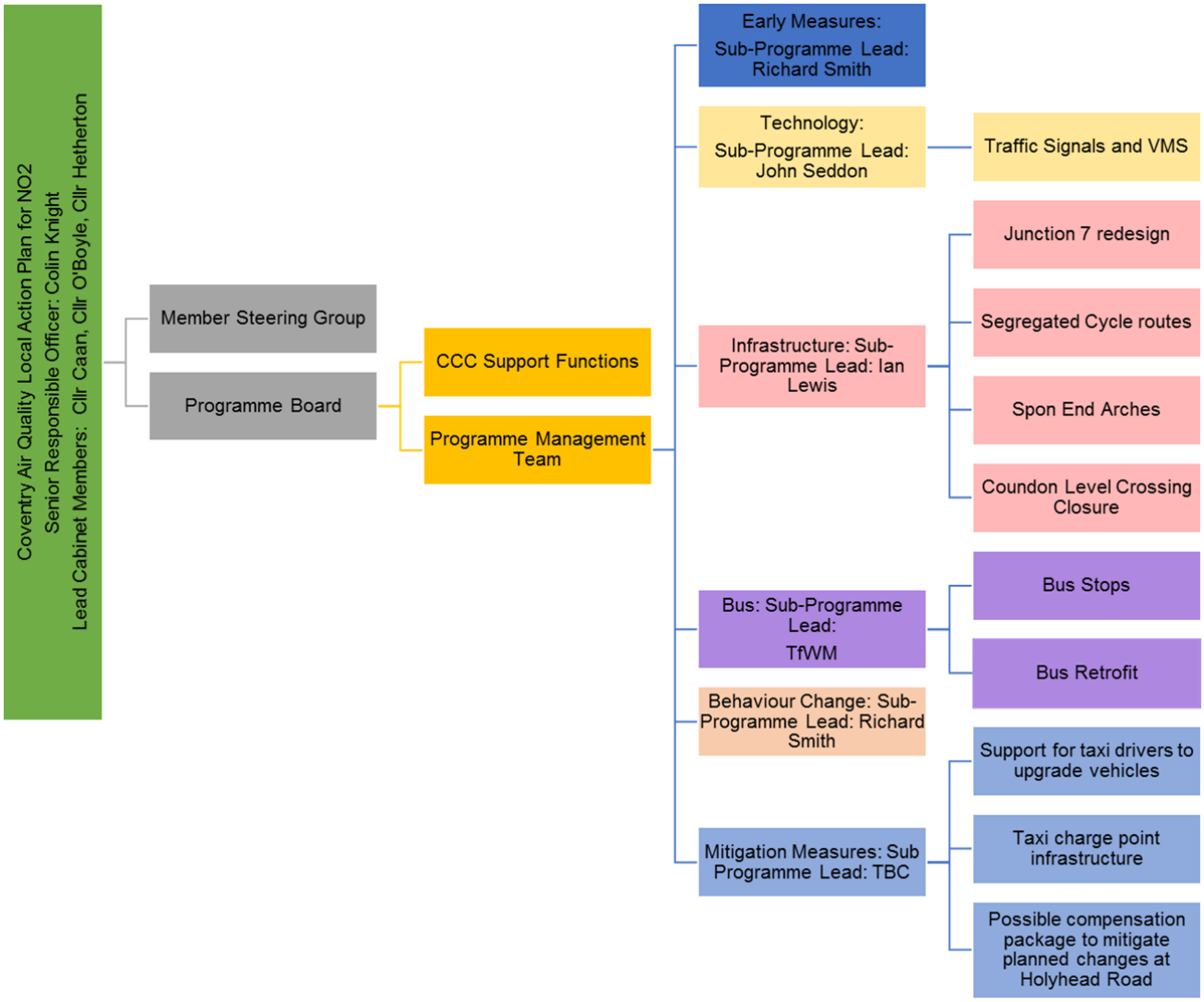
There are a number of organisations who have strategic roles in the delivery of the Air Quality Local Plan and these are set out in Table 51:

Table 51 – Strategic Roles

Organisation	Strategic Roles
JAQU	Overall management of the Local Air Quality Management (LAQM) process. Delivering the UK Plan to for Tackling Roadside Nitrogen Dioxide Concentrations. Provision of funding for local authorities to deliver their Local Plans. Development and implementation of national initiatives to improve air quality.
CCC	Legally responsible for improving air quality in Coventry under the Environment Act 1995. Implementation of measures to tackle exceedances of air pollutant levels within the Coventry Air Quality Management Area (AQMA). Delivering the Local Plan to Tackle Roadside Nitrogen Dioxide Concentrations – in particular demonstrating local leadership in tackling air quality issues in Coventry.
Transport for West Midlands (TfWM)	Provision of advice, support and funding in relation to pan-West Midlands initiatives which will contribute towards improved air quality – including public transport services, bus fleet, Connected and Autonomous Vehicles and walking / cycling. Co-ordination and sharing of best practice and experience in relation to air quality issues across the conurbation.
Technical consultants	Provision of project management support. Assisting with specific technical tasks for the delivery

5.2. Governance Structure

The proposed governance structure builds on that used for the feasibility study. As the AQLAP moves into the implementation stage, the focus moves into sub programme/projects.



5.3. Governance Structure Roles and Responsibilities

Governance Level	Roles and Responsibilities
Senior Responsible Officer (SRO)	Overall responsibility for ensuring that the agreed plan meets its objective of improved air quality within the time and cost parameters agreed in the final business case. The SRO is the Director of Transportation and Highways for the Council, providing a suitably senior leadership to the programme.
Member Steering Group (MSG)	Provision of strategic direction and advice in relation to the key Cabinet portfolios impacted by air quality issues, namely: • Economic Regeneration;

Governance Level	Roles and Responsibilities
	• Highways and Transport; • Environmental Health; and • Public Health.
Programme Board (PB)	Receiving advice (from JAQU and PM) and making decisions on the direction of the Local Plan work, including: • Monitoring objectives for the Local Plan; • Overview and co-ordination of all project activities to ensure project undertaken within the agreed scope; • Monitoring progress against activities and milestones; • Reviewing risk register and approve any issues, risks or additional requirements that have resulted/may result in major deviation from the agreed plan, and, if appropriate, any mitigation measures. • Providing advice on key technical and policy issues in relation to air quality.
Programme Manager (PM/PMT))	Responsible for the day to day management of the project on behalf of the PB: • Being main liaison with JAQU; • Producing, monitoring and updating all of the Project documents (alongside project team); • Commissioning the necessary technical work identified in the plan; • Monitoring progress of technical work streams • Produce highlight reports for PB summarising: ○ Work complete/work planned against agreed timeline ○ Any issues or additional requirements (including risks) that have, or might result in major deviation from the agreed plan. • Drafting all reports for consideration and approval by Programme Board and CCC Cabinet; • Monitoring spend against agreed budgets; • Working with stakeholders; and • Ensuring that all legal, financial and procurement processes are followed.
CCC Support Advisors	Consists of CCC officers covering a range of specialties including transport and infrastructure, parking, economic development, public health and planning. Provision of advice and support to the PM and PB in relation to: • Legal issues;

Governance Level	Roles and Responsibilities
	• Finance; • Procurement • Communications.
Sub – Programme Leads	In order to deliver the various elements of the preferred option, a series of sub programmes will be delivered by experienced technical project managers. It is envisaged that these projects will feed into the AQ programme board process as appropriate for the individual project.

5.4. Project Management

The Programme Board will meet monthly in 2019 and is chaired by the SRO. The project teams will meet monthly (aligned to feed into the board meeting) chaired by the Project Manager and a monthly highlight report produced by the PM for the PB. Programme Board meetings are proposed to move to quarterly in 2020 due to the nature of projects and timeframes for delivery.

5.5. Programme

Progress will be regularly reviewed through the use of the programme, which is a live document which is updated as the scheme progresses. This sets out the key events of the project and when they are expected to happen. The overall programme for the LAQAP implementation is shown overleaf. Subject to OBC approval, the design work and various procurement processes will be mobilised later in 2019. Construction of the various measures will vary depending on an appropriate timetable to be agreed to with the contractors.

The programme is also a useful tool in terms of change control. Any significant changes to the project impacting scope, timescales, cost etc. will be reported to the PB for sign off to ensure that appropriate actions are taken to minimise the impacts/accept the change of scope.

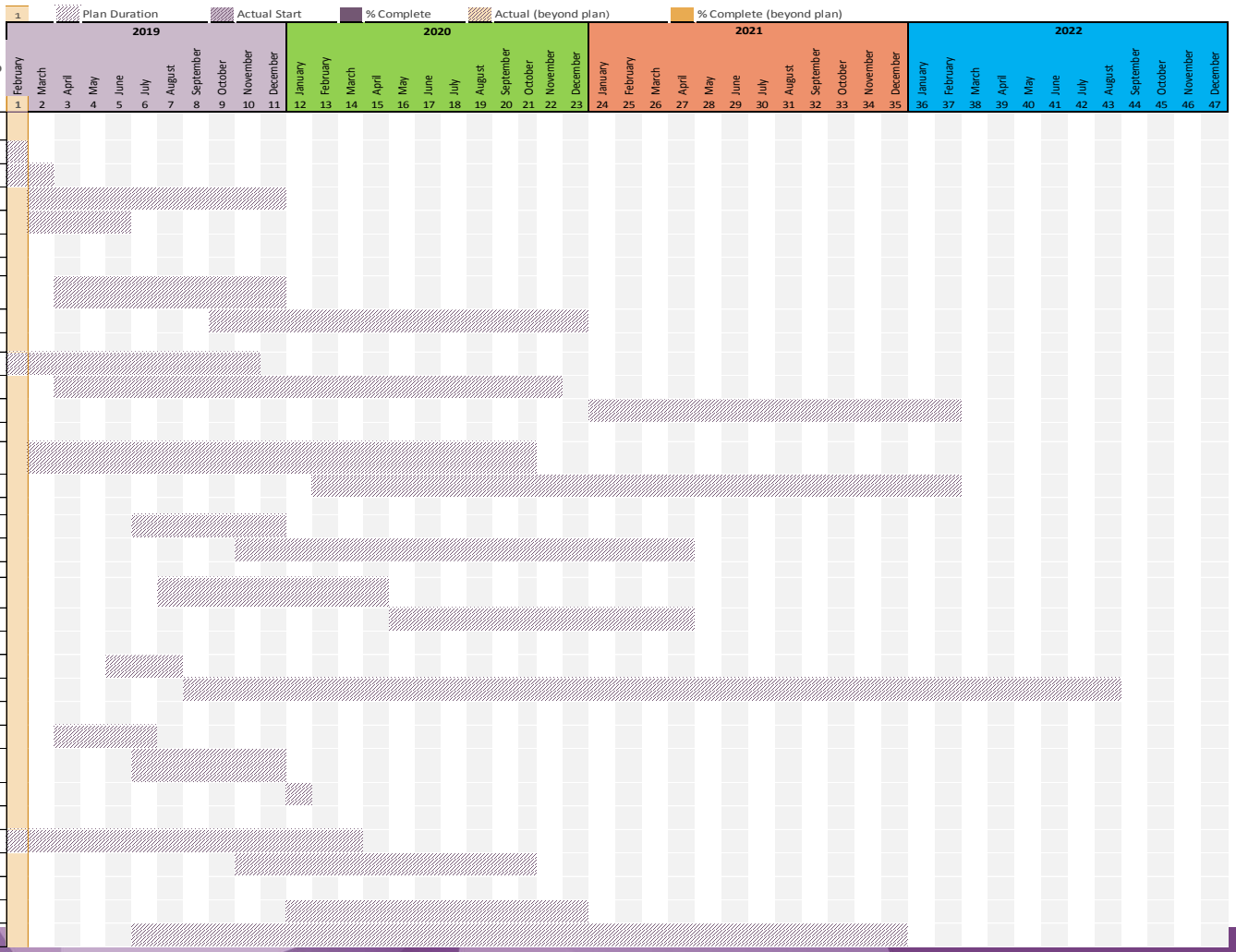
Draft Outline delivery programme

Local Air Quality Action Plan

As at 11th February 2019

Plan Duration | Actual Start | % Complete | Actual (beyond plan) | % Complete (beyond plan)

ACTIVITY	PLAN START	PLAN DURATION	PLAN COMPLETION
Feasibility Study			
OBC	1	1	2
Public Engagement	1	2	3
Statutory consultation	2	10	12
FBC	2	4	6
Infrastructure schemes			
Cycle Routes			
Design, Consultation & Approvals	3	9	12
Construction	9	15	24
Spon End			0
Design & Consultation	1	10	
Statutory Processes	3	20	23
Construction	24	14	38
Coundon Level Crossing			
Design, Consultation & Approvals	2	20	22
Construction	13	25	38
Traffic Signals & VMS			
Design	6	6	12
Construction	10	18	28
Junction 7			
Design, Consultation & Approvals	7	9	16
Construction	16	12	28
Travel planning			0
Procurement	5	3	8
In progress	8	36	44
Peak closures on Holyhead Road			0
Development	3	4	7
Design, Consultation & Approvals	6	6	12
implementation	12	1	13
Bus retrofit			0
Bus retrofit	1	14	15
bus stop improvements	10	12	22
CAF			0
Electric charge points	12	12	24
electric taxi support	6	30	36



5.6. Risk Management

The risk register is a live document that is continually revisited and updated throughout the life of the project, ensuring that risks can be minimised through on-going monitoring and mitigated through effective programme management and partnership working across the wider stakeholders. The risk register is a standing agenda item for PB meetings, with any substantive changes to risk ratings, or to the risks identified, being brought to the PB for discussion. The key risks all relate to the following three areas: deliverability of the preferred option, political acceptance of required option and cost uncertainties of preferred option.

Given the challenging timescales for this work, in order to ensure early impact on NO_2 external consultants will need to be part of the programme.

5.7. Financial Management

5.7.1. Financial Reporting

Financial reporting is critical to ensuring that the SRO, PB and PT are able to track progress. The PM will be responsible for undertaking regular financial reporting to inform the PB of progress, via monthly highlight reports.

Oversight of the financial management will be provided by CCC accountants under the guidance of the Council's S151 officer.

5.8. Benefits Realisation Strategy and Monitoring and Evaluation Plan

Evaluation and monitoring throughout the delivery of the programme is crucial to ensure benefits are realised. The implementation and operational phases of the programme will be the subject of a Monitoring and Evaluation Plan. A monitoring framework needs to be in place to enable evaluation. The Monitoring and Evaluation note provided by JAQU makes clear that the primary focus for Local Authorities is monitoring of measures rather than evaluation.

At the current time, only monitoring of measures is proposed. This would consist of annual traffic and air quality monitoring. The costs relating to the monitoring requirements are included in both the options detailed in this OBC (see financial case). Where possible, permanent traffic count loops will be installed to allow continuous/more flexible monitoring. This would be a comparable cost to the assumed costs in the financial case (temporary counts each year for the duration).

The progress on travel planning measures and taxi upgrade support is measured within each sub project and will report to programme board via sub-programme leads as appropriate

Bus retrofit will be monitored through reporting via TfWM to the programme board.

The proposed approach will be designed to assess whether the outputs and impacts of the scheme deliver the desired benefits (outcomes) and overarching objectives. The evaluation (if chosen) will include quantitative and qualitative measures, thereby covering a range of process and impact evaluation.

Appendices

Appendix A. Modelled exceedances of EU limit values in 2021

This appendix presents the forecast exceedances at various hot spot locations around the Coventry urban area. This information is taken from the baseline local air quality modelling.

Census ID	Modelled Roadside Annual Mean NO_2 Concentration ($\mu g/m^3$)													
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
7103	**50.72**	**48.97**	**47.17**	**45.25**	**43.33**	**41.40**	39.53	37.69	35.87	34.07	32.30	30.55	28.83	27.14
7631	**56.40**	**54.68**	**52.91**	**50.99**	**49.11**	**46.88**	**44.74**	**42.65**	**40.57**	38.60	36.65	34.75	32.90	31.08
7647	**69.54**	**66.89**	**64.03**	**60.88**	**57.61**	**55.08**	**52.61**	**50.17**	**47.73**	**45.35**	**42.98**	**40.63**	38.29	35.97
26497	**54.66**	**52.85**	**50.96**	**48.90**	**46.83**	**44.61**	**42.46**	40.35	38.25	36.23	34.22	32.26	30.33	28.43
27132	**49.97**	**48.56**	**47.12**	**45.59**	**44.10**	**42.16**	40.30	38.47	36.67	34.91	33.19	31.50	29.86	28.25
27693	**49.97**	**48.04**	**46.05**	**43.93**	**41.84**	40.00	38.25	36.54	34.86	33.27	31.72	30.21	28.75	27.34
37169	**50.20**	**48.21**	**46.15**	**43.94**	**41.69**	39.85	38.09	36.37	34.66	32.98	31.33	29.71	28.13	26.58
37731	**54.42**	**53.46**	**52.50**	**51.46**	**50.63**	**48.55**	**46.55**	**44.60**	**42.66**	**40.82**	39.01	37.24	35.51	33.82
37748	**49.91**	**47.86**	**45.77**	**43.54**	**41.50**	39.81	38.20	36.63	35.08	33.62	32.19	30.80	29.46	28.15
47156	**48.32**	**46.81**	**45.25**	**43.57**	**42.07**	40.46	38.93	37.44	35.96	34.57	33.20	31.87	30.57	29.32
47690	**50.43**	**48.53**	**46.55**	**44.40**	**42.28**	**40.51**	38.80	37.11	35.44	33.85	32.27	30.73	29.22	27.74
58401	**48.04**	**46.76**	**45.45**	**43.99**	**42.57**	40.44	38.39	36.37	34.37	32.44	30.53	28.65	26.82	25.01

Note: Values in **bold** denote exceedances of annual mean NO_2 EU limit value

Appendix B. Indicative source apportionment

PCM Census ID	Total NO_2	Road NO_2	Background NO_2	Estimated Contribution to Annual Mean NO_2 ($\mu g/m^3$)								
				Petrol cars	Diesel cars	Black cab taxis	Petrol LGVs	Diesel LGVs	Rigid HGVs	Artic HGVs	Buses	Coaches
7103	**43.3**	26.9	16.4	1.7	13.2	2.0	0.0	5.8	1.2	0.4	0.9	1.6
7631	**49.1**	29.5	19.6	2.1	16.3	2.5	0.0	5.4	1.2	0.4	0.0	1.6
26497	**46.8**	29.0	17.8	1.9	15.0	2.3	0.0	4.9	1.2	0.5	1.5	1.6
27132	**44.1**	27.0	17.1	1.9	15.1	2.3	0.0	4.9	1.0	0.4	0.0	1.3
27693	**41.8**	22.2	19.6	1.6	11.8	1.8	0.0	4.9	0.8	0.3	0.0	1.1
37169	**41.7**	25.8	15.9	1.5	12.5	2.0	0.0	4.7	1.2	0.5	1.6	1.8
37731	**50.6**	29.7	20.9	2.2	16.3	2.5	0.0	5.8	1.1	0.4	0.0	1.4
37748	**41.5**	20.6	20.9	1.4	11.2	1.7	0.0	3.4	1.0	0.4	0.0	1.4
47156	**42.1**	21.1	20.9	1.1	9.6	1.5	0.0	2.9	1.1	0.4	3.0	1.6
47690	**42.3**	22.9	19.4	1.3	10.1	1.6	0.0	3.6	1.5	0.6	2.3	2.0
58401	**42.6**	24.8	17.8	1.5	11.9	1.9	0.0	3.1	0.9	0.4	4.0	1.3

Appendix C. Options Initially Sifted Out

This appendix presents all the options, which were taken out during an initial sift. This was prior to the sifting undertaken using the MCA framework (critical success factors). Reasoning behind the sifting is also presented.

