Worcester City Council

Air Quality Action Plan

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

2024 - 2029

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Report Reference Number	WCC AQAP 2024-29 Final
Date	November 2024

Executive Summary

This Air Quality Action Plan (AQAP) has been produced as part of the Council's statutory duties required by the Local Air Quality Management (LAQM) framework. It outlines the action the Council will take to improve air quality in Worcester City between 2024 and 2029.

This action plan has been produced following declaration of the Worcester City Air Quality Management Area (Worcester City (Political Boundary)) in 2019.

The AQMA has been declared due to exceedances of the annual mean objective (40 $\mu g/m^3$) for nitrogen dioxide (NO_2), attributable to road traffic, under terms of the Environment Act 1995. Therefore, measures contained within this plan focus on reducing emissions from sources of nitrogen dioxide pollution. However, it is anticipated that actions taken to reduce NO_2 concentrations across Worcester City will likely result in a linked improvement in other pollutants such as particulate matter.

This Action Plan replaces the Worcester City elements of the previous countywide plan: 'Worcestershire Air Quality Action Plan' (2013).

Significant projects delivered through past actions include:

- **Major signalling infrastructure updates** to improve congestion and manage traffic flows in a number of city locations.
- **Variable Message Signage (VMS)** utilised to deter unnecessary trips through City Centre.
- **Update and implementation of an existing Traffic Regulation Order (TRO)** restricting non-permitted vehicles and reducing traffic flows through Lowesmoor.
- **Technical Guidance Note for Planning produced** to encourage good practice and implementation of standard mitigation measures.
- **Successful bid to Defra Air Quality Grant scheme** 2022-23 for purchase and installation of 10 low-cost real time sensors to provide enhanced monitoring network.

- **Making Air Quality information more accessible.** LAQM reports published, interactive AQMA maps and advice to publicly available on website.
- **New Worcestershire Parkway Station** opened on 23rd February 2020, located southeast of the city will remove existing regional and national car journeys from the strategic road network, thereby reducing local road traffic congestion.
- **Southern Link Road (SLR) A4440 improvements** anticipated to provide an increase in journey time reliability and reduction in congestion on a major route linking Worcester to the strategic road network.
- **Changed the fee for fully electric taxis and private hire vehicles** for 2023 to 2025 to incentivise take up of low emission vehicles within the local taxi fleet.
- **A new walking and cycling bridge** across the River Severn in Worcester from Gheluvelt Park to the Kepax site in St John's is due for completion in late 2024.
- **Installation of Electric Vehicle (EV) charge points at more locations**, including 10 dual chargers within King Street and Tallow Hill car parks.
- **Additional active travel paths** and upgraded routes alongside the River Severn to connect to Diglis and linking through Duck Brook to Cherry Orchard

Monitoring of local air pollution carried out across Worcester City indicate concentrations of nitrogen dioxide have generally decreased over the last 25 years, in common with national trends.

Analysis of the impact of local actions to improve air quality since the declaration of the AQMA, was significantly disrupted during the COVID-19 pandemic due to restrictions affecting travel patterns and behaviours, significantly reducing concentrations in 2020-21. This also delayed required work to progress this AQAP during that period.

The most recent Annual Status Report (ASR 2024) however identified that concentrations in 2022-23 had returned to pre-pandemic levels indicating the AQMA should remain, and an AQAP is required. This is likely to have been caused by the

increase in traffic following the cessation of COVID-19 regulations and restrictions in March 2022.

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

In 2018, Public Health England (PHE) estimated that the total cost to the NHS and social care due to NO_2 for where there is robust evidence for an association, is estimated to be £60.8 million by 2025, and £230 million by 2035. This increases to £2.7billion and £9.2billion respectively when diseases with less robust evidence are included[3].

Vehicles are the largest contributor to NO_2 pollution at local roadsides, contributing 80% of the total (on average). This means higher levels of NO_2 are typically focused in high traffic areas within city centres (such as Worcester). Targeted local action, in addition to a national strategy, is therefore a key part of the solution to tackling NO_2 levels in the UK[4].

Worcester City Council is committed to reducing the exposure of people in Worcester City to poor air quality in order to improve health.

Worcester City Council, in collaboration with air quality partner(s) Worcestershire County Council (WCC), have developed actions that can be considered under seven broad topics:

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[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010

[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, 2018

[4] UK plan for tackling roadside nitrogen dioxide concentrations, 2017

- Freight and delivery management
- Policy guidance and development control
- Promoting low emission transport
- Promoting travel alternatives
- Public information
- Transport planning and infrastructure
- Traffic management

Worcester City Council's priorities are:

- Priority 1 - Reducing Emissions from Transport
- Priority 2 - Public Health and Well-being
- Priority 3 – Sustainable Travel and Transport
- Priority 4 – Planning for Future Development

Proposed actions are:

- Installation of public EV charging points
- Provision of Local Electric Vehicle Infrastructure (LEVI) for residential off-street parking
- Developing the Worcestershire EV Charging Strategy to support LEVI
- Producing an Air Quality Supplementary Planning Document (SPD)
- Improving directional signage for Heavy Goods Vehicles (HGV)
- Funding of a Behavioural Change Officer post
- Encouraging awareness of air quality via public access to real time monitoring data
- Encouraging awareness and behavioural change interventions linked to focussed real time monitoring data
- Introducing a bike hire and bike share scheme
- Improvements to the local bus fleet and services

- Promotion of sustainable Travel Choice measures
- Provide online Active Travel Guides for Business
- Raising awareness of air pollution and positive actions through annual events
- Formation of a countywide Air Quality Strategy Communications Plan
- Developing and implementation of a Local Cycling and Walking Infrastructure Plan (LCWIP)
- Encourage and support sustainable modes of transport to schools and ModeSHIFT star accreditation
- Upgrade the Worcester City Refuse Collection Vehicles (RCV) fleet
- Provide additional cycle parking and storage
- Improve and upgrade bus stop infrastructure (shelters)
- Remove city centre HGV parking
- Introduce anti-idling awareness for taxi drivers

In this AQAP, Worcester City Council outline the plan to effectively tackle air quality issues within the council's control. However, it is recognised that there are a large number of air quality policy areas that are outside of the local authority's (LA) influence (such as vehicle emissions standards agreed in Europe), but for which the LA may have useful evidence, and so the council will continue to work with regional and central government on policies and issues beyond Worcester City Council's direct influence.

Responsibilities and Commitment

This AQAP has been prepared by Worcestershire Regulatory Services (WRS) for Worcester City Council. WRS is a shared service formed from the Environmental Health and Licensing departments of the six Worcestershire District Councils.

This AQAP was prepared with the support and agreement of the following officers and departments:

- Lloyd Griffiths, Corporate Director (Operations, Homes & Communities), Worcester City Council

- Ruth Corrall, Sustainability Team (Leader), Worcester City Council
- Rebecca Hocknell, Sustainability Team (Active Travel), Worcester City Council
- Nick Kay, Economic Development and Regeneration, Worcester City Council
- Emily Barker, Head of Planning and Transport Planning, (Directorate of Economy and Infrastructure), Worcestershire County Council
- Mark Kelly, Principal Transport Planner, Worcestershire County Council
- Natasha Friend, Place Planning Team (Principal Planner), Worcestershire County Council
- Matthew Fung, Public Health (Consultant), Worcestershire County Council
- Rachel Cockayne, Public Health (Practitioner), Worcestershire County Council
- Victoria Moulson, Public Health (Senior Practitioner, Health Protection) Worcestershire County Council
- Heather Dawes, Sustainability Manager (Programme Manager), Worcestershire County Council
- Mark Cox, Technical Services (Manager), Worcestershire Regulatory Services
- Adrian Allman, Technical Pollution (Principal Officer), Worcestershire Regulatory Services
- Chris Poole, Technical Pollution (Air Quality), Worcestershire Regulatory Services

This AQAP has been approved by:

- Worcester City Council Licensing and Environment Health Committee
- Worcester City Council Environment Committee

The Director of Public Health for Worcestershire is supportive of the measures in the AQAP and Worcestershire County Council Public Health have contributed to the development of the plan through membership of the Steering Group.

This AQAP will be subject to an annual review, appraisal of progress and reporting to Worcester City Council's Licensing and Environmental Health Committee and Environment Committee. Progress each year will be reported in the Annual Status

Reports (ASRs) produced by Worcester City Council, as part of the council's statutory Local Air Quality Management duties.

If you have any comments on this AQAP please send them to Technical Pollution, Worcestershire Regulatory Services at:

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1 Introduction

This report outlines the actions that Worcester City Council along with air quality partners, Worcestershire County Council, will deliver between 2024 and 2029 to reduce concentrations of air pollutants and exposure to air pollution; thereby positively impacting on the health and quality of life of residents and visitors to Worcester City.

It has been developed in recognition of the legal requirement on the local authority to work towards Air Quality Strategy (AQS) objectives under Part IV of the Environment Act 1995 and relevant regulations made under that part and to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

This Plan will be reviewed every five years at the latest and progress on measures set out within this Plan will be reported annually within Worcester City Council's Annual Status Report (ASR) on air quality.

Aims and objectives of the plan:

- Introduce measures to reduce measured concentrations of nitrogen dioxide (NO_2) to achieve compliance with national air quality objectives (AQO).
- Introduce measures to address sources of NO_2 emissions identified in source apportionment work.
- Raise awareness of impacts of air pollution and encourage behavioural change to improve the health and well-being of Worcester City residents and the local environment.
- Meet the statutory requirements of the LAQM regime and the Environment Act 1995.

2 Summary of Current Air Quality in Worcester City

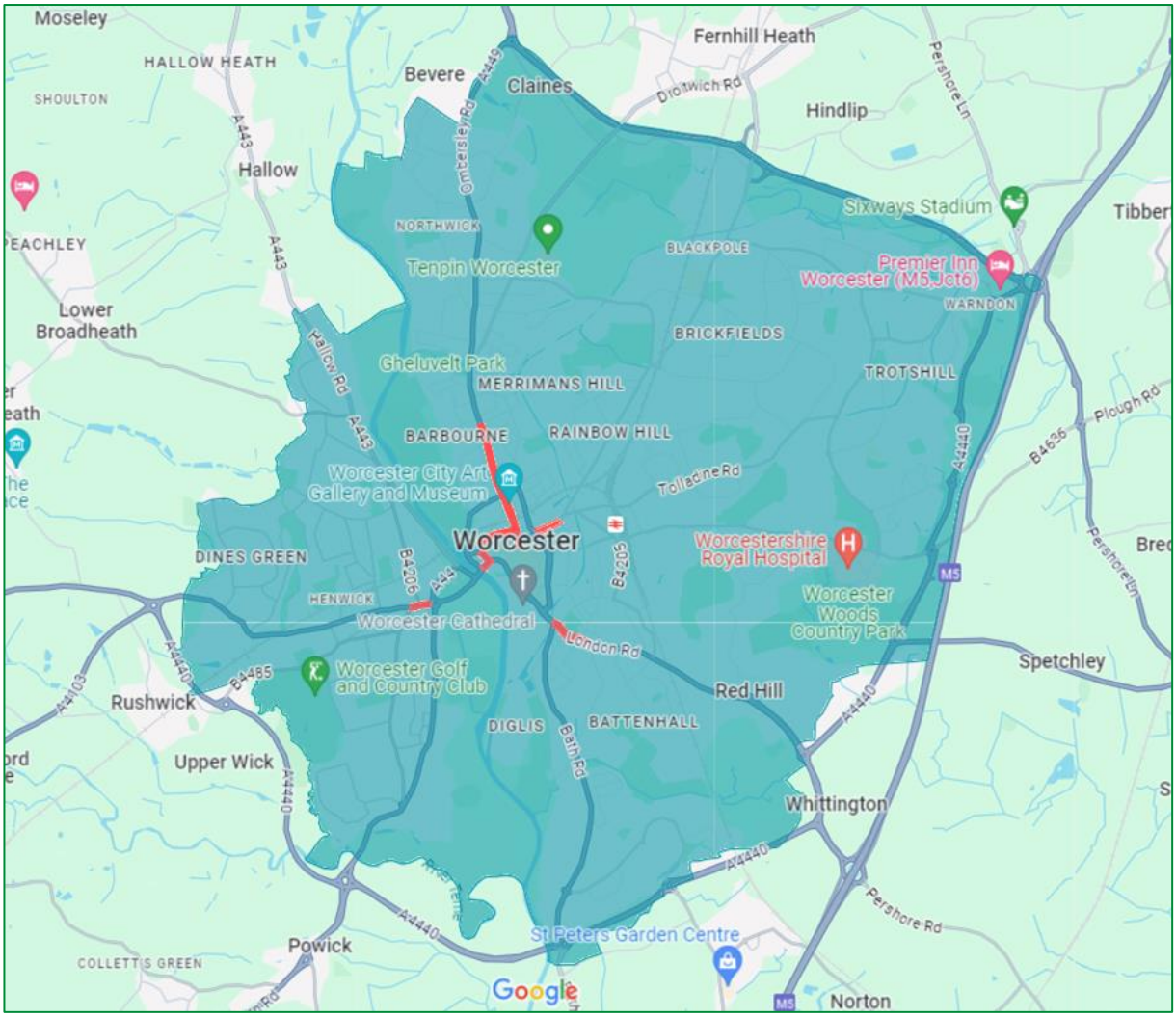
Review and assessment has established air quality over the majority of Worcester is generally good but there are a number of areas within Worcester City that have elevated levels of nitrogen dioxide (NO_2) due to road traffic.