OPTION TYPE	OPTION DESCRIPTION	RATIONALE FOR SIFTING OUT
Infrastructure	Coventry Station improvements and bus interchange.	The station masterplan is currently under development; however, this is unlikely to take place in time to impact on NO_2 levels in the shortest possible time (2021).
Public Transport	Investment into the transport network such as HS2 and associated connectivity.	HS2 Phase 1 is planned for opening in 2026, hence, investing money into improving connectivity will not allow Coventry to meet NO_2 targets in the shortest possible time (2021).
Public Transport	Very light rail.	Implementing infrastructure for very light rail is expensive and the planning and delivery of such infrastructure will take time. Hence, a very light rail option will not allow Coventry to achieve the NO_2 target levels in the shortest possible time (2021) and achieve value for money.
Public Transport	Metro sprint along priority corridors connecting major towns, cities and the airport.	It will be very difficult to plan and implement the infrastructure in the shortest possible time (2021) to meet NO_2 target levels.
Public Transport	Coventry to Nuneaton rail corridor improvements.	A lack of available diesel rail vehicles (DMU) in the UK market place will mean that these improvements are unlikely to help meet the NO_2 target levels in the shortest possible time (2021).
Employer Led	Park and Ride scheme from Birmingham and Coventry Airports, using electric vehicles, to JLR.	Very specific and will not contribute enough to the overall reduction of NO_2 in the Coventry urban area.
Employer Led	Introducing low emission vehicles for traffic officers.	Very specific and will not contribute enough to the overall reduction of NO_2 in the Coventry urban area.
Cycle Based	Ensure that cycling routes are green and scenic to enable a higher uptake of cycling activity.	Defra have suggested that early evidence shows that additional green space/vegetation/trees do not contribute significantly to the reduction of NO_2 levels.
Planning Policy	Embedding health into the planning process. There could be potential discussions with developers prior to planning applications about ensuring health is taken more seriously in new developments allowing more scope for physical activity within the developments.	This option is not likely to have a significant impact on reducing NO_2 levels in the shortest possible time, as the number of new developments between now and 2021 is likely to be small.
Infrastructure	Implement a metro to Birmingham and Solihull	Implementing infrastructure for a metro system is expensive and the planning and delivery of such infrastructure will take a long time. Hence, a metro system will not allow Coventry to achieve the NO_2 target levels in the shortest possible time (2021) and achieve value for money.
Infrastructure	Start building infrastructure for autonomous vehicles, as it is anticipated that in around 20 years' time we will all be travelling in these and autonomous vehicles will make the road accessible for all.	This type of transport mode and technology is too far into the future and will not allow Coventry to meet their emission levels in the shortest possible time (2021).

Technology	Change the location of exhaust pipes to the other side of the vehicle i.e. not close to pedestrians walking along the pavement.	It will not be possible to implement this solution on vehicles in the timeframe available to allow Coventry to meet their air quality targets in the shortest possible time. Such an action will require international collaboration with car manufacturers.
Technology	Inductive charging i.e. charge vehicles by placing the vehicle over a charge pad.	This type of technology is still in its infancy and will not allow Coventry to meet their NO_2 targets in the shortest possible time.
Technology	Invest on research into low emission vehicles with an endless range.	The timescales to achieve NO_2 compliance within the shortest possible time would not be possible, as the results from the research and the actions required from the research are likely to take longer than allowed.
Technology	Autonomous travel pods, which can be used around the city as a taxi service.	This type of technology is still in its infancy and will not allow Coventry to meet their NO_2 targets in the shortest possible time.
Technology	Invest in and develop autonomous mass transit in the city of Coventry.	Implementing infrastructure for such a system is expensive and the planning for such infrastructure will take a long time. Hence, an autonomous mass transit system option will not allow Coventry to achieve the NO_2 target levels in the shortest possible time and achieve value for money.
Public Transport	Increase spaces for bikes on trains and have provision for bikes on trains during the peak hours. A potential solution could be separate carriages on trains, only for bikes.	Unlikely to be feasible, as train operators are likely to lose revenue and will object. Furthermore, the rail franchise for West Midlands Railways has just been awarded and the Virgin West Coast is currently in negotiations. Hence, implementing such a measure is likely to take longer than the shortest possible time (2021).
Public Transport	Make substantial investment in HS2 to make it more interconnected.	HS2 Phase 1 is planned for opening in 2026, hence, investing money into improving connectivity will not allow Coventry to meet NO_2 targets in the shortest possible time.
Public Transport	Improve rail links to UK Central from Coventry by implementing a light rail system	Implementing infrastructure for very light rail is expensive and the planning for such infrastructure will take time. Hence, a very light rail option will not allow Coventry to achieve the NO_2 target levels in the shortest possible time and achieve value for money. franchising will not allow.
Public Transport	A new rail station located in the east of Coventry and which will link to University Hospitals Coventry and Warwickshire (UHCW).	Implementing such type of infrastructure will take a long time to plan and implement, hence, this option is unlikely to enable CCC to meet their NO_2 target levels in the shortest possible time (2021).
Public Transport	Rapid transit and or a metro system in the Coventry area.	Implementing infrastructure for rapid transit or metro system is expensive and the planning for such infrastructure is will take time. Hence, a very light rail option will not allow Coventry to achieve the NO_2 target levels in the shortest possible time and achieve value for money.
Public Transport	Make public transport free, hence, the need for a car would diminish.	Not feasible due to the costs involved with implementing such a system, hence, value for money would not be possible. But increased affordability is an option.
Taxis	Implement and promote taxi sharing service in Coventry. This is currently done in South Africa and taxi drivers can benefit as there is a potential for them increase the fare for shared taxis and passengers benefit as half of the increased fare is less than the previous fare.	There are safety and security risks involved with travelling alone with strangers. Furthermore, the demand for this type of activity is likely to be very low.
Financial Penalties / Incentives	Increase the price of diesel by increasing the duty on diesel to reflect	This will require national Government support and intervention and is unlikely to take happen in the shortest possible time (2021).

	the full environmental and health impact costs.	
Financial Penalties / Incentives	Work with DVLA to increase vehicle tax for larger and or higher polluting vehicles.	This will require national Government support and intervention and is unlikely to take happen in the shortest possible time (2021). Furthermore, this has recently been implemented by the Government.
Planning Policy	Coventry needs to think about the future of air quality in a joined-up way and should think long term rather than short term.	This does not allow Coventry to meet their NO_2 target levels in the shortest possible time.
Planning Policy	Develop an new regional spatial plan and ensure that it is a bigger priority, politically.	This does not allow Coventry to meet their NO_2 target levels in the shortest possible time.
Others	Install multi-utility tunnels and channels under the road, with liftable covers, to prevent the digging of roads each time for a new job.	The infrastructure required will take a long timeframe and the costs involved would be significant. Hence, Coventry would not be able to achieve value for money and achieve NO_2 target levels in the shortest possible time.
Information Based	Provide travel packs to residents of new developments.	This option is unlikely to allow Coventry to meet their NO_2 target levels in the shortest possible time as the number of new developments between now and 2021 is likely to be small, hence, having a minimal impact.
Information Based	Initiate projects with university students and academics to undertake research on key issues and issue areas and use the findings to develop solutions.	Will take too long to have an impact as research needs to be first undertaken and then conclusions drawn from the research with the aim of implementing a solution based on the research.
School Safety	Mannequin children outside schools to reduce speeds. This is an approach currently used in Nottingham.	This is unlikely to have a large enough impact on NO_2 exceedances as speed of vehicles is not, necessarily, the issue.
Transport Modelling	Map the key transport movements in the Coventry urban area.	This is not a solution as mapping the key transport movements is likely to allow Coventry to understand where the issues are.
Community Engagement	Connect with the community by running joined up campaigns with the community on what local communities want and take account of their inputs in the planning process. The following are some of the community type of engagements, which can be undertaken: - Work with local communities to design streetscape and ideal streets to close to traffic. - Introduce more sustainable community plans, which include the monitoring of local air quality and following up air quality issues and plans with the community and getting the community more involved. - Undertake community engagement on all projects and identify a balance between the people who live there and the people who travel on that road. As part of the engagement, build 3D models to allow the community to use and identify issues and solutions.	This type of activity does not help reduce NO_2 emission levels, significantly.


Coventry City Council
Solihull
METROPOLITAN BOROUGH COUNCIL
Warwickshire
County Council

Appendix D. Options Recommended for Options Sifting

This appendix presents all the options, which remained beyond the initial sift and were put forward for the MCA sifting process. This is a list of all the options, which remained and are in no particular order.

NO.	OPTION	WHAT DOES IT ADDRESS?	DESCRIPTION
1	Develop and implement priority lanes aimed at promoting car sharing, public transport and the use of low emission vehicles	Targets single occupancy car trips along hotspots	Develop and implement priority lanes on key arterial and radial routes, where possible. E.g. lanes which can only be used by vehicles with more than one person in the car, low emission vehicles and buses etc. This would encourage car sharing and reduce the number of single occupancy car trips and or journeys and the use of low emission vehicles and public transport.
2	Retro-fit existing cars with low emission engines	Targets the level of emissions from cars by targeting existing cars	Retro-fit existing cars on the road using low emission engines and technology to make them eco-friendlier.
3	Improve public transport connectivity to the Ricoh Arena	Reduces car trips along hotspots by improving bus transport	Provide a more frequent public transport service and additional capacity to the Ricoh Arena during events and sports matches, to reduce the number of car journeys.
4	A more frequent and better-quality bus service along key routes.	Reduces car trips along hotspots by improving bus transport	Develop and implement a higher frequency and a better quality (improved the comfort levels, increased amount of available personal space, wifi connectivity, low emission vehicles) bus service along key routes, where the NO_2 levels are in exceedance.
5	A faster and more direct bus service between Coventry and Solihull/Warwick	Targets commuter car trips by improving public transport	Provide a more direct and faster bus service between Coventry, Solihull and Warwick.
6	Promote and incentivise the use electric cycles for long distance commuting.	Encourages walking and cycling mode share, hence, reducing vehicle trips	Promote the use of electric cycles for longer distance commuting.
7	Implement measures to incentivise behaviour change	Improved travel planning	Implement measures to get people to change their routine, involving more open conversations into schools, healthcare facilities and employers. As part of this measure, undertake campaigns, to portray the message that healthier lifestyle and behaviour is trendy and fashionable.

8	Take a more strategic corridor and area based approach to road improvements	Targets journey efficiency	Implement and undertake a more comprehensive and strategic corridor and area-based approach to improvements on the road network rather than a piecemeal junction by junction improvement.
9	Implement measures to significantly reduce traffic on certain roads (routes), including infrastructure changes.	Reduces car trips along hotspots by removing traffic	Implement measures to significantly reduce traffic on roads (routes) during certain times of the day by implementing including any required infrastructure changes.
10	Integrated online shopping delivery	Targets LGV trips	Incentivise retailers to ensure that online shopping delivery is more integrated and planned between retailers so that each delivery vehicle can be better utilised, hence, reducing the number of trips.
11	Improve facilities along Coventry Canal to increase canal side walking and cycling activity.	Encourages walking and cycling mode share, hence, reducing vehicle trips	Improve facilities along Coventry Canal to encourage more people to use the Canal towpath as a walking and cycling route for local journeys, thereby increasing walking and cycling mode share and reducing vehicle trips.
12	Enhance the CCC marketing and campaign strategy.	Marketing and campaigning	Enhance the CCC marketing and campaign strategy and focus on using social media more effectively. In order to ensure that the message about NO_2 exceedances and related issues can be delivered to the community more effectively.
13	Establish an Employer Network within Coventry with the aim of supporting businesses to encourage more agile working practices and to promote sustainable travel initiatives through shared best practice.	Targets peak hour car trips by changing time of travel	Promote and implement agile working across companies and organisations in the Coventry urban area. The following should be focussed upon to deliver this initiative effectively: - Question the need for travelling to work and implement working behaviours which promote more working from home, hologram meetings etc. - Encourage more flexibility with the hours of work and the place of work. - Establish an Employer Network within Coventry as a means of sharing best practice and sustainable travel initiatives in the most effective manner.
14	Improve broadband coverage, speed and quality	Targets peak hour car trips by changing time of travel	Improve broadband coverage, speed and quality so that more people can work from home, thereby reducing the need to travel.
15	Implement measures to increase office sharing to increase car sharing	Improved travel planning	Implement measures to enable and promote businesses and organisations to share office space in order to increase the likelihood of car sharing

16	Promote and implement the use of additional low emission buses	Targets the level of emissions from buses	Promote and implement the use of additional low emission buses throughout Coventry. Low emission technology can include hybrid buses, biofuel powered buses and electric buses, as an alternative to petrol and diesel. CCC has already retro-fitted 21 buses with hybrid technology to meet Euro 5 standards. Recently they had submitted a bid to retrofit more buses with low emission technology and have been awarded funding to retro-fit another 150 buses (includes match funding from National Express). Coventry was successful in getting funding for this proposal.
17	Promote and increase the use of car clubs and car hire schemes	Targets driver behaviour for business and schools	Promote and increase the use of car clubs and car hire schemes rather than ownership. In order to make this initiative successful and help reduce NO_2 emissions in the Coventry urban area, the following should be focussed upon: - The use of technology such as mobile applications to find cars and hire cars on demand. - Fleet, within car clubs, should largely comprise of low emission vehicles, including electric vehicles.
18	Promote and implement measures to increase car sharing	Targets commuter car trips	Promote and implement measures to increase car sharing throughout the Coventry urban area. A car sharing scheme is already in place in Coventry and this could be expanded upon.
19	Improve cycle security	Encourages walking and cycling mode share, hence, reducing vehicle trips	Implement measures to improve cycle security throughout the Coventry urban area to increase cycling activity and increase mode share. Measures to improve cycle security could include the following: - Provide more secure cycle storage throughout the Coventry urban area. - Provide free GPS trackers for cycles, D-Locks and cycling kits.
20	Increase cycle hire	Increasing access to cycles, hence increasing mode share.	Increase cycle hire schemes, throughout the city. A new public cycle share scheme is due to be rolled out from Summer 2018 onwards and this could be expanded upon.
21	Capture and use data to influence route choice.	Reduces car trips along hotspots by removing traffic	Use modern technology and results from pilot studies such as Intelligent Mobility A444, Binley Road and Walsgrave Road A4600 to capture air quality data and influence route choice and to allow the best route to be chosen, in order to minimise NO_2 exceedances and emissions.
22	Public display of air quality data, issues and impacts.	Marketing and campaigning	Collect, analyse and display live air quality information at key locations including schools and shopping centres using digital display screens. Use innovative presentation to link improvement measures with future air quality at

			locations to engage with the community and promote behaviour change. This information be displayed alongside traffic, parking and public transport information to help influence people's travel choices when travelling into Coventry city centre. As well as display at key locations, information would be disseminated via CCC's website, social media, broadcast media and the Employer Network
23	Promote and support the uptake of low emission private vehicles	Targets the level of emissions from cars	Promote and support the use of private electric vehicles throughout Coventry by: - Introducing plans for electric vehicle charging points at home rather on streets. - Ensuring that electric charge points are located near the front of retail car parks as an incentive for purchasing and using electric vehicles. - Promoting the purchase of electric pool cars and vehicles by employers. - Promoting the use of electric vans and taxis. - Ensuring that new developments provide charging points at new houses and commercial facilities.
24	Improve electric vehicle charging infrastructure available to private car users	Targets the level of emissions from existing and new cars	Promote and support the use of private electric vehicles throughout Coventry by providing adequate electric vehicle charging infrastructure by: - Make space for and install fast charge points for electric vehicles (for example it may be possible to provide a 80% capacity charge in 30 minutes). - Providing and investing in more universal charging points. - Install on-street charging points in residential areas with no private driveways.
25	Increasing the number of electric taxi charging points	Targets the level of emissions from taxis	Increasing the number of electric taxi charging points, by expanding on the 39 electric charging points for taxis, which have already been funded.
26	Introduce a workplace parking levy in Coventry	Targets commuter car trips by focussing on business	Introduce a workplace parking levy in Coventry to reduce the number of trips made for commuting purposes.
27	MaaS (Mobility as a Service)	Increase public transport patronage	The complete journey experience for public transport users is important and this should be focussed upon to increase public transport usage. MaaS, short for Mobility as a Service, brings all means of travel together. It combines routing options from different transport providers into a single mobile service, removing the hassle of planning and one-off payments. Hence, increasing public transport mode share.