In 2018, there were exceedances of the annual mean objective for NO_2 (40µg/m^3) at nine locations leading to the declaration of the Worcester City Air Quality Management Area (Worcester City (Political Boundary)) in 2019, under terms of the Environment Act 1995.

Further information on monitoring and assessment of air quality, and Air Quality Management Areas within Worcester City are detailed within the Annual Status Reports.

Areas of poor air quality within Worcester typically coincide with the Strategic Road Network (SRN) in and around the city centre in proximity with sensitive residential receptors. These relate to The Butts - All Saints Road - Bridge Street strategic road one way system, The Tything (A38) to The Foregate Street corridor, Lowesmoor - Rainbow Hill - Astwood Road (B4850) corridor, St Johns Bull Ring (A44) and London Road (A44). These areas are shown below in Figures 2.1 and 2.2.

Figure 2.1 - Worcester City AQMA (Worcester City (Political Boundary))

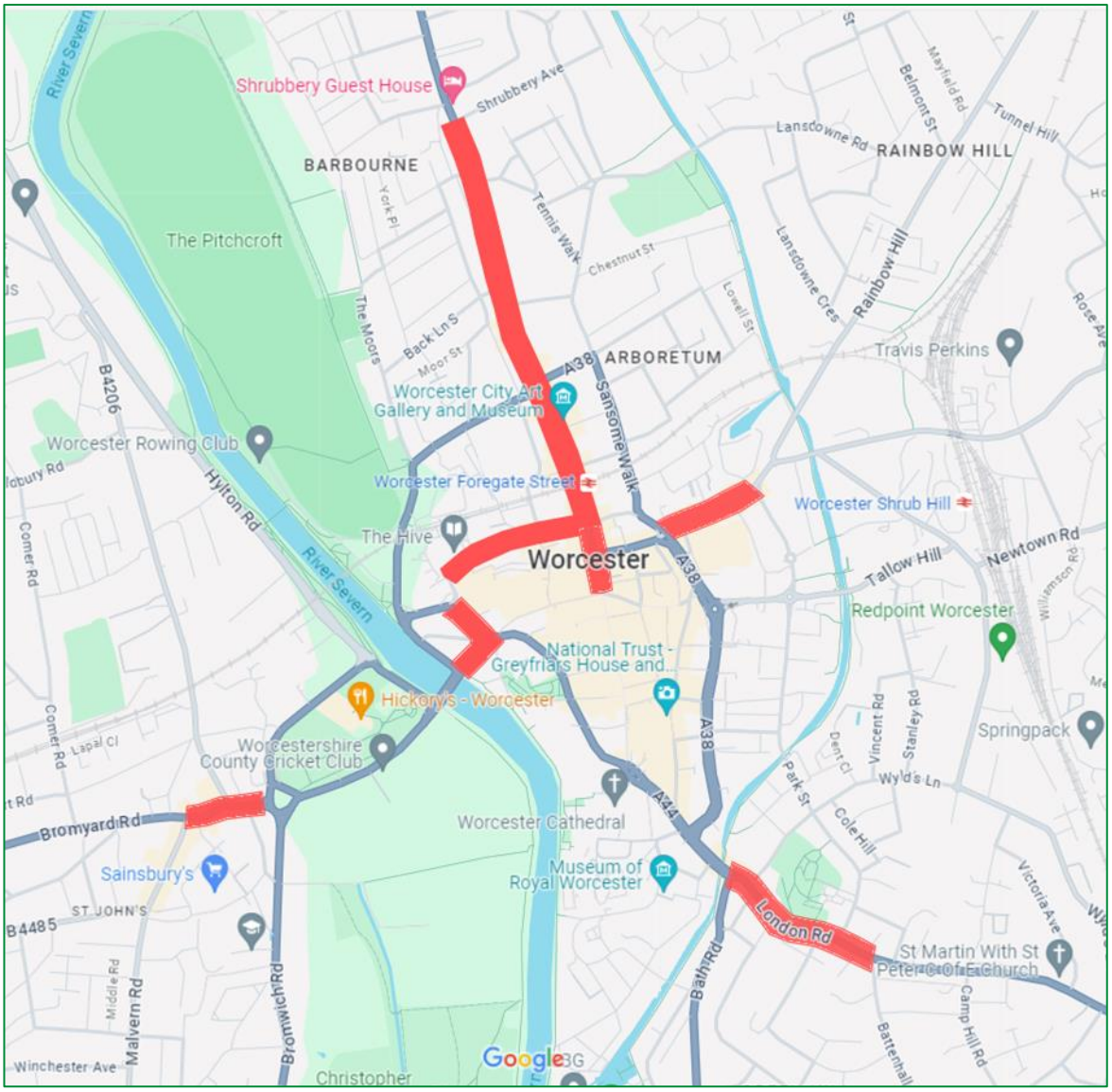


Like many parts of the UK, poor air quality in Worcester City is linked to areas with high volumes of traffic, congestion or ‘street canyon’ landscapes (where height of the building is greater than width of road) or a combination of these factors.

Prior to 2024, monitoring for nitrogen dioxide (NO_2) concentrations in Worcester City has generally been undertaken via a network of passive diffusion tubes. In 2023 this consisted of 37 monitoring locations within Worcester City boundary.

In 2023, the highest concentration of NO_2 recorded across Worcester City was 44.3 $\mu g/m^3$ at But2 (located in The Butts). This location has recorded the highest concentration across the city for the last 6 years with a measured concentration of 43.9 $\mu g/m^3$ in 2022 and 52.43 $\mu g/m^3$ in 2018.

Figure 2.2- Hotspots of poor air quality within centre of Worcester City



In common with national trends, monitoring indicates concentrations of nitrogen dioxide have generally decreased over the last 25 years. However, current trend analysis has been complicated in the years since the Worcester City AQMA declaration due to low bias adjustment factors in 2019, and lockdowns and restrictions affecting travel patterns and behaviours associated with the COVID-19 pandemic in 2020-21.

All bar one diffusion tube monitoring stations in the Worcester City area saw an increase in annual mean NO_2 concentrations, averaging 3.72 µg/m^3 (11%), between 2021 and 2022. This is likely to have been caused by the increase in traffic between the two periods following the cessation of all COVID-19 regulations and restrictions in March 2022. Available data from Worcestershire County Council confirms traffic had

returned to 98% of pre-pandemic levels across the county by the beginning of 2022. During 2023, 29 of the 37 monitoring locations sites recorded a reduction in NO_2 levels from the previous year, an overall decrease in average recorded annual mean NO_2 concentrations of 1.01 µg/m^3 (3.2%) between 2022 (31.21 µg/m^3) and 2023 (30.20 µg/m^3) across the Worcester City area.

At this time, it is unclear if some enforced behaviours during the pandemic that led to a decrease in the number of journeys made, such as virtual meetings replacing face to face and an increase in working from home, will continue to have the beneficial impact on reducing concentrations of NO_2 in future years. As such the measures outlined within this action plan are driven by pre-pandemic measured nitrogen dioxide concentrations.

Table 2.1 - Monitoring results at hotspot locations between 2018 and 2023

2018 - 2023							
Site No	**Location***	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
StJ1	St Johns	**42.7**	36.0	22.7	28	34.6	34.5
LR5	London Road	**44.1**	35.0	27.5	30.5	33.2	30.4
Tyn	The Tything	**47.2**	**41.8**	31.1	34.3	38.7	36.8
Fos	Foregate St	**48.5**	37.3	27.5	33.1	37.6	35.6
But2	The Butts	**52.4**	**42.1**	35.9	39.1	**43.9**	**44.3**
BrS2	Bridge St	**47.7**	38.6	35.6	33.8	39.1	37.1
DDASH	All Saints Rd	**43.8**	36.8	29	30.5	35.9	34.3
Lwm1	Lowesmoor	**41.2**	33.9	31.8	31.6	36.2	35.8
Bkc	The Cross	**46.9**	38.4	29.4	32.9	38.8	36.0
Objective		**40 µg/m^3**					

As outlined above, the Worcester City Air Quality Management Area (Worcester City (Political Boundary)) has been declared for exceedances of the annual mean AQO for NO_2, and therefore the measures contained within this plan focus on reducing emissions from sources of nitrogen dioxide pollution.

However, LAQM. Policy Guidance 2022 and the Air Quality Strategy 2023 outline the role local authorities have in delivering reductions in particulate matter and contributing to national targets for $PM_{2.5}$. Local authorities are required to report on any local data and actions to improve, or impacting on, $PM_{2.5}$ concentrations within

Annual Status Reports. The most recent reports are available to view and download at Worcester City Council | Worcestershire Regulatory Services (worcsregservices.gov.uk).

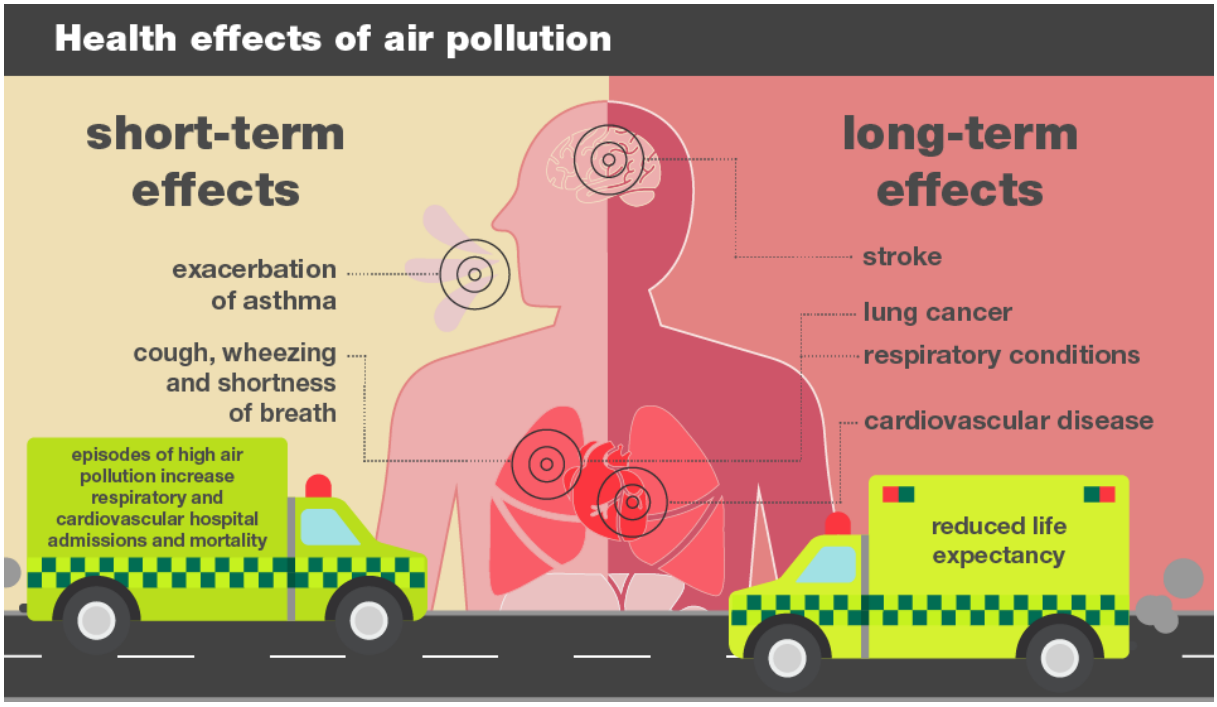
In February 2023, Defra confirmed that WRS had been successful in a bid to the Air Quality Grant Scheme 2022/23 to establish an enhanced real-time air quality monitoring network across Worcestershire. The scheme involves the installation of approximately 26 'low-cost Air Quality Monitors' across the county which measure NO_2, PM_{10}, and $PM_{2.5}$. Ten of the monitors were installed in January 2024 and are currently operating within Worcester City area. The first calendar year's annual monitoring results from these monitors will be reported on in the ASR 2025.