28	Improve cycling and pedestrian facilities	Encourages walking and cycling mode share, hence, reducing vehicle trips	Increase walking and cycling by improving infrastructure, as it is difficult to promote these activities, otherwise. Areas of focus should include the following: - Adopt best practice from the 'cycle demonstration towns' and "mini-Holland" London Boroughs to build the cycling culture in Coventry. - Improve pedestrian walkway facilities, such as including benches along the route.
29	Implement more Park and Ride	Targets car trips along hotspots	Coventry should explore opportunities to expand Park and Ride by coordinating with large employers, establishments and developers. Some of the focus areas are: - Park and Ride schemes to link to public bike hire schemes. - Large employers including JLR, University of Warwick and UHCW should be consulted. - Should be planned to accommodate visitor coaches - Potential use of peripheral car parks that are under-utilised on weekdays, such as the Ricoh Arena.
30	Incentivise large suppliers/retailers/manufacturers to transport more goods by rail.	Targets HGV trips	Work with Network Rail, Freight Operating Companies and large retailers/suppliers/manufacturers, such as JLR, to transport more of their goods by rail, hence reducing the number of the HGV trips.
31	Increase rail service frequency between Coventry and Warwick.	Targets commuter car trips by improving public transport	Work with Network Rail and Train Operating Companies to increase rail service frequency between Warwick and Coventry, as currently, it is around 1tph. This could reduce the number private vehicle trips between Warwick and Coventry.
32	Incentivise the uptake of low emission taxis	Targets the level of emissions from taxis	Incentivise tax drivers to buy and or replace taxis with low emission taxis.
33	Integrate and restrict the delivery of goods to business	Targets HGV and LGV trips	Work with business and road freight hauliers to implement the following: - Ensuring deliveries to business only take place outside of restricted hours - Road hauliers using low emission vehicles for delivery, where possible - Integrating the delivery schedule so that one delivery vehicle can deliver to multiple users, particularly, when the destinations are close by and or in the same building.
34	Plan and develop freight consolidation centres	Targets HGV trips	Plan, develop and implement freight consolidation centres for last mile deliveries into and out of the city centre. These could be

			operated using low emission heavy goods vehicles from a FCC located adjacent to the M6.
35	Integrated PT ticketing and cross border ticketing	Increase public transport patronage	CCC should work with transport operators across modes and other local authorities to implement a more integrated ticketing, with focus on the following: - Integrated cross border ticketing between TfWM and Warwickshire. - The use of mobile technology/electronic payments systems, including the Swift Card - Ticket prices, which are easier to understand and are more affordable.
36	Review and update existing taxi licensing policies	Targets the level of emissions from taxis	Review existing taxi licensing policies and make amendments, where possible, including the following: - Future licensing should be based on emissions and accessibility rather than the age of the vehicle. - Ensure that taxi licensing schemes are competitive and consistent across the West Midlands. For example, it is currently possible to get a taxi license in Wolverhampton, which is less stringent, and drive in Coventry.
37	Install and update urban traffic control systems using more intelligent programming	Targets journey efficiency	Updating traffic controllers and signalling using more intelligent programming to reduce delays and stop starts on the network. Potential, technology includes the use of SCOOT.
38	Work with employers to improve their travel plans through the establishment of an Employer Network to facilitate best practice sharing.	Targets driver behaviour	Work with businesses and employers to establish an Employer Network that will help them improve their travel plans and their effectiveness through best practice sharing and by undertaking the following: - Businesses and employers should be required to undertake more review and monitoring of their travel plans to understand the effectiveness of the plans; - All employers should be mandated to having a travel plan; - Businesses should minimise inter-site and inter-office travel. - Employers should invest in a team, who can provide personalised travel planning tips to their employees; and - Employers should highlight the benefits of increased activity to and from work such as weight loss, improved mental health.
39	Develop and provide a mobile application to improve travel planning (early MaaS)	Targets driver behaviour for business	Develop and provide a mobile application to improve travel planning for the public, similar to the City Mapper application in Birmingham. This would be an important component of a larger MaaS initiative.

40	Work with schools to improve their travel plans	Targets driver behaviour for schools	Work with schools and parents to improve their travel plans and their effectiveness by undertaking the following: - Promoting clean air zones around schools by implementing parking restrictions outside of schools; - Travel campaigns for parents who drop their children to school; - Implement measures to increase car sharing to and from schools; and - Implement measures to increase 'walking buses', 'cycling buses' and 'scooter buses' for children, which can be organised teacher/parent organisations.
41	Schools to implement and provide school buses	Targets peak hour car trips by reducing the number of trips	Schools to implement and provide school buses.
42	Develop and extend the strategic cycle network across Coventry	Encourages walking and cycling mode share, hence, reducing vehicle trips	Develop and extend the strategic cycle network throughout Coventry to make it easier to cycle around the city, thereby increasing cycling mode share and reducing the number of vehicle trips. This includes construction of routes of high quality as well as linking opportunities for multimodal travel through improved access at stations and cycle parking. The strategic network will make cycling more accessible including to groups who are currently more under-represented among people who cycle.
43	Implement cycle superhighways within Coventry	Encourages walking and cycling mode share, hence, reducing vehicle trips	Implement cycling super highways, throughout, Coventry. The potential to develop cycle superhighways will be considered as part of the LCWIP process and some initial work around routes, which can accommodate these has already been undertaken by Coventry.
44	Incentivise and provide funding for electric cars	Targets the level of emissions from cars	Provide grants for electric cars to drivers, so that the uptake of electric cars is incentivised and increases, quickly. This is over and above the existing Government schemes promoted through OLEV that provides up to £5k support.
45	Provide driver behaviour training	Targets driver behaviour for business and schools	Provide driver training to promote better, and greener, driving techniques.
46	Improve and increase green space	Encourages walking and cycling mode share, hence, reducing vehicle trips	Develop and implement a more holistic vision around 'green space' and the planting of more trees, in order to improve public realm and attract the public to increase walking and cycling, as a result.

47	Increase parking charges	Increase public transport patronage	Increase parking charges at city centre car parks to reduce the number of car trips to the centre of Coventry, and to encourage people to travel by other modes.
48	Improve wayfinding for walking	Encourages walking and cycling mode share, hence, reducing vehicle trips	Improve wayfinding for walking as the existing wayfinding is very poor around the city and is possibly discouraging people not familiar with the city from walking.
49	Low emission LGV vehicles for last mile delivery.	Targets LGV trips	Promote and incentivise in order to increase the use of low emission LGV vehicles around the city for last mile delivery.
50	Implement better traffic management measures at issue roads (routes)	Targets journey efficiency	Implement better traffic management measures on issue roads, junctions and routes to improve journey efficiency and reduce NO_2 emissions. Measures can be wide ranging from one-way traffic flow to improved signalling and gyratory operations.

Appendix E. Long List of Packaged Options

This appendix presents the packaged options. These were developed by taking the long list of options, which remained beyond the initial sift, and combined into groups to make them more effective measures/options.

PACKAGE	OPTIONS	WHAT DOES IT ADDRESS?
P1	19 - Improve cycle security	Encourages walking and cycling mode share, hence, reducing vehicle trips
P2	11 - Improve facilities along Coventry Canal to increase canal side walking and cycling activity. 28 - Improve cycling and pedestrian facilities 46 - Improve and increase green space 48 - Improve wayfinding for walking	Encourages walking and cycling mode share, hence, reducing vehicle trips
P3	42 - Develop a strategic cycle network 43 - Implement cycle superhighways within Coventry	Encourages walking and cycling mode share, hence, reducing vehicle trips
P4	20 - Increase cycle hire	Increasing access to cycles, hence increasing mode share.
P5	6 - Promote and incentivise the use electric cycles for long distance commuting.	Encourages walking and cycling mode share, hence, reducing vehicle trips
P6	27 - MaaS (Mobility as a Service) 35 - Integrated PT ticketing and cross border ticketing	Increase public transport patronage
P7	12 - Enhance the CCC marketing and campaign strategy. 22 - Public display of air quality data, issues and impacts.	Marketing and campaigning
P8	1 - Develop and implement priority lanes	Targets car trips along hotspots
P9	3 - Improve public transport connectivity to the Ricoh Arena 4 - A more frequent and better quality bus service along key routes.	Reduces car trips along hotspots by improving bus transport

P10	9 - Implement measures to significantly reduce traffic on certain roads (routes), including infrastructure changes. 21 - Capture and use data to influence route choice.	Reduces car trips along hotspots by removing traffic
P11	29 - Implement more Park and Ride 47 - Increase parking charges	Targets car trips along hotspots
P12	5 - A faster and more direct bus service between Coventry and Solihull/Warwickshire	Targets commuter car trips by improving public transport
P13	26 - Introduce a workplace parking levy in Coventry 38 - Work with employers to improve their travel plans	Targets commuter car trips by focussing on business
P14	38 - Work with employers to improve their travel plans 39 - Develop and provide a mobile application to improve travel planning (early MaaS) 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change 18 - Promote and implement measures to increase car sharing 15 - Implement measures to increase office sharing to increase car sharing 48 - Improve wayfinding for walking	Targets driver behaviour for business
P15	40 - Work with schools to improve their travel plans 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change	Targets driver behaviour for schools
P16	10 - Integrated online shopping delivery 33 - Integrate and restrict the delivery of goods to business	Targets LGV trips
P17	30 - Incentivise large suppliers/retailers/manufacturers to transport more goods by rail. 34 - Plan and develop freight consolidation centres 33 - Integrate and restrict the delivery of goods to business	Targets HGV trips
P18	8 - Take a more strategic approach to road improvements 37 - Install and update traffic control systems using more intelligent programming 50 - Implement better traffic management measures at issue roads (routes)	Targets journey efficiency
P19	13 - Promote and support businesses to encourage more agile working 14 - Improve broadband coverage, speed and quality	Targets peak hour car trips by changing time of travel

P20	41 - Schools to implement and provide school buses	Targets peak hour car trips by reducing the number of trips
P21	16 - Promote and implement the use of additional low emission buses	Targets the level of emissions from buses
P22	23 - Promote and support the uptake of low emission private vehicles 24 - Improve electric vehicle charging infrastructure available to private car users 44 - Incentivise and provide funding for electric cars	Targets the level of emissions from new cars
P23	2 - Retro-fit existing cars with low emission engines 24 - Improve electric vehicle charging infrastructure available to private car users	Targets the level of emissions from cars by targeting existing cars
P24	25 - Increasing the number of electric taxi charging points 32 - Incentivise the uptake of low emission taxis 36 - Review and update existing taxi licensing policies	Targets the level of emissions from taxis
P25	31 - Increase rail service frequency between Coventry and Warwickshire.	Targets commuter car trips by improving public transport
P26	49 - Low emission LGV vehicles for last mile delivery.	Targets LGV trips
P27	28 - Improve cycling and pedestrian facilities 42 - Develop a strategic cycle network 19 - Improve cycle security 20 - Increase cycle hire	Encourages walking and cycling mode share, hence, reducing vehicle trips
Class B CAZ	Class B CAZ (taxis, buses, coaches and HGVs) on the ring road and, possibly, key radial routes	Benchmark
Class C CAZ	Class C CAZ (taxis, buses, coaches, HGVs and LGVs) on the ring road and, possibly, key radial routes	Benchmark
Do Nothing	Do Nothing	Do Nothing

Appendix F. MCA Framework

This appendix presents the MCA framework, which was developed using the primary and secondary critical factors. This framework was used to further refine the long list of packaged options into a short list of options to take forward to OBC stage.

CRITICAL SUCCESS FACTORS	CONSIDERATIONS
(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	*Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m³?*
	In which year is compliance achieved?
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m², if combined with another option? [Answer to this question should not be used for the pass/fail scoring]
	Is the option compliant?
(A) Does this option improve the overall economy and job prospects, within Coventry?	*Does this option improve the overall economy within Coventry?*
	Does this option improve job prospects and create jobs within Coventry?
	Overall economy
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*
	How does this option affect overall exposure and to what extent does it reduce overall exposure?
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?
	Overall strategic and wider air quality fit
(C) Is there a well-developed supply side, who have the capacity and capability to deliver this option?	*Who will deliver the solution (LA, external party or both)?*
	Who will be the lead organisation for the delivery of this option?
	Are there capable contractors available to deliver this option?
	Is there a sufficiently well-developed market to support the efficient delivery of this option?
	Overall supply side and capability score
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*
	What is the affordability of this option in the long run taking account of operating and maintenance costs?

	How will this option be funded (public, private or a mix of funding sources)?
	Are there any other potential funding sources, for this option?
	Overall affordability score
(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?
	Is this option based on proven/existing technology?
	Overall achievability score
(F) What is the overall distributional Impact of this option?	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?
	Is there a potential to insure some groups against the detrimental impacts of the option?
	Does this option have an impact on health inequalities?
	Overall distributional impact score
(G) Does this option provide value for money	*Do the likely benefits of this option exceed the costs?*
	Has the option been designed effectively while maximising benefits?
	Overall value for money score

Appendix G. MCA methodology

This appendix provides further details on the sifting methodology and can be read in conjunction with the Economic Case if further detail is required on the methodology.

G.1. Sifting methodology and workshop

Each of the long list of packaged options were given final scores, with clearly recorded rationale during a workshop on the 20th February 2018 at CCC offices. However, prior to the workshop, the study team scored each of the options, providing rationale. This was done to ensure that the workshop ran smoothly by smoothing out any potential problems in the MCA. Furthermore, the prior scoring allowed the project team to firm up on the advantages and disadvantages for each option, which enabled discussion and challenge during the workshop.

While, scoring the options, each option was compared against the criteria set out in the MCA and equal weightings were applied to each of the secondary CSF, with a view on agreeing/changing the weightings for the secondary CSF during the workshop.

The workshop was attended by various specialists within the study team and represented by a number of departments within CCC.

G.2. Outcomes from the sifting workshop

During the workshop, there were a few recommendations provided by the attendees, to develop more rounded and complete options, which were taken on board by the study team to develop an initial shortlist of options which passed the primary CSF and scored well against the secondary CSFs. The following recommendations were provided by the attendees:

1. The weightings recommended for each secondary CSF were discussed and it was agreed that these should remain equally weighted.
2. Packaged option 13 (introducing a workplace parking levy in Coventry) would be undeliverable in the timescales. As such, this package was adjusted to a fail but it was agreed that other elements of the packaged option (option 38 - work with employers to improve their travel plans) should still be included within another package.
3. An option based around the use of low emission LGVs for last mile delivery should be added to the long list of options, which was added and scored following the workshop taking account of the discussions during the workshop.
4. It was agreed that the cycling options fail, as part of other options, as they were currently packaged and presented at the workshop. However, it was recommended that they should be combined with travel planning to make them more effective. Furthermore, a more focussed and more deliverable cycling package was added and scored taking account of discussions with CCC during and following the workshop.
5. It was recommended that packaged option (P9 – Improve bus transport) should be designed to be more effective by including within it, the following:
    a. Integrated public transport ticketing and cross border ticketing
    b. A faster and more direct bus service between Coventry and Solihull/Warwickshire
6. Packaged option (P7 – better marketing and campaigning) should remain as an overall strategy for all options to make each option more effective.
7. Packaged option (P10 - Implement measures to make certain roads(routes) traffic free including infrastructure changes) should remain in the final shortlist, whatever the score may be as the NO_2 exceedances on Holyhead Road are very high and this option may be the only way forward at the location.

The initial shortlisted packaged options have come out of the sifting process as options which are likely to help CCC achieve NO_2 compliance in the shortest possible time. However, it was also recommended that these

packaged options can and should be re-assembled and re-packaged to make them more effective at reducing NO_2 emissions in the Coventry urban area.

Table 52 - Initial shortlisted packaged options

PACKAGED OPTION	DESCRIPTION	COMPLIANCE	SECONDARY CSF SCORE
P9	3 - Improve public transport connectivity to the Ricoh Arena 4 - A more frequent and better-quality bus service along key routes 35 - Integrated PT ticketing and cross border ticketing 5 - A faster and more direct bus service between Coventry and Solihull/Warwickshire 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	10.00
P26	49 - Low emission LGV vehicles for last mile delivery. 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	10.00
P14	38 - Work with employers to improve their travel plans 39 - Develop and provide a mobile application to improve travel planning (early MaaS) 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change 18 - Promote and implement measures to increase car sharing 15 - Implement measures to increase office sharing to increase car sharing 48 - Improve wayfinding for walking 19 - Improve cycle security 28 - Improve cycling and pedestrian facilities 42 - Develop a strategic cycle network 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	8.00
P15	40 - Work with schools to improve their travel plans 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change 19 - Improve cycle security 28 - Improve cycling and pedestrian facilities 42 - Develop a strategic cycle network 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	7.00
P24	25 - Increasing the number of electric taxi charging points 32 - Incentivise the uptake of low emission taxis 36 - Review and update existing taxi licensing policies 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	7.00
P18	8 - Take a more strategic approach to road improvements 37 - Install and update traffic control systems using more intelligent programming 50 - Implement better traffic management measures at issue roads (routes) 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	6.00
P21	16 - Promote and implement the use of additional low emission buses 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	5.00

P27	28 - Improve cycling and pedestrian facilities 42 - Develop a strategic cycle network 19 - Improve cycle security 20 - Increase cycle hire 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	5.00
P10	9 - Implement measures to significantly reduce traffic on certain roads (routes), including infrastructure changes. 21 - Capture and use data to influence route choice 12 - Enhance the CCC marketing, incentivising and campaign strategy	PASS	-5.00

The long list of packaged options, which failed on compliance and or scored poorly against the secondary CSFs are shown in Table 53 and are not recommended to be taken any further. The '*Action Taken'* column suggests any actions which have been taken following on from recommendations during the workshop. Full details of the scores for each of the long list of packaged options, along with rationale can be found in **Appendix H**.

Table 53 - Failed packaged options

PACKAGE	DESCRIPTION	COMPLIANCE	SECONDARY CSF SCORE	ACTION TAKEN
P8	1 - Develop and implement priority lanes	FAIL	-4.00	
P6	27 - MaaS (Mobility as a Service) 35 - Integrated PT ticketing and cross border ticketing	Fail	-3.00	Option 35 has been added to Package 9. Option 39 includes early Maas measures as full MaaS is not possible.
P16	10 - Integrated online shopping delivery 33 - Integrate and restrict the delivery of goods to business	FAIL	-2.00	
P1	19 - Improve cycle security	FAIL	1.00	New package added (P27) and this option has also been added to travel planning measures
P2	11 - Improve facilities along Coventry Canal to increase canal side walking and cycling activity. 28 - Improve cycling and pedestrian facilities 46 - Improve and increase green space 48 - Improve wayfinding for walking	FAIL	1.00	New package added (P27) and Option 28. added to travel planning measures
P13	26 - Introduce a workplace parking levy in Coventry 38 - Work with employers to improve their travel plans	FAIL	1.00	Option 38 is included within travel planning measures
P19	13 - Promote and support businesses to encourage more agile working 14 - Improve broadband coverage, speed and quality	FAIL	1.00	
P3	42 - Develop a strategic cycle network 43 - Implement cycle superhighways within Coventry	FAIL	2.00	New package added (P27) and Option 42. added to travel planning measures
P5	6 - Promote and incentivise the use electric cycles for long distance commuting.	FAIL	2.00	

P23	2 - Retro-fit existing cars with low emission engines 24 - Improve electric vehicle charging infrastructure available to private car users	FAIL	2.00	
P11	29 - Implement more Park and Ride 47 - Increase parking charges	FAIL	3.00	
P20	41 - Schools to implement and provide school buses	FAIL	3.00	
P25	31 - Increase rail service frequency between Coventry and Warwickshire.	FAIL	6.00	
P4	20 - Increase cycle hire	FAIL	9.00	New cycling package added (P27) which includes cycle hire.
P12	5 - A faster and more direct bus service between Coventry and Solihull/Warwickshire	FAIL	9.00	Option 5 has been added to Package 9


Coventry City Council
Solihull
METROPOLITAN BOROUGH COUNCIL
Warwickshire
County Council

Appendix H. MCA Scores/Rationale for Each Packaged Option

This appendix provides the full details of the scores given in the MCA sifting process and the rationale.

		P21	P22	P23	P24
CRITICAL SUCCESS FACTORS	CONSIDERATIONS	16 - Promote and implement the use of additional low emission buses	23 - Promote and support the uptake of low emission private vehicles 24 - Improve electric vehicle charging infrastructure available to private car users 44 - Incentivise and provide funding for electric cars	2 - Retro-fit existing cars with low emission engines 24 - Improve electric vehicle charging infrastructure available to private car users	25 - Increasing the number of electric taxi charging points 32 - Incentivise the uptake of low emission taxis 36 - Review and update existing taxi licensing policies
		Targets the level of emissions from buses	Targets the level of emissions from new cars	Targets the level of emissions from cars by targeting existing cars	Targets the level of emissions from taxis
(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	*Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3?*	Yes, this option is likely to reduce the NO_2 emission levels in the issue areas as buses operate along these routes or nearby these routes. Furthermore, petrol/diesel buses are large contributors towards NO_2 emissions and Coventry has an extensive bus network.	Yes, this option is likely to reduce the NO_2 emission levels in the issue areas as cars operate along these routes or nearby these routes. Furthermore, petrol/diesel cars are large contributors towards NO_2 emissions. There is a high uptake of new cars in the UK.	Yes, this option is likely to reduce the NO_2 emission levels in the issue areas as existing cars operate along these routes or nearby these routes. Furthermore, petrol/diesel cars are large contributors towards NO_2 emissions. There is a large number of high polluting existing cars in the Coventry urban area.	Yes, this option is likely to reduce the NO_2 emission levels in the issue areas as existing taxis operate along these routes or nearby these routes. Furthermore, petrol/diesel taxis are large contributors towards NO_2 emissions. There is a large number of high polluting taxis in the Coventry urban area.
	In which year is compliance achieved?		As there are only around 200 electric vehicles in the city, the shift required from diesel / petrol to electric needs to be significant to have a large enough impact. This is a good long-term strategy; however, the option is unlikely to achieve the shift required in the timescales.	However, currently it is not technically possible to retrofit cars.	
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]				
	Is the option compliant?	PASS	PASS	FAIL	PASS
(A) Does this option	*Does this option improve the overall economy within Coventry?*	Neutral	Yes, as JLR is a big contributor to the Coventry economy and the company may provide some of the low emission cars.		

improve the overall economy and job prospects, within Coventry?	*Does this option improve job prospects and create jobs within Coventry?*	This option has the potential to create a small number of jobs to retro-fit and maintain the low emission buses. A new £80 million electric vehicle battery development facility will be built in Coventry, Warwickshire, aiming to make the UK "a world leader" in electric vehicle battery technology.	Yes, as JLR is a large provider of jobs in Coventry and the company may provide some of the low emission cars. A new £80 million electric vehicle battery development facility will be built in Coventry, Warwickshire, aiming to make the UK "a world leader" in electric vehicle battery technology.	This option has the potential to create a number of jobs to retro-fit and maintain the low emission cars. A new £80 million electric vehicle battery development facility will be built in Coventry, Warwickshire, aiming to make the UK "a world leader" in electric vehicle battery technology.	Yes, as The London Taxi Company is a large provider of jobs in Coventry and the company may provide some of the low emission Taxis. A new £80 million electric vehicle battery development facility will be built in Coventry, Warwickshire, aiming to make the UK "a world leader" in electric vehicle battery technology.
	Overall economy	1	1	1	2
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*	Using low emission buses throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city	Using low emission cars and having the charging infrastructure throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city	Using low emission cars and having the charging infrastructure throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city	Using low emission Taxis and having the charging infrastructure throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	This option will reduce overall exposure along bus routes, which are hotspots in the Coventry urban area.	This option will reduce overall exposure along busy routes, some of which are hotspots in the Coventry urban area.	This option will reduce overall exposure along busy routes, some of which are hotspots in the Coventry urban area.	This option will reduce overall exposure along busy routes, some of which are hotspots in the Coventry urban area.
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, it is likely to reduce NO_2 emissions but only by a minimal amount.	Yes, it is likely to reduce NO_2 emissions, significantly due to the large number of car trips.	Yes, it is likely to reduce NO_2 emissions, significantly due to the large number of car trips.	Yes, it is likely to reduce NO_2 emissions, significantly due to the large number of taxi trips.
	Overall strategic and wider air quality fit	0	2	2	2
(C) Is there a well developed supply side, who have the capacity and capability to deliver this option?	*Who will deliver the solution (LA, external party or both)?*	This solution is likely to be delivered between both CCC and the bus operators and relies upon commitment from bus operators.	This solution is likely to be delivered between both CCC and technical contractors to design and deliver the charging infrastructure.	This solution is likely to be delivered between both CCC and technical contractors to design and deliver the charging infrastructure.	This solution is likely to be delivered between both CCC and technical contractors to design and deliver the charging infrastructure and the taxi drivers.
	Who will be the lead organisation for the delivery of this option?	Lead organisation is likely to be the bus operator	Lead organisation is likely to be CCC, who will act as client and programme manager.	Lead organisation is likely to be CCC, who will act as client and programme manager.	Lead organisation is likely to be CCC, who will act as client and programme manager.
	Are there capable contractors available to deliver this option?	Yes there are, as retro-fitting of buses with low emission is currently under way in Coventry and other parts of the UK.	Yes there are, many car manufacturers who sell low emission cars and companies who can supply and fit the charging infrastructure. However, there is likely to be a power supply issues if the shift from petrol/diesel to electric vehicles is achieved.	Yes there are, many car manufacturers who sell low emission cars and companies who can supply and fit the charging infrastructure. However, there is likely to be a power supply issues if the shift from petrol/diesel to electric vehicles is achieved.	Yes, taxi manufacturers sell low emission taxis and companies who can supply and fit the charging infrastructure. This is currently underway in Coventry, with 39 charging points for taxis, already.

	Is there a sufficiently well-developed market to support the efficient delivery of this option?	Yes, there are, as retro-fitting of buses with low emission is currently under way in Coventry and other parts of the UK.	Yes, the market for low emission cars and associated infrastructure is well developed and buoyant.	Yes, the market for retro-fitting low emission cars is proven technology, although difficult to implement in some cars, and associated infrastructure is well developed and buoyant.	Yes, the market for retro-fitting and selling low emission taxis is proven technology, although difficult to implement in some cars, and associated infrastructure is well developed and buoyant.
	Overall supply side and capability score	1	-1	-1	1
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*	This is a relatively cheap option as the initial cost of buses can be outweighed against lower operating costs during the operating life of the bus.	This is likely to be an expensive solution, although some costs will be outweighed by lower vehicle operating costs. However, this will be a benefit to private users.	This is likely to be an expensive solution, although some costs will be outweighed by lower vehicle operating costs. However, this will be a benefit to private users.	This is likely to be an expensive solution, although some costs will be outweighed by lower vehicle operating costs. However, this will be a benefit to taxi drivers.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	Lower operating and maintenance costs as low emission buses do not require as much petrol/diesel.	Lower operating and maintenance costs as low emission cars do not require as much petrol/diesel.	Lower operating and maintenance costs as low emission cars do not require as much petrol/diesel.	Lower operating and maintenance costs as low emission taxis do not require as much petrol/diesel.
	How will this option be funded (public, private or a mix of funding sources)?	This option is likely to be funded by public sector funding with some potential match funding from bus operators.	This option is likely to be funded by public sector funding as well as owners of the vehicles.	This option is likely to be funded by public sector funding as well as owners of the vehicles.	This option is likely to be funded by public sector funding as well as owners of the vehicles.
	Are there any other potential funding sources, for this option?	Match funding from bus operators.	Potential low emission funding sources need to be investigated.	Potential low emission funding sources need to be investigated.	Potential low emission funding sources need to be investigated.
	Overall affordability score	2	-1	-1	-1
(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*	Yes, this is already underway in Coventry	Yes, this is already underway in Coventry	This has not yet been tested, however, potential is there. However, many owners may be reluctant to change due to costs.	Implementing taxi charging infrastructure is already underway in Coventry. 6 charging points to be delivered by end of 2018 and 39 by the end of 2019. It may be difficult to change policy.
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?	Potential that there are not enough resources in the market place if there are a significant number of orders around the rest of the UK	Potential that there are not enough resources in the market place if there are a significant number of orders around the rest of the UK	Potential that there are not enough resources in the market place if there are a significant number of orders around the rest of the UK	Potential that there are not enough resources in the market place if there are a significant number of orders around the rest of the UK
	Is this option based on proven/existing technology?	Yes, this is proven technology and in use throughout the UK	Yes, this is proven technology and in use throughout the UK	Proven technology and in use	Proven technology and in use.
	Overall achievability score	1	-2	-1	1
(F) What is the	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*	Neutral	Poorer communities are unlikely to be able to afford this option	Poorer communities are unlikely to be able to afford this option	Poorer taxi drivers are unlikely to be able to afford this option

overall distributional Impact of this option?	*Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?*	No, as it reduces the amount of emissions from buses.	No, as it reduces the amount of emissions from new cars.	No, as it reduces the amount of emissions from existing cars.	No, as it reduces the amount of emissions from existing taxis.
	Is there a potential to insure some groups against the detrimental impacts of the option?	N/A	N/A		Taxis drivers required to uptake low emission taxis due to policy change can be provided with additional funding, if they can demonstrate that they are not able to afford the option.
	Does this option have an impact on health inequalities?	Yes, many of the buses operate in more deprived parts of Coventry. Hence, low emission buses are likely to improve health inequalities in these parts of Coventry.	Yes, many of the cars operate in more deprived parts of Coventry. Hence, low emission new cars are likely to improve health inequalities in these parts of Coventry.	Yes, many of the cars operate in more deprived parts of Coventry. Hence, low emission existing cars are likely to improve health inequalities in these parts of Coventry.	Neutral
	Overall distributional impact score	1	1	2	1
(G) Does this option provide value for money	*Do the likely benefits of this option exceed the costs?*	This option is likely to improve health and the option may attract a higher patronage on the bus network. However, as 75% of the buses are already funded for and are to be completed by 2021. The remaining 25% of buses are unlikely to have a big enough impact and may not be along the problem routes.	This option is likely to improve improved health and reduce vehicle operating costs. However, the initial high capital costs are like to be very high. Furthermore, as there are only around 200 electric vehicles in the city, the shift required from diesel / petrol to electric needs to be significant to have a large enough impact. This is a good long-term strategy, however, the option is unlikely to achieve the shift required in the timescales.	The benefits of this option are likely to be extensive due to improved health and lower vehicle operating costs. However, the initial high capital costs are like to be very high.	The benefits of this option are likely to be extensive due to improved health and lower vehicle operating costs. However, the initial high capital costs are like to be high.
	Has the option been designed effectively while maximising benefits?				
	Overall value for money score	-1	-2	0	1
	Overall Score	5.00	-2.00	2.00	7.00

		P12	P25	P13	P19	P20
CRITICAL SUCCESS FACTORS	CONSIDERATIONS	5 - A faster and more direct bus service between Coventry and Solihull/Warwickshire	31 - Increase rail service frequency between Coventry and Warwickshire.	26 - Introduce a workplace parking levy in Coventry 38 - Work with employers to improve their travel plans	13 - Promote and support businesses to encourage more agile working 14 - Improve broadband coverage, speed and quality	41 - Schools to implement and provide school buses
		Targets commuter car trips by improving public transport	Targets commuter car trips by improving public transport	Targets commuter car trips by focussing on business	Targets peak hour car trips by changing time of travel	Targets peak hour car trips by reducing the number of trips
(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	*Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3?*	Yes, this option is likely to reduce the annual mean NO_2 concentration levels for a number of reasons: - currently a significant number of commuters between Coventry and Warwick and Coventry and Solihull for work. However, the public transport service is poor. Furthermore, 80-90% of commuters between these origin and destinations travel as car drivers or passengers (as shown in the Coventry City Council report 2015, "Coventry and Warwickshire Commuter Movements". - Therefore, reducing the mode share from car to public transport can significantly reduce car trips.	Currently a significant number of commuters between Coventry and Warwick and Coventry and Solihull for work. However, the public transport service is poor. Furthermore, 80-90% of commuters between these origin and destinations travel as car drivers or passengers (as shown in the Coventry City Council report 2015, "Coventry and Warwickshire Commuter Movements". Therefore, reducing the mode share from car to public transport can significantly reduce car trips.	The 2011 Census data showed that there are approximately 150,000 commuters who commuted within Coventry or into Coventry and the overall mode share of the car (including passenger) is approximately 67%. Hence, implementing this option is likely to impact on a large number of trips if delivered effectively.	Working from home risen from 1.44% in 1981 to 7.35% in 2011 as shown in the 2011 Census data. If more can be done to increase this percentage further than commuter trips would reduce vehicle commuter journeys (particularly the car). Many jobs in Coventry require people at the location of business (as a high percentage of jobs in Coventry is in manufacturing, retail, education and health).	Statistics from the 'Education Data Team Key Statistics Report', Coventry City Council, February 2017 shows that there were approximately 55,000 (33,000 - primary and 22,000 - secondary) children in education in the Coventry area in 2015/16. The 'National Travel Survey 2014' from the DfT suggests that approximately 46% of 5-10 year olds and 23% of 11-16 year olds travel to school by car. The use of the car is the second most popular mode of travel after walking. Hence, providing school buses is likely to impact on a large number of car trips (max 40,000 car trips per school day) and reduce the mode share for the car.
	In which year is compliance achieved?		However, this option is unlikely to achieve the required reductions in NO_2 in the timeframe as a doubling of the rail service is already planned for by the end of 2019 and any further increase to the	However, changing driver behaviour and implementing a workplace levy is likely to take a long time (due to legal framework etc) and achieving NO_2 emission	The slow increase in 'working from home' from 1981 to 2011 is a sign that we are unlikely to achieve NO_2 emission targets in the shortest possible time.	Difficult plan and timetable effectively and will have limited impact.

			rail service is unlikely to occur in the shortest possible time.	targets in the shortest possible time may not be possible.		
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]	This option combined with another option is likely to achieve a greater reduction in the NO_2 in the shortest possible timeframe.		Option 'No. 38 - Work with employers to improve their travel plans', should be combined with another option to make it effective.		
	Is the option compliant?	PASS	FAIL	FAIL	FAIL	FAIL
(A) Does this option improve the overall economy and job prospects, within Coventry?	*Does this option improve the overall economy within Coventry?*	Yes, improving public transport frequency can allow more people to access jobs in Coventry, which they were not able to otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.	Yes, improving public transport frequency can allow more people to access jobs in Coventry, which they were not able to otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.	A workplace parking levy may result in some employers relocating elsewhere to retain or attract staff, therefore impacting on the local economy. However, this may be minimal.	More people may start working as they can balance their lifestyle around more easily, hence improving the local economy. Faster broadband makes people more effective.	Providing school buses will allow some parents, who otherwise worked reduced hours or zero hours, to work more and or take up employment. This will have a positive impact on the local economy.
	Does this option improve job prospects and create jobs within Coventry?			A workplace parking levy may result in some employers relocating elsewhere to retain or attract staff, hence reducing the overall number of jobs.	Neutral	Additional school buses will create a small number of new jobs for drivers and alike.
	Overall economy	1	1	-1	1	1
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.	Some commuters may choose not to work as they cannot afford the levy. This is more likely to impact on the poorer community.	Improves accessibility to jobs for a wider community.	Improves accessibility as certain families will have improved access to public transport. This option improved community safety as children have access to a safe transport mode to school.
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	This can significantly impact overall exposure, in a positive way, due to the large number of existing commuter movements between the destinations	This can significantly impact overall exposure, in a positive way, due to the large number of existing commuter movements between the destinations	This solution can reduce overall exposure significantly, especially along busy commuter routes as fewer people may use the car for commuting.	This solution can reduce overall exposure, especially along busy commuter routes as fewer people may use the car for commuting.	This solution can reduce overall exposure, especially along busy commuter routes as fewer people may use the car for travelling to school.
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, reducing NO_2 exposure is beneficial to health and reducing these commuter movements is likely to alleviate the pressure on some the hotspots including Holyhead and the A429	Yes, reducing NO_2 exposure is beneficial to health and reducing these commuter movements is likely to alleviate the pressure on some the hotspots including Holyhead and the A429	This solution can reduce overall exposure significantly, especially along busy commuter routes as fewer people may use the car for commuting. This will improve health inequalities as the more deprived	Yes, reducing NO_2 exposure is beneficial to health and reducing these commuter movements is likely to alleviate the pressure on some the hotspots.	Yes, reducing NO_2 exposure is beneficial to health and reducing these school car trips is likely to alleviate the pressure on some the hotspots.

				communities are located along these routes.		
	Overall strategic and wider air quality fit	2	2	0	1	1
(C) Is there a well developed supply side, who have the capacity and capability to deliver this option?	*Who will deliver the solution (LA, external party or both)?*	CCC with co-operation from bus operators.	CCC with co-operation from bus train operators and Network Rail.	CCC in liaison with local business	CCC in liaison with local business and National Government and contractors for broadband infrastructure.	CCC in liaison with schools and bus operators.
	Who will be the lead organisation for the delivery of this option?	CCC	CCC	CCC for the levy and the businesses will deliver a more effective travel plan.	CCC in liaison with local business and National Government and contractors for broadband infrastructure.	CCC
	Are there capable contractors available to deliver this option?	Yes, as not much new infrastructure is required. Many of the changes required include timetabling changes etc.	Yes, as not much new infrastructure is required. Many of the changes required include timetabling changes etc.	Yes	Yes	Yes
	Is there a sufficiently well developed market to support the efficient delivery of this option?	Yes	Yes	Yes	Yes	Yes, providing school buses is common practice across parts of the UK.
	Overall supply side and capability score	1	1	1	1	1
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*	This is relatively cheap option as not new infrastructure is required.	This is relatively cheap option as not new infrastructure is required.	Relatively cheap option to implement as it is policy and behaviour change, largely. However, additional staff may be require to administer the levy.	Implementing a better broadband coverage will require significant cost. However, this may already be happening and has happened.	Initial costs are likely to be high due to capital costs of the buses.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	Long run operating costs can be met by additional public transport revenue. Fewer car trips can result in less maintenance on the road network.	Long run operating costs can be met by additional public transport revenue. Fewer car trips can result in less maintenance on the road network.	Costs to employ administration staff will not be funded in the long run.	Relatively cheap option as broadband is likely to be funded by national Government.	Operating costs can be met by revenue from bus operation.
	How will this option be funded (public, private or a mix of funding sources)?	Public funding to implement the changes with revenue to cover longer term operating costs.	Public funding to implement the changes with revenue to cover longer term operating costs.	Public sector funding initially with levy revenue in the long run.	Public and some private investment from telecommunications companies	Initial investment will be public.
	Are there any other potential funding sources, for this option?				National Government for Broadband	Potential match funding from bus operators.
	Overall affordability score	1	1	2	1	-1