3 Worcester City Council's Air Quality Priorities

3.1 Public Health Context

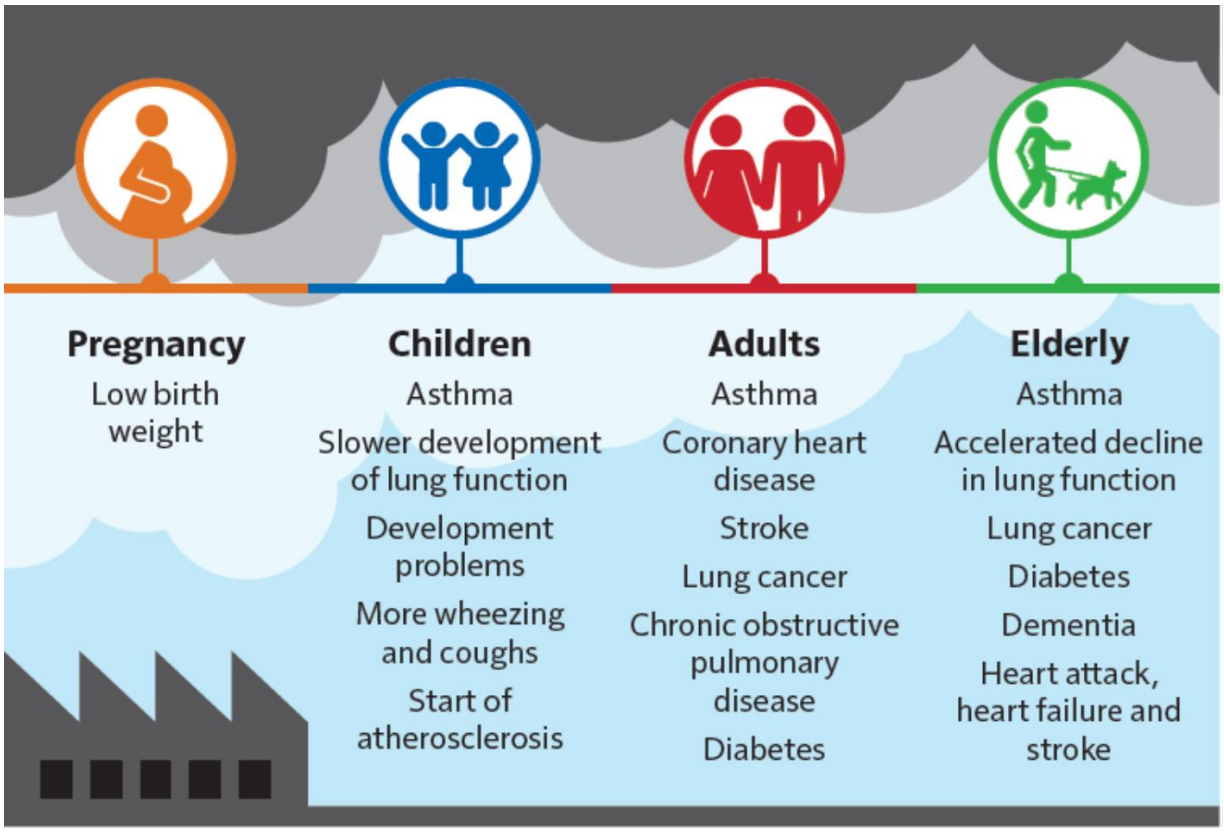
The Chief Medical Officer's (England) Annual report 2022 states 'Air pollution affects people's health throughout their lives, including before birth, in the very young, through to older adults. Exposure to air pollution, indoors and outdoors, over a long period of time, reduces people's life expectancy. There is clear evidence that air pollution contributes to the initiation and development of cardiovascular and respiratory diseases, and can cause lung cancer. The mortality burden of air pollution in England is estimated to be between 26,000 and 38,000 a year, but in addition many people suffer avoidable chronic ill health as a result of it. Improvements in air quality have been associated with improved health outcomes – for example, reductions in air pollution in London have led to reduced childhood asthma hospital admissions.'

Figure 3.1 - Health effects of air pollution



Source: Public Health England (14 Nov 2018) Health matters: air pollution - GOV.UK (www.gov.uk)

Figure 3.2 - Air pollution effects through lifetime



Source: Chief Medical Officers Report 2022

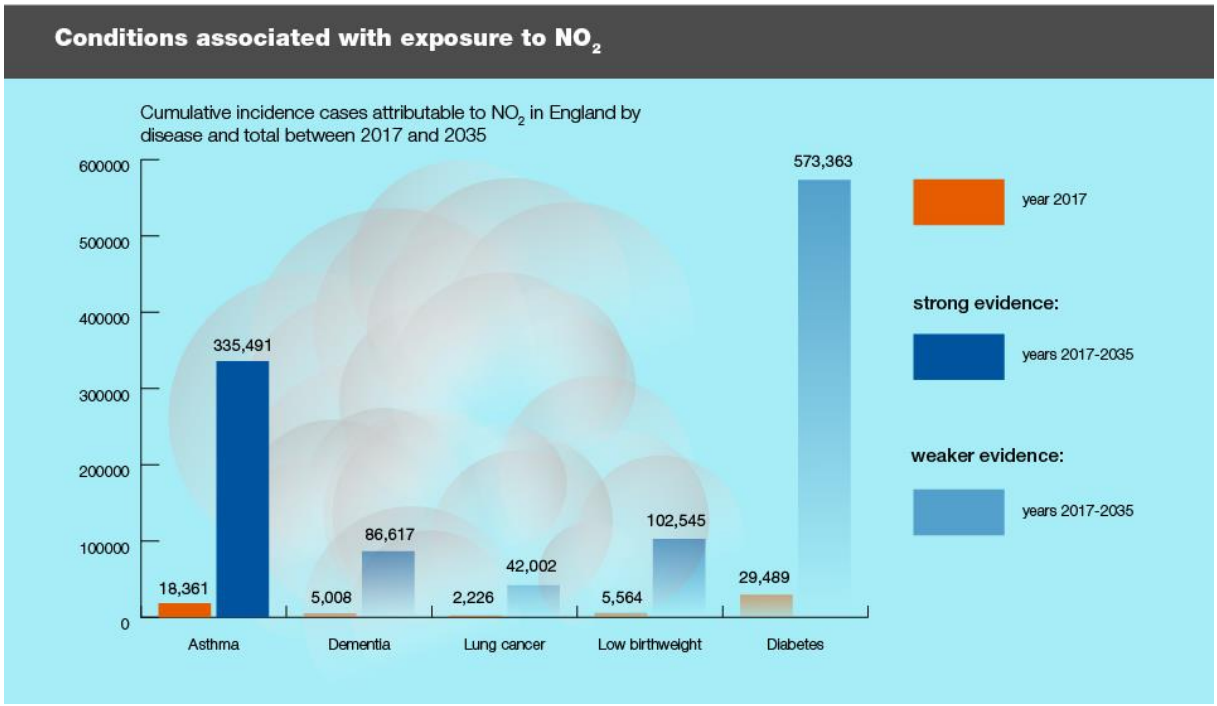
3.1.1 Health Impacts of nitrogen oxides

Nitrogen oxides (NOx) are a group of gases that are predominantly formed during combustion and emitted in the form of nitric oxide (NO). The main sources are power generation, industrial, combustion and road transport. When NO reacts with other gases present in the air, it can form nitrogen dioxide (NO_2), which is harmful to health.

A notable source of NO_2 is road traffic – which has made it difficult to distinguish the effects seen in epidemiological studies for NO_2 from those of particulate matter. However, the evidence associating NO_2 with health effects continues to grow.[5]