(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*	Yes, but will require liaison with bus operators.	Yes, but will require liaison with train operators and Network Rail. However, this is unlikely to achieved in the timescales as long lead times are required for rail timetable changes.	It can de delivered however, it will be difficult to implement a levy politically and it will also be difficult to impact on behaviour change. However, it has running in Nottingham for 3 years now and generating revenue	It can de delivered however, it will be difficult to impact on behaviour change and many jobs require people at the location of business (as a high percentage of jobs in Coventry is in manufacturing, retail, education and health). Broadband improvements will require liaison with national Government.	Yes, but will require liaison with bus operators and schools.
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?	Running additional services on the rail network may be restricted by existing timetabling constraints.	Running additional services on the rail network may be restricted by existing timetabling constraints.			Yes, there are many bus operators and schools across Coventry who can be approached.
	Is this option based on proven/existing technology?	N/A	N/A		Yes high speed broadband is a proven technology	Yes, this is common practice across other parts of the UK.
	Overall achievability score	1	-2	-1	-2	1
(F) What is the overall distributional Impact of this option?	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*	Will make certain jobs and locations accessible to a wider community (specifically the deprived as public transport is cheaper than private car)	Will make certain jobs and locations accessible to a wider community (specifically the deprived as public transport is cheaper than private car)	It may result in some poorer workers not working as they cannot afford the levy.	Will make certain jobs and locations accessible to a wider community.	Will make certain schools and locations accessible to a wider community (specifically the deprived as public transport is cheaper than private car), who otherwise were not able to travel to these locations for education.
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?	No, it reduces overall emissions.	No, it reduces overall emissions.	If commuters, work elsewhere and continue to travel by car then the issue is displaced elsewhere.	No, as it will reduce overall levels of emissions rather than displace.	No, it reduces overall emissions.
	Is there a potential to insure some groups against the detrimental impacts of the option?			Can excuse certain commuters from having to pay the levy for example if they have no other reasonable method for travelling into work.		
	Does this option have an impact on health inequalities?	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Will improve health inequalities as commuter trips reduced in the deprived areas.	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)
	Overall distributional impact score	2	2	-1	1	1
(G) Does this option	*Do the likely benefits of this option exceed the costs?*	Cheap solution to implement and bus revenue will be generated. However, rail changes are expensive.	Cheap solution to implement and bus revenue will be generated. However, rail changes are expensive.	Cheap solution to implement and levy revenue will be generated. However, option may have negative impact on business and jobs.	Broadband is expensive to implement, although it may already be funded and the impacts of this overall option is likely to be minimal.	Initial capital costs for the purchase of buses are high, however, operational costs can be met by bus revenue. However, impact may be minimal.

provide value for money	*Has the option been designed effectively while maximising benefits?*					
	Overall value for money score	1	1	1	-2	-1
	Overall Score	9.00	6.00	1.00	1.00	3.00

		P16	P26	P17
CRITICAL SUCCESS FACTORS	CONSIDERATIONS	10 - Integrated online shopping delivery 33 - Integrate and restrict the delivery of goods to business	49 - Low emission LGV vehicles for last mile delivery.	30 - Incentivise large suppliers/retailers/manufacturers to transport more goods by rail. 34 - Plan and develop freight consolidation centres 33 - Integrate and restrict the delivery of goods to business
		Targets LGV trips	Targets LGV trips	Targets HGV trips
PRIMARY) Compliance (Meeting the	*Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m²?*	Yes, it will reduce the NO_2 emissions. However, the impact is likely to be small.	Yes, it will reduce the NO_2 emissions and the impact is likely to be large as initial local modelling suggest that a large contributor of the NO_2 emissions in Coventry is the diesel LGV.	Yes the impact is likely to be large as HGVs are large contributors to NO_2 emissions in the Coventry area.

NO_2 Levels in the shortest possible time)	*In which year is compliance achieved?*	Minimal impact, hence it is unlikely to meet targets by the compliance year	This option is likely to meet targets by the compliance year as electric vehicles are fairly cheap (comparable to diesel LGVs) and re common.	It will be possible to deliver freight consolidation centres in the timeframe, if the land is available.
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]			
	Is the option compliant?	FAIL	PASS	PASS
(A) Does this option improve the overall economy and job prospects, within Coventry?	*Does this option improve the overall economy within Coventry?*	This is likely to impact negatively on businesses, which rely on timely delivery of goods including retailers.		This is likely to impact negatively on businesses, which rely on timely delivery of goods including retailers.
	Does this option improve job prospects and create jobs within Coventry?	Integrating deliveries may mean fewer delivery jobs available. Furthermore, restricting delivery times may mean fewer delivery drivers willing to work.	A new £80 million electric vehicle battery development facility will be built in Coventry, Warwickshire, aiming to make the UK "a world leader" in electric vehicle battery technology.	Can create jobs in the rail freight delivery sector and within the consolidation centres. However, fewer HGV drivers may be required.
	Overall economy	-2	1	-1
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*	Integrating online delivery will require an innovative approach.	Using low emission LGVs throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city	Fewer HGVs will result in a safer community as HGVs are contributors towards road accidents. Fewer HGVs will improve the image of Coventry.
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	It will reduce exposure, although it is likely to be minimal.	This option will reduce overall exposure along busy routes, which are hotspots in the Coventry urban area.	It will reduce exposure significantly, although it will be in the long run.
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, but impact is likely to be minimal.	Yes, it is likely to reduce NO_2 emissions, significantly	Yes, in the long run.
	Overall strategic and wider air quality fit	1	2	1
(C) Is there a well developed supply side, who have the capacity and capability to	*Who will deliver the solution (LA, external party or both)?*	This will need to delivered mainly by business (who rely on large volumes of delivery)	This solution is likely to be delivered between both CCC and businesses.	CCC can act as programme manager. However, there will be reliance on Network Rail, Freight Operating Companies, road hauliers and technical consultants and contractors to design and deliver the consolidation centres.
	Who will be the lead organisation for the delivery of this option?	CCC can act as programme manager and implement policy change.	Lead organisation is likely to be Coventry to co-ordinate and manage	CCC can act as programme manager and implement policy change.
	Are there capable contractors available to deliver this option?	Yes, there are many delivery companies, hauliers and retailers who can work together to implement. However, co-operation will be difficult to implement.	Yes there are already some businesses using low emission LGVs for delivery.	Yes, there are many delivery companies, hauliers and retailers who can work together to implement. The transport of freight by rail is well developed in the UK.

deliver this option?	*Is there a sufficiently well-developed market to support the efficient delivery of this option?*	Yes, there are many delivery companies, hauliers and retailers who can work together to implement. However, co-operation will be difficult to implement.	Low emission LGVs are already in use in Coventry.	Yes, there are many delivery companies, hauliers and retailers who can work together to implement. The transport of freight by rail is well developed in the UK.
	Overall supply side and capability score	0	2	1
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*	It is relatively cheap option to implement in the short run, however, there may be large negative impacts on business in the long run.	This is a relatively cheap option as the initial cost of LGVs can be outweighed against lower operating costs during the operating life of the bus.	Freight consolidation centres will be expensive to implement and restricting delivery times may impact on business in the long run. However, transporting bulk freight by rail is cheaper in the long run.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	There may be large negative impacts on business in the long run due to lower business as customers may not get products as early as planned.	Lower operating and maintenance costs as low emission LGVs do not require as much petrol/diesel.	Restricting delivery times may impact on business in the long run. Transporting bulk freight by rail is cheaper in the long run.
	How will this option be funded (public, private or a mix of funding sources)?	There could be some funding for business to co-operate, however, private business are likely to foot the bill.	This option is likely to be funded by some public sector funding with private funding from businesses.	Both public and private funding will be required as it is an expensive option.
	Are there any other potential funding sources, for this option?		Businesses funding the LGVs	
	Overall affordability score	1	2	-1
(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*	Co-operation between business may be difficult to obtain as they are in the business of making a profit by providing a good service/product.	Yes, this is already underway in Coventry	Co-operation between business may be difficult to obtain as they are in the business of making a profit by providing a good service/product. Getting delivery slots by rail from exact origin to destination points are difficult due to fixed rail infrastructure.
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?		Potential that there are not enough resources in the market place if there are a significant number of orders around the rest of the UK	
	Is this option based on proven/existing technology?	Certain places around the world do take a more integrated approach, however, a lot of co-operation and government intervention is required.	Yes, this is proven technology and in use throughout the UK	Certain places around the world do take a more integrated approach, however, a lot of co-operation and government intervention is required.
	Overall achievability score	-1	1	-1
(F) What is the overall distributional Impact of this option?	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*		Neutral	
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?	Restriction of delivery times may displace the air quality issue during another time of the day.	No, as it reduces the amount of emissions from buses.	Restriction of delivery times may displace the air quality issue during another time of the day. However, using rail freight will help reduce overall NO_2 emissions.

	Is there a potential to insure some groups against the detrimental impacts of the option?		N/A	
	Does this option have an impact on health inequalities?		Yes, many of the diesel LGVs operate in more deprived parts of Coventry. Hence, low emission buses are likely to improve health inequalities in these parts of Coventry.	
	Overall distributional impact score	0	1	0
(G) Does this option provide value for money	*Do the likely benefits of this option exceed the costs?*	Both benefits and costs in the short run are minimal. However, the impact business in the long run is likely to be negative.	The benefits of this option are likely to be extensive due to improved health and lower vehicle operating costs. The initial capital costs are like to be high, but can be funded by businesses	The costs of developing consolidation centres are likely to large. However, the impact business in the long run is likely to be negative.
	Has the option been designed effectively while maximising benefits?			
	Overall value for money score	-1	1	-1
	Overall Score	-2.00	10.00	-2.00

		P1	P2	P3	P27	P4	P5

CRITICAL SUCCESS FACTORS	CONSIDERATIONS	19 - Improve cycle security	11 - Improve facilities along Coventry Canal to increase canal side walking and cycling activity. 28 - Improve cycling and pedestrian facilities 46 - Improve and increase green space 48 - Improve wayfinding for walking	42 - Develop a strategic cycle network 43 - Implement cycle superhighways within Coventry	28 - Improve cycling and pedestrian facilities 42 - Develop a strategic cycle network 19 - Improve cycle security 20 - Increase cycle hire	20 - Increase cycle hire	6 - Promote and incentivise the use electric cycles for long distance commuting.
		Encourages walking and cycling mode share, hence, reducing vehicle trips	Encourages walking and cycling mode share, hence, reducing vehicle trips	Encourages walking and cycling mode share, hence, reducing vehicle trips	Encourages walking and cycling mode share, hence, reducing vehicle trips	Increasing access to cycles, hence increasing mode share.	Encourages walking and cycling mode share, hence, reducing vehicle trips
(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	*Is this option likely to reduce the annual mean NO2 concentration levels below 40µg/m³?*	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Hence, trying to increase the declining cycling culture via a minor intervention will be difficult. Hence, the positive impact on NO_2 emissions will be minimal.	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Hence, trying to increase the declining cycling culture via a minor intervention will be difficult. Hence, the positive impact on NO_2 emissions will be minimal.	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Trying to increase the declining cycling culture via this major intervention will be more likely than a minor intervention. Success of such schemes can be seen in London.	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Trying to increase the cycling culture via this combined intervention is likely in the shortest possible time due to the broad range of cycling measures. Success of such schemes can be seen in London.	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Trying to increase the declining cycling culture via this major intervention will be more likely than a minor intervention. Success of such schemes can be seen in London.	As a percentage of all the commuter movements in Coventry the cycling mode share in 2011 Census data is only 2.84%. This is a decline from the 1981 percentage of 4.63%. Hence, trying to increase the declining cycling culture via a minor intervention will be difficult. Hence, the positive impact on NO_2 emissions will be minimal. Furthermore, although we are seeing an increase the length of distances travelled by cyclists, the majority of trips are shorter trips i.e. commuting movements within Coventry.

	In which year is compliance achieved?	Unlikely to achieve compliance in the shortest possible time.	Unlikely to achieve compliance in the shortest possible time.	Has the potential to achieve compliance, however, this will be difficult in the shortest possible time as implementing cycling superhighways takes a long time. This can be observed from places like London. However, getting a high mode share is difficult.	Has the potential to achieve compliance in the shortest possible time as a combined option of various cycling and walking measures.	Has the potential to achieve compliance. However, getting the large mode shift from car to cycling is difficult.	Unlikely to achieve compliance in the shortest possible time.
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]	Fails on its own, but can be combined with travel planning measures to make it more effective or possibly as one larger cycling package	No 28. fails on its own, but can be combined with travel planning measures to make it more effective or possibly as one larger cycling package	Fails on its own, but can be combined with travel planning measures to make it more effective or possibly as one larger cycling package			
	Is the option compliant?	FAIL	FAIL	FAIL	PASS	FAIL	FAIL
(A) Does this option improve the overall economy and job prospects, within Coventry?	*Does this option improve the overall economy within Coventry?*	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
	Does this option improve job prospects and create jobs within Coventry?	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work.	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work.	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work.	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work.	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work. The cycle hire scheme will need to manage and maintain, therefore creating some jobs.	Some deprived members of the community may take up employment as cycling may their only affordable method of travel to work.
	Overall economy	0	0	0	0	1	0
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.	Improves accessibility to jobs for a wider community.
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	Can reduce overall exposure, although this is likely to minimal as the increase in cycling will be small.	Can reduce overall exposure, although this is likely to minimal as the increase in cycling will be small.	Can reduce overall exposure.	Can reduce overall exposure.	Can reduce overall exposure.	Can reduce overall exposure.

	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots. Increased physical activity will be a health benefit to the community.
	Overall strategic and wider air quality fit	1	1	2	2	2	1
(C) Is there a well developed supply side, who have the capacity and capability to deliver this option?	*Who will deliver the solution (LA, external party or both)?*	CCC with contractors and engineering consultants to deliver the required infrastructure	CCC with contractors and engineering consultants to deliver the required infrastructure. CCC already have a well-developed cycling infrastructure plan, with costs, to deliver.	CCC with contractors and engineering consultants to deliver the required infrastructure. CCC already have a well-developed cycling infrastructure plan, with costs, to deliver.	CCC with contractors and engineering consultants to deliver the required infrastructure. CCC already have a well-developed cycling infrastructure plan, with costs, to deliver.	CCC with contractors and engineering consultants to deliver the required infrastructure and new cycles	CCC.
	Who will be the lead organisation for the delivery of this option?	CCC	CCC	CCC	CCC	CCC	CCC
	Are there capable contractors available to deliver this option?	Yes	Yes	Yes	Yes	Yes	Yes
	Is there a sufficiently well-developed market to support the efficient delivery of this option?	Yes, as best practices from places like Cambridge can be used.	Yes, as best practices from places like Cambridge can be used.	Yes, as best practices from places like London can be used.	Yes, as best practices from places like London can be used.	Yes, as best practices from places like London can be used.	Yes, plenty of cycle retailers who sell electric cycles.
	Overall supply side and capability score	1	1	1	1	1	2
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*	This option is likely to be expensive in the short run due to the required infrastructure changes and equipment required (to provide free of charge to cyclists)	This option is likely to be expensive in the short run due to the required infrastructure changes.	This option is likely to be very expensive in the short run due to the required infrastructure changes.	This option is likely to be expensive in the short run due to the required infrastructure changes.	This option is likely to be very expensive in the short run due to the required infrastructure changes.	This option is likely to be expensive in the short run as electric cycles may need to be funded or at least part funded.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	Additional cycling infrastructure will incur additional maintenance costs.	Additional cycling infrastructure will incur additional maintenance costs.	Additional cycling infrastructure will incur additional maintenance costs.	Additional cycling infrastructure will incur additional maintenance costs.	Additional cycling infrastructure will incur additional maintenance costs, but can be managed from the revenue generated through the cycle hire.	

	How will this option be funded (public, private or a mix of funding sources)?	Public sector	Public sector	Public sector	Public sector	Public sector	Public sector
	Are there any other potential funding sources, for this option?	Potential sources will need to be investigated.	Potential sources will need to be investigated.	Potential sources will need to be investigated.	Potential sources will need to be investigated.	Potential sources will need to be investigated.	Potential sources will need to be investigated.
	Overall affordability score	-1	-1	-2	-1	1	-1
(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*	Yes, as the new infrastructure and equipment is available easily.	Yes, as the new infrastructure and equipment is available easily.	Yes, as the new infrastructure and equipment is available easily.	Yes, as the new infrastructure and equipment is available easily. CCC already have a well-developed cycling infrastructure plan, with costs, to deliver.	Yes, as the new infrastructure and equipment is available easily. A cycle hire scheme is in development in Coventry and due to open in Summer 2018 and this scheme can be expanded upon.	Yes, plenty of cycle retailers who sell electric cycles.
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?						
	Is this option based on proven/existing technology?	Yes, this is proven equipment and in use throughout the UK	Yes, this is proven equipment and in use throughout the UK	Yes, this is proven equipment and in use throughout the UK	Yes, this is proven equipment and in use throughout the UK	Yes, this is proven equipment and in use in London and will shortly be in use in Coventry.	
	Overall achievability score	1	1	1	1	2	1
(F) What is the overall distributional Impact of this option?	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*	Will make certain jobs and locations accessible to a wider community.	Will make certain jobs and locations accessible to a wider community.	Will make certain jobs and locations accessible to a wider community.	Will make certain jobs and locations accessible to a wider community.	Will make certain jobs and locations accessible to a wider community.	Will make certain jobs and locations accessible to a wider community.
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?	No, it reduces overall emissions.	No, it reduces overall emissions.	No, it reduces overall emissions.	No, it reduces overall emissions.	No, it reduces overall emissions.	No, it reduces overall emissions.
	Is there a potential to insure some groups against the detrimental impacts of the option?						
	Does this option have an impact on health inequalities?	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)

	Overall distributional impact score	1	1	1	1	1	1
(G) Does this option provide value for money	*Do the likely benefits of this option exceed the costs?*	This option is likely to be expensive in the short run due to the required infrastructure changes and equipment required (to provide free of charge to cyclists). Furthermore, the positive impact of this option is likely to be minimal.	This option is likely to be expensive in the short run due to the required infrastructure changes. Furthermore, the positive impact of this option is likely to be minimal.	This option is likely to be expensive in the short run due to the required infrastructure changes.	This option is likely to be expensive in the short run due to the required infrastructure changes. However, it is likely to achieve the mode shift from car trips to reduce NO_2 emissions as well as improve physical health.	This option is likely to be expensive in the short run due to the required infrastructure and cycles. However, revenue generated through the cycle hire could be lucrative, making it profitable.	This option is likely to be expensive in the short run due to the funding required of the cycles. Furthermore, the positive impact of this option is likely to be minimal.
	Has the option been designed effectively while maximising benefits?						
	Overall value for money score	-2	-2	-1	1	1	-2
	Overall Score	1.00	1.00	2.00	5.00	9.00	2.00

		P8	P9	P10	P11
CRITICAL SUCCESS FACTORS	CONSIDERATIONS	1 - Develop and implement priority lanes	3 - Improve public transport connectivity to the Ricoh Arena 4 - A more frequent and better-quality bus service along key routes.	9 - Implement measures to significantly reduce traffic on certain roads (routes), including infrastructure changes. 21 - Capture and use data to influence route choice.	29 - Implement more Park and Ride 47 - Increase parking charges
		Targets car trips along hotspots	Reduces car trips along hotspots by improving bus transport	Reduces car trips along hotspots by removing traffic	Targets car trips along hotspots

(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3?	This option can impact positively as some people will start sharing cars, therefore, reducing car trips along hotspots. However, many may choose a different route and displace the problem elsewhere. Bus operators and private car owners are likely to start using LEV to use the priority lanes and improve journey times.	Rugby team Wasps play their 12 home games at the Ricoh with an average attendance of 19,530 and League One football team Coventry City play their 23 home games with an average attendance of 9,118. Majority will travel by car as the train service to the Ricoh is not extensive. However, this is proving to be difficult at the moment as the line is diesel only and there is a shortage of available diesel rolling stock in the market. The line is due to be electrified as part of the electric spine scheme (which is experiencing delays at the moment due to lack of funding). The 2011 Census data showed that a majority of the commuter movements in Coventry (approx. 55%) is by car and only 11% is by bus, minibus or coach. Hence, improvements to reduce car trips and increase bus trips can have significant impact.	Although, this is likely to reduce issues at certain times in the hotspot areas it will only displace the issue elsewhere.	This option can impact positively as some people will start using the park and ride, therefore, reducing car trips along hotspots.
	In which year is compliance achieved?	This option is unlikely to achieve NO_2 emission targets in the shortest possible time as planning and implement priority in the issue areas will be difficult as these routes are heavily constrained physically.	Although, we are unlikely to increase rail service to the Ricoh Arena in the shortest possible time, it will be possible to make improvements to bus service to reduce car trips and increase mode share.	Making certain routes traffic free will be difficult to implement in the shortest possible time. This may be the only option on Holyhead Road.	This option is unlikely to achieve the required reductions in NO_2 emissions in the shortest possible time as the current availability of park and ride facility is minimal and the potential to grow this is minimal. Increasing parking charges in the timeframe, politically, would be difficult and the potential impact on the leisure offer.
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]			This may be the only option on Holyhead Road.	
	Is the option compliant?	FAIL	PASS	PASS	FAIL
(A) Does this option improve the overall	Does this option improve the overall economy within Coventry?	Unlikely to improve the economy as many users of the road are likely to experience longer journey time due to reduced road space for a majority. Although, who are able to use the priority lanes will see improved journey times.	Yes, improving public transport frequency can allow more people to access jobs in Coventry, which they were not able to otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.	Unlikely to improve the economy as many users of the road are likely to experience longer journey time due to the restrictions and re-routing.	

economy and job prospects, within Coventry?	Does this option improve job prospects and create jobs within Coventry?	Neutral		Neutral	Yes, implementing park and ride can allow more people to access jobs in Coventry, which they were not able to otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.
	Overall economy	-1	1	-1	1
(B) How does this option align with and support the strategic and wider air quality fit?	Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community	Developing priority lanes can seen as innovative by other local authorities.	Improves accessibility to jobs for a wider community.	Implementing traffic free routes and using data and technology can be seen as innovative by other local authorities. Can improve safety in the traffic roads but issues elsewhere.	Improves accessibility to jobs for a wider community. Developing park and ride can be seen as innovative by other local authorities.
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	Although, this option may reduce overall emission slightly due to increased car sharing and uptake of LEV and travel on public transport etc. It is more likely to displace the issue elsewhere (as many car users will re-route) and increased congestion due to reduced road space	This can significantly impact overall exposure, in a positive way, due to the large number of existing car trips along the hotspots.	This option is more likely to displace the issue elsewhere (as many car users will re-route) and increased congestion due to reduced road space for use at certain times.	This can significantly impact overall exposure, in a positive way, due to the large number of existing car trips along the hotspots.
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, slightly in hotspot areas. But can make it worse elsewhere due to displacement.	Yes, reducing NO_2 exposure is beneficial to health and reducing these car trips is likely to alleviate the pressure on some the hotspots.	Yes, slightly in hotspot areas. But can make it worse elsewhere due to displacement.	Yes, reducing NO_2 exposure is beneficial to health and reducing these commuter movements is likely to alleviate the pressure on some the hotspots.
	Overall strategic and wider air quality fit	-1	2	-1	1
(C) Is there a well developed supply side, who have the capacity and capability to deliver this option?	Who will deliver the solution (LA, external party or both)?	CCC with contractors and engineering consultants delivery the required infrastructure	CCC with co-operation from bus operators.	CCC with contractors and engineering consultants delivery the required infrastructure	CCC with contractors and engineering consultants delivery the required infrastructure. Liaison with bus operators and car park owners will be required.
	Who will be the lead organisation for the delivery of this option?	CCC	CCC	CCC	CCC
	Are there capable contractors available to deliver this option?	Yes	Yes, as not much new infrastructure is required. Many of the changes required include timetabling changes etc.	Yes	Yes

	Is there a sufficiently well developed market to support the efficient delivery of this option?	Yes, currently it is in practice in other cities.	Yes	Yes, as best practices from places like Barcelona can be used.	Yes, as best practices from other places across the UK such as Cambridge. It is already in place in Coventry.
	Overall supply side and capability score	1	1	1	1
(D) Is this option affordable both in the short and long run?	How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.	This option is likely to be relatively cheap.	This is relatively cheap option as no new infrastructure is required, but additional LEV buses will be required.	This is relatively cheap option as no new infrastructure is required, but funding for data capture and app development will be required.	This option is likely to be expensive in the short run due to the required infrastructure to implement park and ride.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	Additional operating and maintenance costs is likely to be minimal due to some new road infrastructure.	Long run operating costs can be met by additional public transport revenue. Fewer car trips can result in less maintenance on the road network.	Additional operating and maintenance costs is likely to be minimal due to some new road infrastructure.	Long run operating costs can be met by additional public transport revenue. Fewer car trips can result in less maintenance on the road network.
	How will this option be funded (public, private or a mix of funding sources)?	Public funding	Public funding to implement the changes with revenue to cover longer term operating costs.	Public funding	Public funding to implement the changes with revenue to cover longer term operating costs.
	Are there any other potential funding sources, for this option?	Unlikely		Unlikely	Bus operators can match fund.
	Overall affordability score	1	1	1	1
(E) How achievable is this option given the existing market limitations and constraints?	Can this option be delivered at a local scale?	Unlikely due to the lack of road space and constrained infrastructure and the political will.	Yes, but will require liaison with bus and train operators and Network Rail.	Unlikely due to the lack of road space and constrained infrastructure.	Not likely to be achievable in the required timescales due to the lack of potential for park and ride growth and political support for parking charge increases.
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?		Running additional services on the rail network may be restricted due to lack diesel trains in the marketplace.		
	Is this option based on proven/existing technology?	Yes, currently it is in practice in other cities.	N/A	Yes, currently it is in practice in Barcelona.	Yes, currently it is in practice across the UK.
	Overall achievability score	-2	1	-2	-2
(F) What is the overall distributional Impact of this option?	Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?	People who are unable to car share due to their origin/destination points or buy LEV may experience journey times. However, public transport may become better as a result.	Will make certain jobs and locations accessible to a wider community (specifically the deprived as public transport is cheaper than private car)		Will make certain jobs and locations accessible to a wider community.
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?	Very likely to displace the air quality elsewhere.	No, it reduces overall emissions.	Very likely to displace the air quality elsewhere. (poorer areas)	No, it reduces overall emissions.

	Is there a potential to insure some groups against the detrimental impacts of the option?				
	Does this option have an impact on health inequalities?	May improve health inequalities in hotspot areas, but will impact on health inequalities, negatively, elsewhere due to displacement.	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)	May improve health inequalities in hotspot areas, but will impact on health inequalities, negatively, elsewhere due to displacement.	Yes, can improve due to fewer car trips in the hotspots areas (which are more deprived)
	Overall distributional impact score	0	2	-2	2
(G) Does this option provide value for money	Do the likely benefits of this option exceed the costs?	Relatively cheap to implement and the benefits may not be as high. Furthermore, many are likely to experience increased journey times, hence negatively impacting the economy.	Cheap solution to implement and bus revenue will be generated.	Cheap solution to implement but the benefits are likely to be minimal. It could raise issues elsewhere.	Costs to implement is relatively cheap and generates revenue. Also need for centre city centre parking may not be required any longer. However, potential impact on the leisure offer is likely to be negative.
	Has the option been designed effectively while maximising benefits?				
	Overall value for money score	-2	2	-1	-1
	Overall Score	-4.00	10.00	-5.00	3.00

		P6	P7	P14	P15	P18
CRITICAL SUCCESS FACTORS	CONSIDERATIONS	27 - MaaS (Mobility as a Service) 35 - Integrated PT ticketing and cross border ticketing	12 - Enhance the CCC marketing and campaign strategy. 22 - Public display of air quality data, issues and impacts.	38 - Work with employers to improve their travel plans 39 - Develop and provide a mobile application to improve travel planning (early MaaS) 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change 18 - Promote and implement measures to increase car sharing 15 - Implement measures to increase office sharing to increase car sharing 48 - Improve wayfinding for walking	40 - Work with schools to improve their travel plans 45 - Provide driver behaviour training 17 - Promote and increase the use of car clubs and car hire schemes 7 - Implement measures to incentivise behaviour change	8 - Take a more strategic approach to road improvements 37 - Install and update traffic control systems using more intelligent programming 50 - Implement better traffic management measures at issue roads (routes)
		Increase public transport patronage	Marketing and campaigning	Targets driver behaviour for business	Targets driver behaviour for schools	Targets journey efficiency
(PRIMARY) Compliance (Meeting the NO_2 Levels in the shortest possible time)	*Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3?*	This option can impact positively as the option is likely to increase public transport patronage and reduce mode share from the car.	This option is likely to have a positive impact; however, the impact is likely to be minimal as soft measures rely upon behaviour change.	This package is made up of a number of ideas targeting behaviour change and increasing more sustainable transport modes. As a package this is likely to be effective in reducing NO_2 emissions by targeting business activity and commuters.	This package is made up of a number of ideas targeting behaviour change and increasing more sustainable transport modes. As a package this is likely to be effective in reducing NO_2 emissions by targeting travel to and from schools.	Using SCOOT traffic systems is part of the early measures work and it is anticipated that this type of technology can reduce NO_2 emissions, which result from inefficient journeys. Take a more strategic road works can result in more efficient journeys throughout and fewer construction traffic.

	In which year is compliance achieved?	However, this option is unlikely to achieve NO_2 emission targets in the shortest possible time as planning and implementing MaaS and more integrating ticketing is gradual and requires large investment into infrastructure and technology.	For this option to work, co-operation and behaviour change from the community is required. However, this is likely to be slow and minimal.	As the package includes a number of options, it is likely to have sufficient impact to reduce the NO_2 emissions below the threshold levels.	As the package includes a number of options, it is likely to have sufficient impact to reduce the NO_2 emissions below the threshold levels. However, the potential is smaller than it is for commuter and business activity.	
	Is this option likely to reduce the annual mean NO_2 concentration levels below 40µg/m^3, if combined with another option? [Answer to this question should not be used for the pass/fail scoring]	Option No. 35 should be combined with P9. Combine Option No. 27 into Option No.39	Option No. 12 is a supporting strategy for all successful packages.			
	Is the option compliant?	FAIL	FAIL	PASS	PASS	PASS
(A) Does this option improve the overall economy and job prospects, within Coventry?	*Does this option improve the overall economy within Coventry?*	Yes, improving public transport connectivity can allow more people to access jobs in Coventry, which they were not able to, otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.	Neutral	Yes, promoting and incentivising sustainable transport modes and providing additional resources and training to the community can allow more people to access jobs in Coventry, which they were not able to, otherwise. Hence, improving the economy by attracting a higher and more skilled labour pool.	Yes, promoting and incentivising sustainable transport modes and providing additional resources and training to the community can allow more people to access jobs and better education in Coventry, which they were not able to, otherwise.	This option has the potential to reduce journey times and congestion. This will impact positively to the local economy as people can be more productive.
	Does this option improve job prospects and create jobs within Coventry?		Neutral			
	Overall economy	1	0	1	1	1
(B) How does this option align with and support the strategic and wider air quality fit?	*Does this option fit and or compliment other existing, Council wide, planned policies, particularly within the Local Plan? Including: - public realm, accessibility, culture, innovation and safer community*	Implementing MaaS and integrated ticketing throughout Coventry, will portray Coventry as an innovative city and give a clean and green image of the city. It will improve accessibly for some members of the community.	Can use the marketing and campaigning to send out strong messages about policies and improve the image of Coventry.	Implementing all of these measures, will portray Coventry as an innovative city and give a clean and green image of the city. It will improve accessibly for some members of the community.	Implementing all of these measures, will portray Coventry as an innovative city and give a clean and green image of the city. It will improve accessibly for some members of the community.	Implementing this option, will portray Coventry as an innovative city and give a clean and green image of the city.
	How does this option affect overall exposure and to what extent does it reduce overall exposure?	This option will reduce overall exposure, if there is an increase in mode share for public transport.	Can have a small positive impact.	This option will reduce overall exposure, if there is an decrease in car trips.	This option will reduce overall exposure, if there is an decrease in car trips.	This option will reduce overall exposure, due to more efficient journeys.
	Does it improve health and wellbeing of residents and visitors, by reducing NO_2 emissions?	Yes, it is likely to reduce NO_2 emissions, significantly	Can have a small positive impact.	Yes, it is likely to reduce NO_2 emissions, significantly	Yes, it is likely to reduce NO_2 emissions, significantly	Yes, it is likely to reduce NO_2 emissions.

	Overall strategic and wider air quality fit	2	1	1	1	1
(C) Is there a well-developed supply side, who have the capacity and capability to deliver this option?	*Who will deliver the solution (LA, external party or both)?*	CCC with co-operation from bus operators, train operators, other local authorities and Network Rail.	CCC with the help of marketing organisations.	CCC in liaison with local business and possibly DVLA for driver training.	CCC in liaison with schools and possibly DVLA for driver training.	CCC with contractors and engineering consultants delivery the required traffic infrastructure
	Who will be the lead organisation for the delivery of this option?	CCC	CCC	CCC	CCC	CCC
	Are there capable contractors available to deliver this option?	MaaS is in research and trial phase at the moment and is a while before it becomes common practice.	Not much additional infrastructure is required and currently Coventry already collect air quality data.	Yes	Yes	Yes
	Is there a sufficiently well-developed market to support the efficient delivery of this option?	Not yet to deliver MaaS	N/A	Yes, this type of campaigning and travel planning activity is currently undertaken by some business in Coventry.	Yes, this type of campaigning and travel planning activity is currently undertaken by some business in Coventry.	Yes, currently SCOOT is in practice in other cities and can be delivered effectively.
	Overall supply side and capability score	-2	1	1	1	1
(D) Is this option affordable both in the short and long run?	*How affordable is this option in the short run taking account of capital costs? I.e. JAQU would prefer cheaper options over more expensive solutions.*	This will require large scale infrastructure and technology investment.	Well-developed and effective marketing and campaigning can be costly.	Relatively cheap option to implement as it is policy and behaviour change, largely. However, additional capital will be required to provide driver training and develop travel planning module application.	Relatively cheap option to implement as it is policy and behaviour change, largely. However, additional capital will be required to provide driver training.	This option is likely to be expensive in the short run due to the required infrastructure and traffic equipment.
	What is the affordability of this option in the long run taking account of operating and maintenance costs?	Operation and maintenance costs will increase to manage the infrastructure and the technology. However, additional revenue from increased public transport usage may compensate.				Long run additional operating costs and maintenance costs due to the additional equipment.
	How will this option be funded (public, private or a mix of funding sources)?	This will require public funding with some possibility of funding from Network Rail, other local authorities and bus and train operators.	Public sector	Public sector funding with possible support from local business.	Public sector funding with possible support from local schools.	Public funding
	Are there any other potential funding sources, for this option?					
	Overall affordability score	-2	-1	1	1	-1

(E) How achievable is this option given the existing market limitations and constraints?	*Can this option be delivered at a local scale?*	This requires co-operation between local authorities, bus and train operators, Network Rail and possibly national Government to be delivered effectively.	Can largely be delivered by CCC with possible assistance from marketing agencies.	Yes, with the help of local business.	Yes, with the help of local schools.	Yes, with the help of technical consultants and contractors to deliver the infrastructure
	Given the market limitations, are there adequate resources available to manage and implement such a solution successfully?	Not yet to deliver MaaS		Yes, sufficient level of expertise exist within CCC and local businesses.	Yes, sufficient level of expertise exist within CCC and local schools.	This type of infrastructure is common and readily available.
	Is this option based on proven/existing technology?	Integrating ticket is common place, such as the London Oyster card. However, MaaS is in research and development phase.		Yes, good travel planning, driver training and behaviour change campaigns are common practice	Yes, good travel planning, driver training and behaviour change campaigns are common practice	
	Overall achievability score	-2	1	1	1	1
(F) What is the overall distributional Impact of this option?	*Does this option significantly affect one or more of particular groups of stakeholders, particularly vulnerable groups?*	Will make certain jobs and locations accessible to a wider community (specifically the deprived as public transport is cheaper than private car)				
	Does the option displace the air quality issues elsewhere, and particularly impact deprived areas and communities?	No, it reduces overall emissions.		No, it reduces overall emissions.	No, it reduces overall emissions.	No, it reduces overall emissions.
	Is there a potential to insure some groups against the detrimental impacts of the option?					
	Does this option have an impact on health inequalities?	Yes, can improve due to fewer car trips.	Yes, can improve due to fewer car trips along hotspot areas as well as behaviour change	Yes, can improve due to fewer car trips.	Yes, can improve due to fewer car trips.	Yes, will improve due to lower emissions overall
	Overall distributional impact score	2	1	1	1	1
(G) Does this option provide value for money	*Do the likely benefits of this option exceed the costs?*	Costs to implement are high and uptake is likely to be slow.	The benefits of the scheme are likely to be minimal.	Relatively cheap option with potential for a good amount of benefits.	Relatively cheap option with potential for a good amount of benefits.	Although, the required infrastructure may be expensive, this option is likely to provide good value for money, due to reduced congestion and NO_2 emissions.
	Has the option been designed effectively while maximising benefits?					
	Overall value for money score	-2	-2	2	1	2
	Overall Score	-3.00	1.00	8.00	7.00	6.00

Appendix I. Socio-Demographic Mapping

The figures in this Appendix map each of the key impact groups identified in the JAQU Options Appraisal guidance for the study area, showing their location in relation to the proposed Clean Air Zone D boundary. Each of the indicators, over 65 years old, under 16 years old, income deprivation, ethnicity, LGV proportions and SME proportions are ranked into quintiles nationally dependent on the proportion of the population of that group within the LSOA or MSOA. This then shows which areas have high proportions of these indicators within them. Quintile 1 will have the highest proportion of the respective vulnerable group because it will sit within the highest 20% nationally of that proportion of vulnerable group. The following maps show the make-up of the area, where there are high proportions of any specific groups and where they are in relation to the proposed Clean Air Zone. This highlights any specific areas where there may be a high proportion of more than one vulnerable group and helps inform the assessment and appraisal.