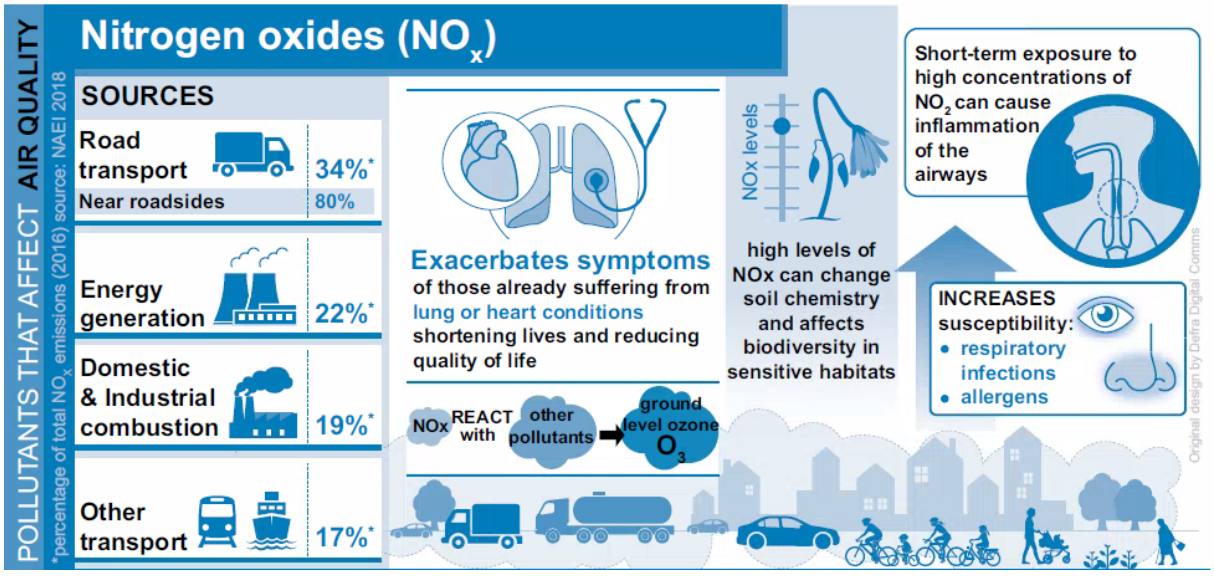
[5] Chief Medical Officer's Annual Report: Air Pollution, 2022

Figure 3.3 - Conditions associated with exposure to NO_2



Source: Public Health England (14 Nov 2018) [Health matters: air pollution - GOV.UK (www.gov.uk)]

Figure 3.4 - Sources and symptoms of nitrogen oxides



Source: Clean Air Strategy 2019

3.1.2 Economic Impact

In September 2020, CBI Economics produced 'Breathing Life into the UK Economy, a report that quantifies the economic benefit to the UK of meeting WHO Air Quality guidelines. The report commissioned by the Clean Air Fund states:

'Air pollution impacts human health and the productivity of the UK workforce, which in turn impacts the economy. Analysis conducted by CBI Economics in 2020 estimated that clean air in line with the World Health Organisation's (WHO) guidelines could deliver a £1.6bn boost to the UK economy each year. This would be on top of savings to NHS and social care budgets from treating fewer patients with health conditions associated with pollution.

Evidence shows a key link between NO_2 and health outcomes. Reducing NO_2 therefore, has a key role to play in realising this economic potential. NO_2 exposure leads to both short-term and long-term health impacts, exacerbating respiratory conditions such as asthma, possibly increasing the likelihood of lung cancer, stroke, and cardiovascular disease, and has been linked to adverse birth outcomes. This comes at a cost to the healthcare system.'[6]

In 2018, Public Health England (PHE) estimated that the total cost to the NHS and social care due to NO_2 for where there is robust evidence for an association, is estimated to be £60.8 million by 2025, and £230million by 2035. This increases to £2.7billion and £9.2billion respectively when diseases with less robust evidence are included.[3]'

3.2 Planning and Policy Context

The following supporting planning and policy documents contribute toward improvements in air quality in Worcester City:

Active Travel Action Plan (2023 – 2025): The council have introduced a plan to increase rates of active travel in Worcester City.

[6] Breathing Life into the UK Economy, 2020

***Draft* Air Quality Supplementary Planning Document (2024):** This draft SPD has been prepared collectively by the South Worcestershire councils (Malvern Hills District Council, Worcester City Council and Wychavon District Council) in conjunction with Worcestershire County Council, and WRS, as part of the South Worcestershire Development Plan (SWDP). The SPD is designed to support to improvements in air quality within South Worcestershire through areas of decision and plan making in respect of new development.

Bus Service Improvement Plan (2021): Worcestershire County Council's strategy focusses on road and rail passenger transport services within the county, including Home to School, bus, taxi, Community Transport and other community-based bespoke transport initiatives.

Electric Vehicle Charging Strategy (2023 - 2025): This strategy sets out Worcester City Council's approach to encouraging and accelerating the transition to electric vehicles in the city.

Environmental Sustainability Strategy (2020 - 2030): Worcester City Council declared a climate emergency in July 2019 and committed to work towards making the city carbon neutral by 2030. Actions to reduce carbon emissions commonly also reduce air pollution and the strategy compliments this Air Quality Action Plan.

Joint Health and Well-being Strategy (2022 – 2032): The strategy outlines Worcestershire Health and Wellbeing Board's commitment to improving mental health and wellbeing, supporting people to live well in good health for as long as possible, particularly those who have poorer health outcomes.

Local Transport Plan (2018-2030): Worcestershire County Council has responsibility for strategic transport issues in the county and published the fourth Local Transport Plan (LTP4) in 2017.

Planning for Health in South Worcestershire, Supplementary Planning Document (2017): This SPD has been produced collectively by the South Worcestershire councils (Malvern Hills District Council, Worcester City Council and Wychavon District Council) in conjunction with Worcestershire County Council as part of the SWDP. It provides guidance to local authority planning officers, applicants, relevant organisations and the wider community on delivering healthier developments.

Technical Guidance Note for Planning: WRS have produced a technical guidance document for Local Planning Authorities, developers and consultants on approach and requirements in respect of environmental protection matters, including air quality, and planning applications.

Worcester City Centre Transport Strategy (2023): In this strategy the council sets out proposals and a delivery plan for improving transport and streets in the City Centre in support of the Worcester City Centre Masterplan. The strategy has been shared with Worcestershire County Council with a request for them to give priority to progressing development and implementation of the final strategy in order to shape future transport decisions and assist in meeting the responsibilities of local government in improving air quality, development and the implementation of those elements that fall under the control of the county council as part of the next county-wide Local Transport Plan (LTP5).

3.3 Source Apportionment

The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions and target measures.

Following declaration of the Worcester City AQMA in June 2019, a source apportionment exercise has been carried out by Worcester City.

Required traffic surveys to inform the assessment were began in March 2020 but were suspended uncompleted due to the outbreak of the Covid-19 pandemic, which had significant impacts on traffic movements and behaviour. The level of traffic flow was deemed to have returned to sufficient levels to resume outstanding traffic surveys towards the end of 2021. The completed assessment was published in April 2022 and is available to download here.

Source apportionment studies have been carried out for a number of hotspots of poor air pollution concentrated within the city centre or SRN; the Tything, Foregate Street, the Butts, the Cross, Bridge Street, All Saints Road, and Lowesmoor. Additionally, source apportionment previously undertaken for St Johns and London Road in 2017 was included within the assessment.