Figure 21 - Quintiles showing the proportion of population over 65 by LSOA and location of CAZ D

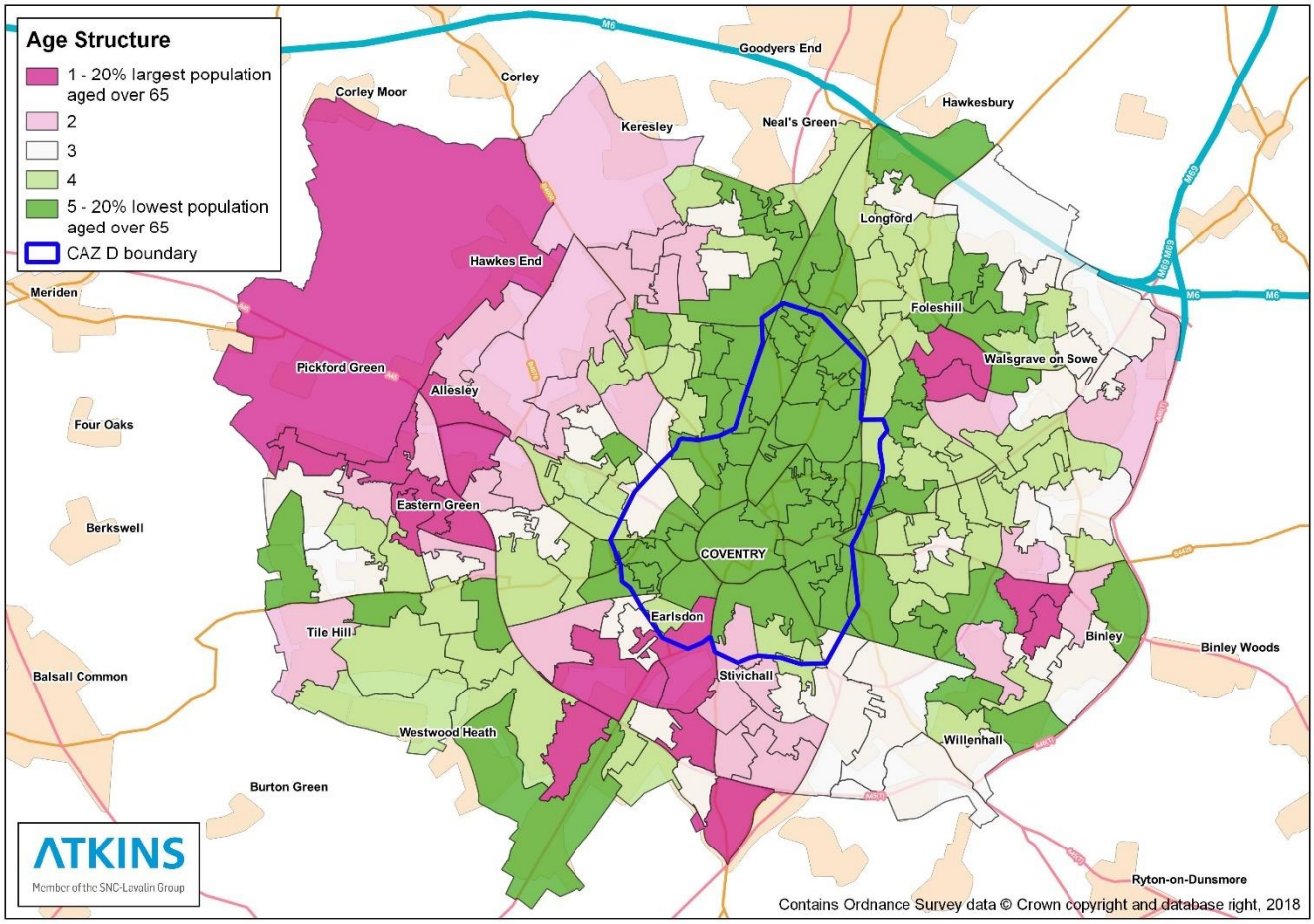


Figure 21 shows that there is a low proportion of elderly people living within the CAZ boundary. However, there is an area with the 20% highest proportion of elderly people in England and Wales to the north-west of the CAZ. Elderly people living in this area may travel to the centre of Coventry to access amenities, such as retail centres.

Figure 22 - Quintiles showing the proportion of population under 16 by LSOA and location of CAZ D

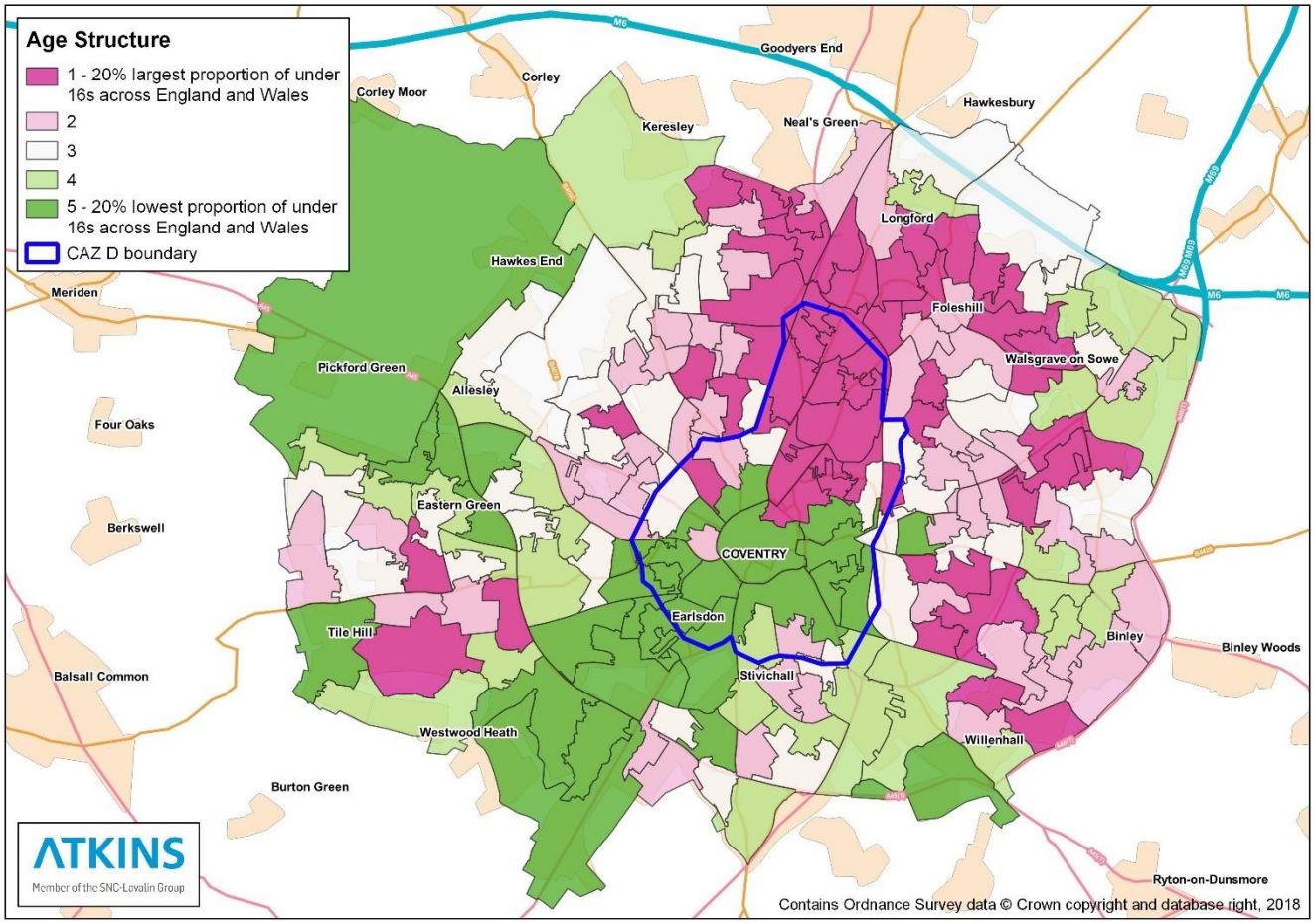
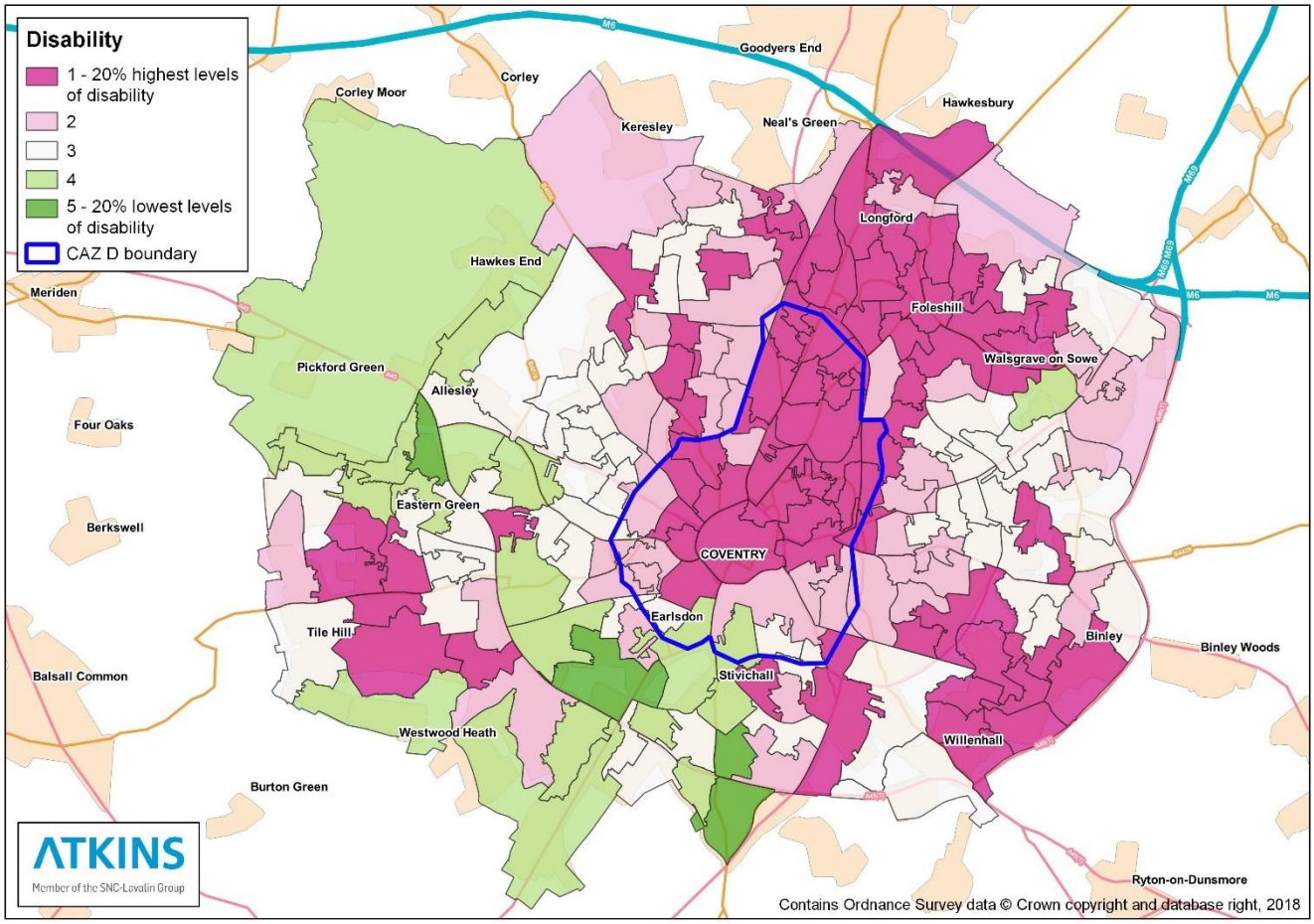


Figure 22 shows that there is an area with the highest 20% proportion of children for England and Wales to the north of Coventry city centre, both within and outside of the CAZ. These children may travel within the CAZ to access schools and other amenities.

Figure 23 **-** Proportion of population unable to work through ill health by LSOA and location of CAZ D



There is a high proportion of people who are unable to work through ill health or a disability living within the CAZ boundary, as shown in Figure 23. This vulnerable group may need regular access to hospitals and health centres in the city.

Figure 24 **-** Quintiles showing the proportion of non-white residents by MSOA and location of CAZ D

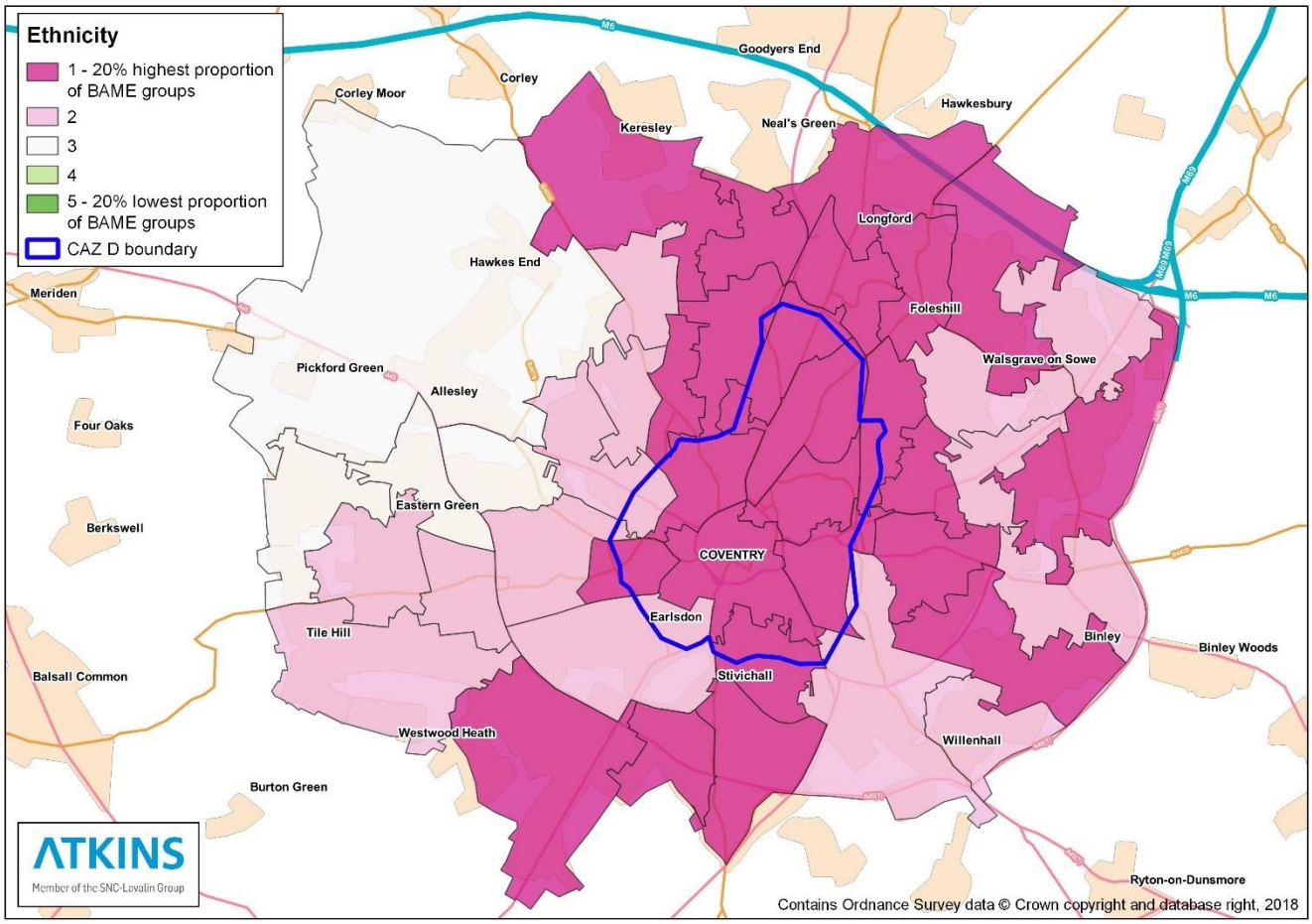
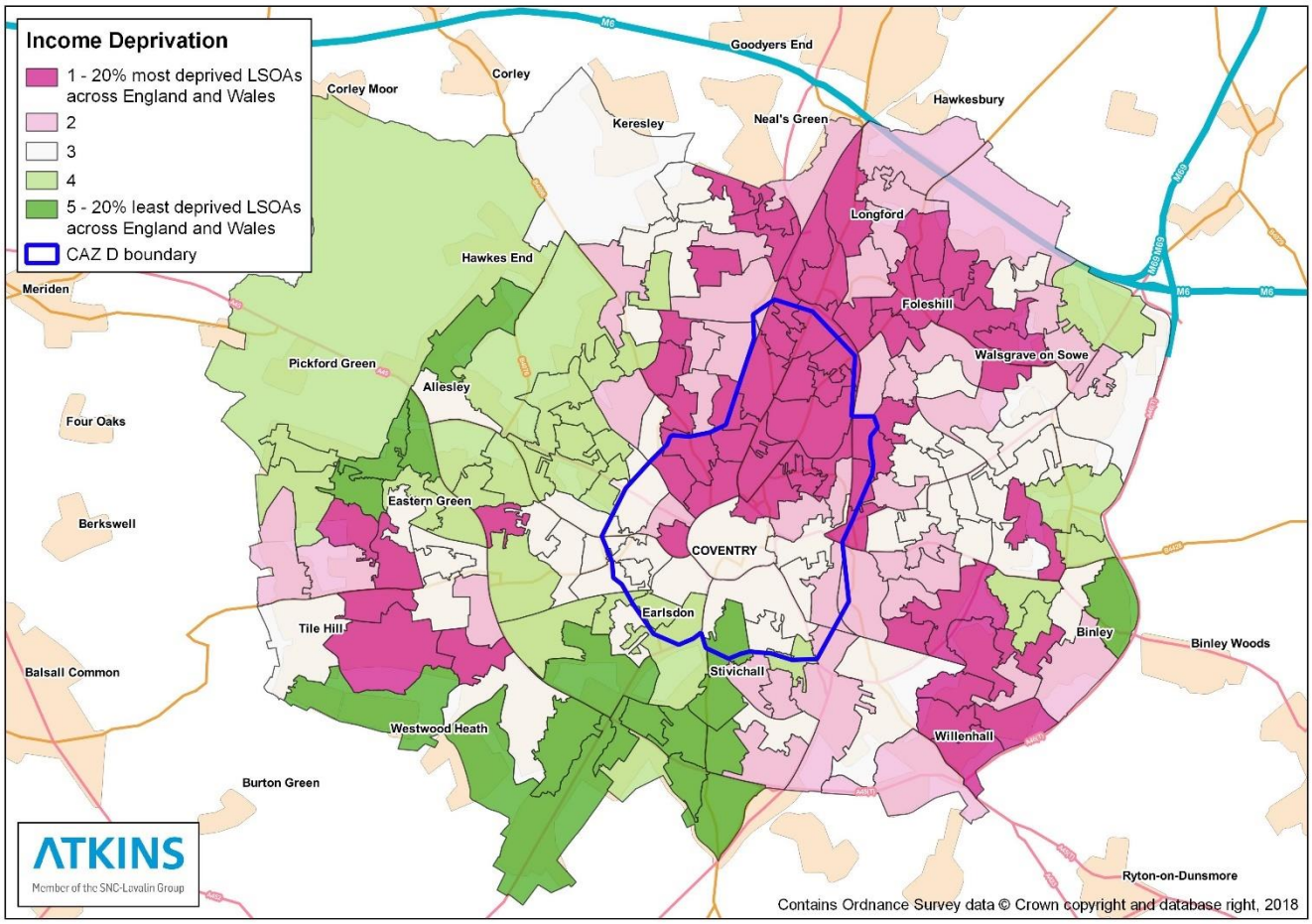


Figure 24 shows that there is a higher than average proportion of BME for all MSOAs within the CAZ. Care should be taken when looking at impacts of the scheme to this vulnerable group, due to the high proportions both within and surrounding the CAZ boundary.