The percentage source contributions and overall concentrations within the AQMA identified by the assessment are summarised in Table 3.1 and Figures 3.5 and 3.6 below:

Table 3.1 - Annual Mean NO_2 concentrations by source and percentage contributions

Annual Mean Concentration (µg/m^3)									
Site ID	Regional Back-ground[1]	Local Back-ground[2]	Cars	LGVs	Taxis	HGVs	Buses	MCs	Total
St Johns (StJ1)	10.67	5.28	11.56	3.27	ND	3.13	10.28	0.02	44.21
London Road (R12)[3]	6.29	12.25	13.41	5.14	ND	8.78	1.31	0.03	47.21
Tything (Tyn)	9.12	4.5	16.29	6.18	2.35	4.16	4.6	0.03	47.21
Foregate (Fos)	9.12	4.5	12.1	4.65	4.68	2.93	10.48	0.03	48.51
The Foregate (Fos2)	9.12	4.5	7.7	2.95	2.98	1.86	6.67	0.02	35.81
The Butts (But2)	9.12	4.5	8.52	3.65	2.43	2.06	22.13	0.02	52.43
Bridge Street (BRS2)	8.43	4.69	17.25	6.96	1.48	4.02	4.82	0.05	47.7
The Cross (Bkc)	9.12	4.5	7.69	3.13	4.26	2.2	16.02	0.04	46.94
All Saints Road (DDASH)	8.43	4.69	13.74	4.72	1.18	3.96	7.02	0.05	43.8
Lowesmoor (Lwm1)	10.07	4.21	5.09	2.91	2.02	1.21	15.67	0.01	41.2
% Contribution to Total									
Site ID	Regional Back-ground[1]	Local Back-ground[2]	Cars	LGVs	Taxis	HGVs	Buses	MCs	Total
St Johns (StJ1)	24.14	11.93	26.16	7.4	ND	7.08	23.24	0.05	100
London Road (R12) [3]	13.3	25.9	28.4	10.9	ND	18.6	2.8	0.1	100
The Tything (Tyn)	19.32	9.53	34.51	13.09	4.98	8.82	9.75	0.07	100
Foregate (Fos)	18.82	9.29	24.95	9.58	9.64	6.03	21.6	0.06	100
Foregate Street (Fos2)	25.49	12.58	21.5	8.25	8.31	5.19	18.62	0.06	100
The Butts (But2)	17.39	8.58	16.25	6.96	4.63	3.92	42.21	0.04	100
Bridge Street (BRS2)	17.67	9.83	36.16	14.59	3.11	8.43	10.1	0.11	100
The Cross (Bkc)	19.4	9.58	16.39	6.66	9.07	4.69	34.12	0.09	100
All Saints Road (DDASH)	19.25	10.71	31.38	10.77	2.7	9.05	16.02	0.11	100
Lowesmoor (Lwm1)	24.44	10.22	12.35	7.06	4.91	2.94	38.04	0.03	100

1 Regional background includes emissions from sources not in LA control e.g. Motorways outside of study area, Industrial sources, Domestic properties, Railways, Rural sources, Others

2 Local background includes emissions from sources LA have some influence over e.g. Primary A roads, Minor Roads and Point sources in and outside of study area

3 Modelled receptor in AQC (2017) Detailed Assessment of Air Quality along London Road, Worcester

ND – No Data available for Taxis in these locations

Figure 3.5 - Annual Mean NO_2 concentrations by source

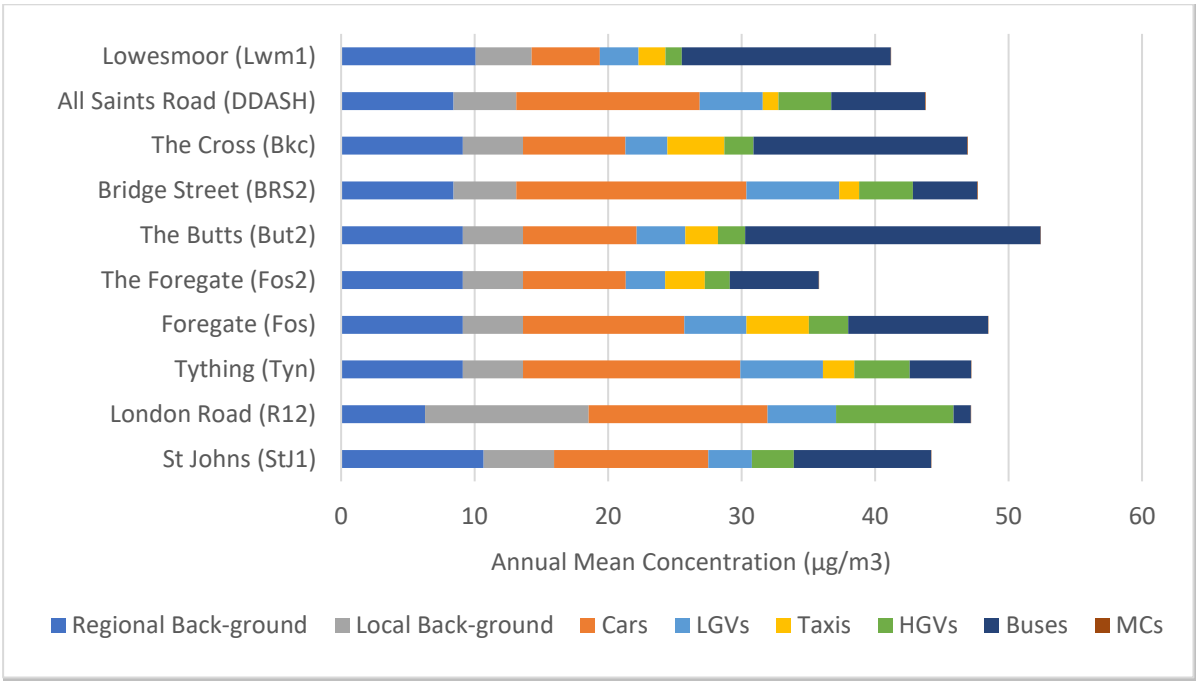
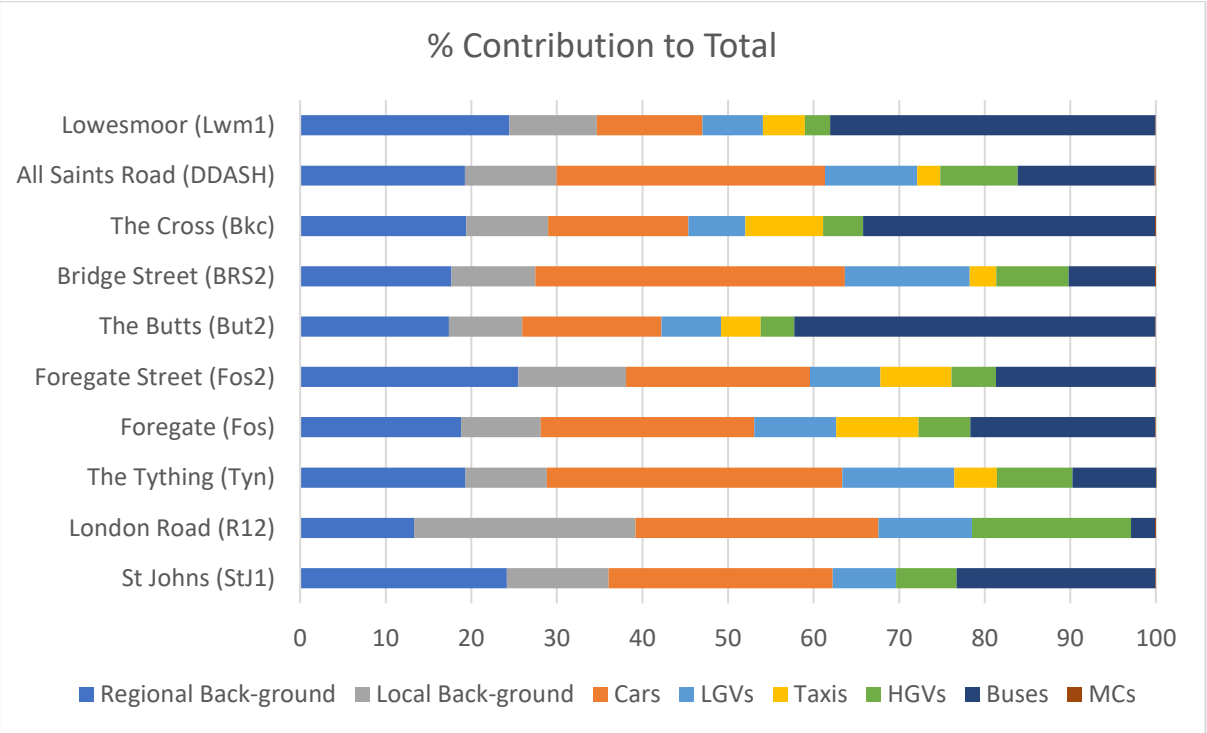