Figure 25 **-** Quintiles showing the proportion of income deprivation by LSOA and location of CAZ D



There is an area with the highest 20% proportion of income deprived households within the Clean Air Zone, as shown in Figure 25. Income deprived residents are more likely to own older cars, which are more likely to be non-compliant. Hence, impacts of the scheme to this vulnerable group will require consideration. Figure 13 shows the distribution of income deprivation across Coventry.

Figure 26 **-** Quintiles showing the proportion of income deprivation within Coventry by LSOA

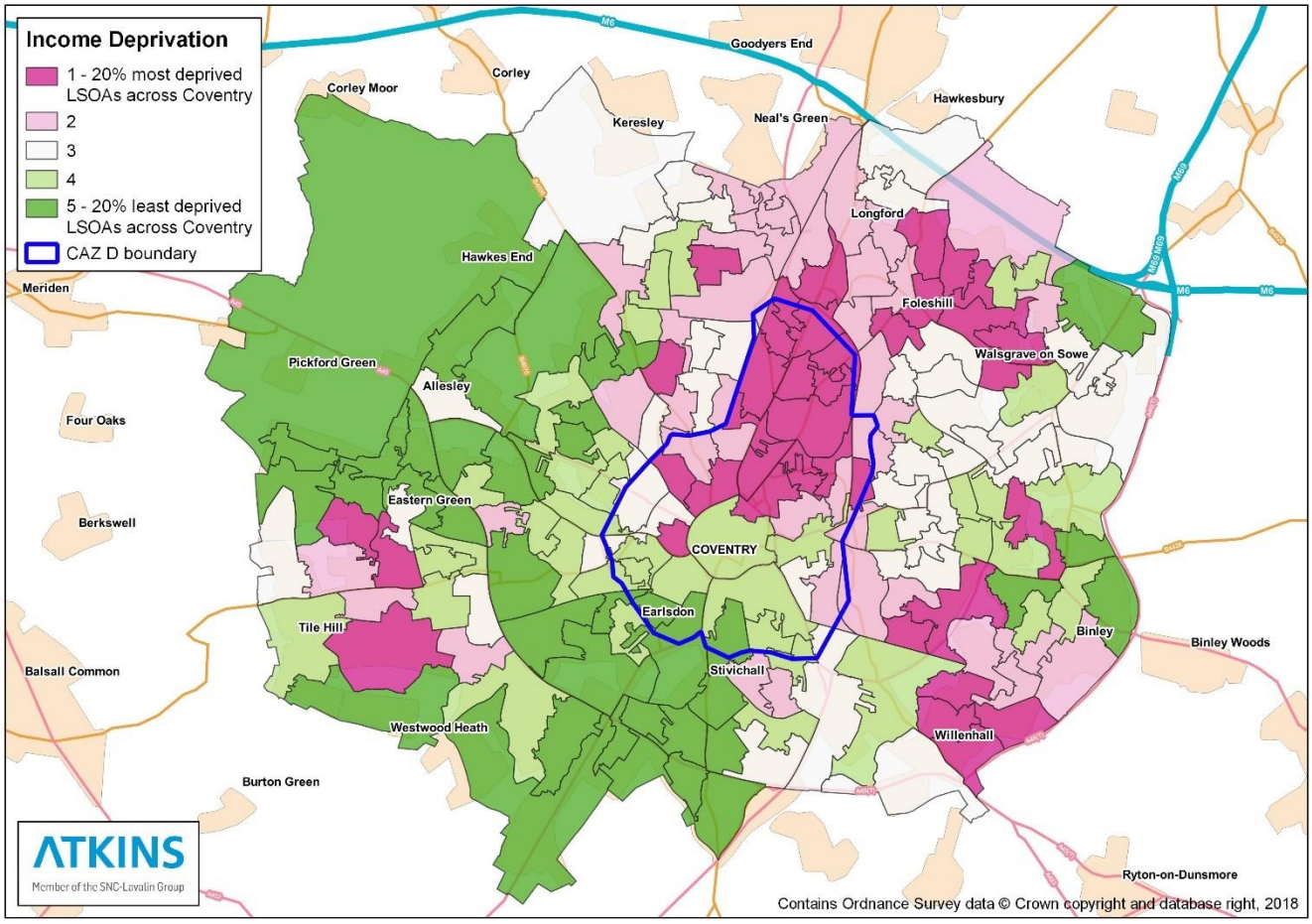


Figure 27 **-** Quintiles showing the distribution of LGVs within the study area by LSOA

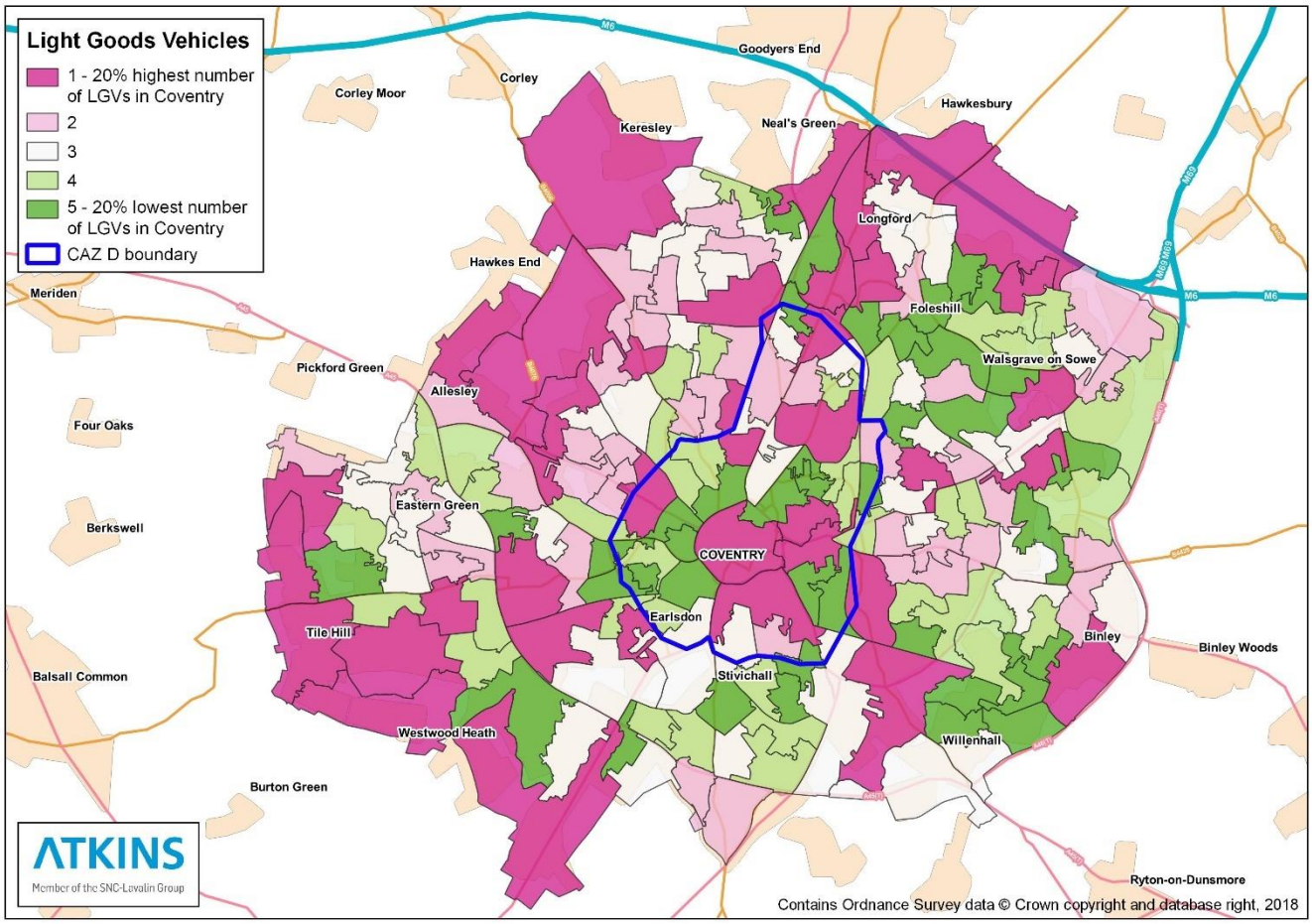
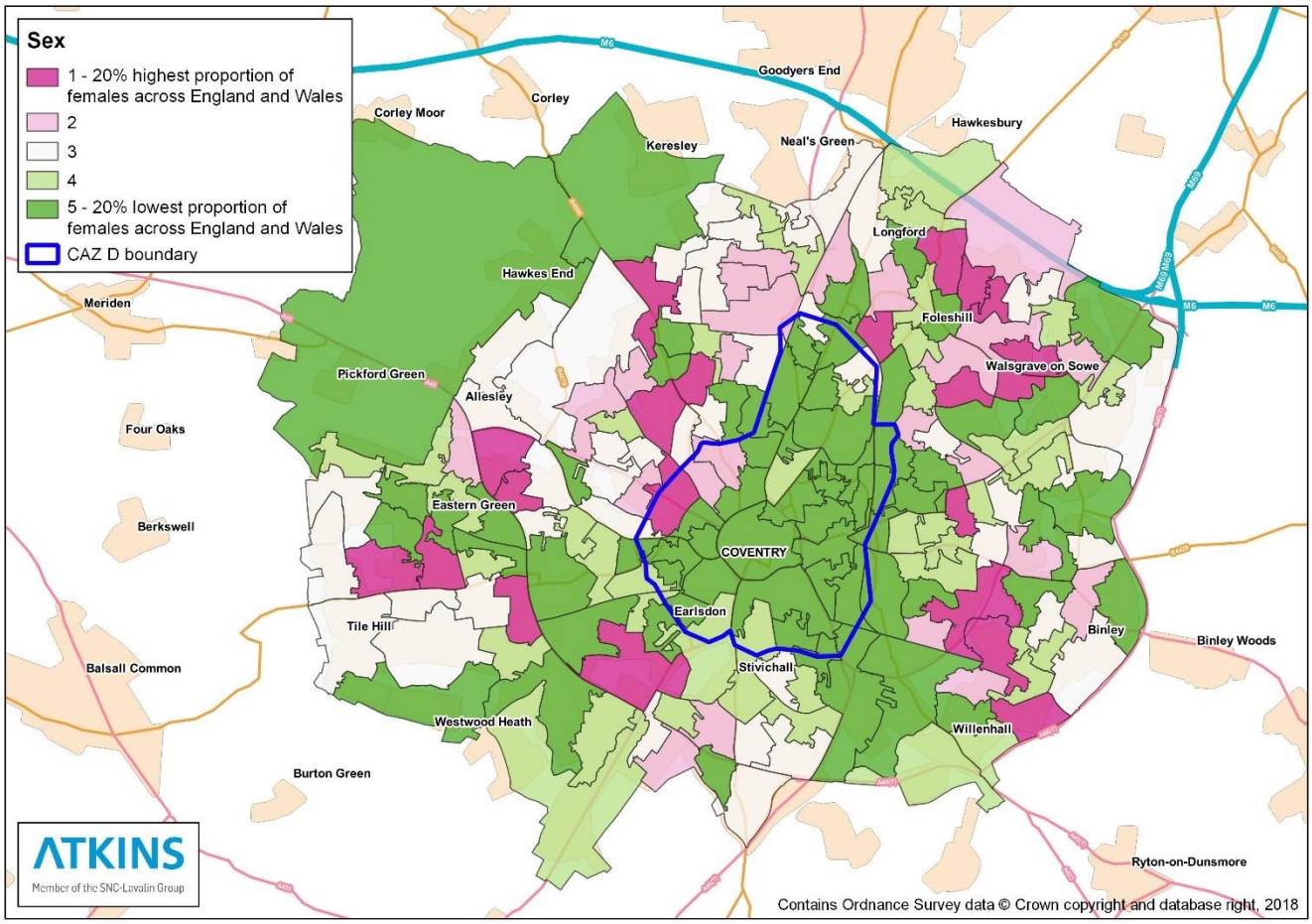


Figure 27 shows that the areas with the highest numbers of LGVs registered in Coventry are both within and just outside the CAZ. These vehicles could travel within the CAZ boundary for business purposes, although some of these LGVs may be registered to these locations but be in use elsewhere.

Figure 28 - Quintiles showing the proportion of females for England and Wales by LSOA



There are low proportions of females within the CAZ boundary, compared to that of England and Wales. However, there are some LSOAs around the edge of the CAZ with the highest 20% proportion of females in England and Wales, as shown in Figure 28.

Figure 29 **-** Quintiles showing the distribution of micro, small and medium businesses within Coventry

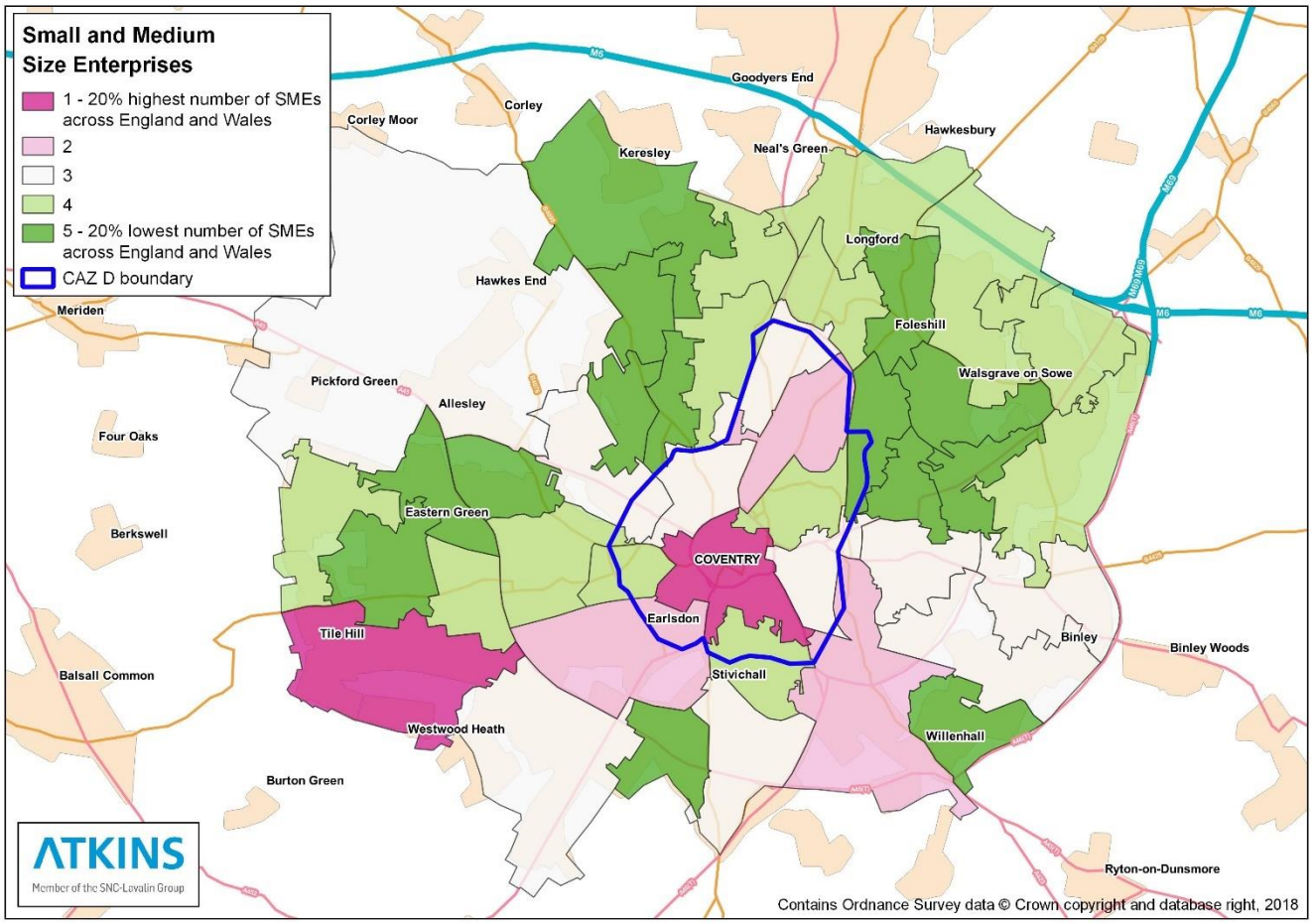


Figure 29 shows that the areas with the highest number of SMEs within the study area that are located both in the centre of Coventry and outside of the CAZ in more rural areas.