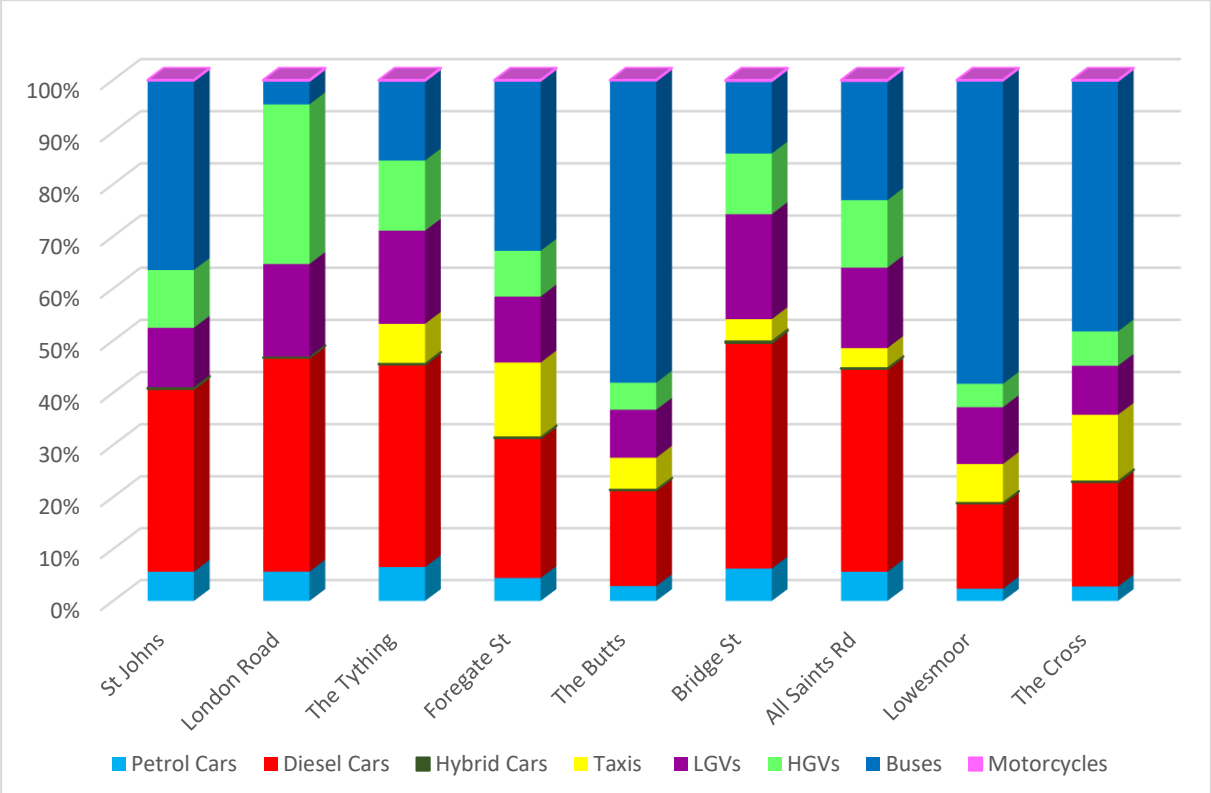
Figure 3.6 - Percentage source contributions



The outcome of the source apportionment exercise demonstrates background concentrations contribute a significant proportion of the overall concentration of NO_2 measured within each of the study areas, varying from 25.97% to 39.27%. As the local authority is largely unable to influence regional background levels, and local background concentrations are predominately a result of traffic sources on other local roads, it is more useful to consider the source apportionment of the local traffic sources in isolation when developing actions for improving air quality.

Additionally, because of the non-linear relationship between NOx and NO_2 emissions it is more appropriate to consider total NOx (Nitrogen Oxides) emissions of the local traffic contribution for source apportionment, as shown in Figure 3.7 below.

Figure 3.7 - Local Road NOx proportions by vehicle type in each AQMA hotspot



NB No specific data was available for Taxi contribution within St Johns and London Road

Cars were shown to comprise the largest proportion of traffic volume with between 65.74% and 82.54% contributing to between 18.91% and 49.84% of vehicle source emissions. Buses comprise a much smaller proportion of the traffic volume ranging between 0.6% and 10.48% but contributing much larger proportions of vehicle emissions of between 4.57% and 58.19%. Similarly, HGV fleet proportions range

between 1.37% and 7.45% but contribute between 4.5% and 30.62% of vehicle emissions.

3.4 Required Reduction in Emissions

The source apportionment assessment demonstrated that for the majority of study areas it is likely that a reduction across all vehicle types, or combination of several categories, would be required to achieve the objective. The data indicates that a maximum reduction in NOx of 37.7% would be required to achieve the annual average of nitrogen dioxide objective within all areas. A maximum reduction of 43% would be necessary across all vehicle types to achieve results 5% below the objective, and 48.1% to achieve 10% below the objective.

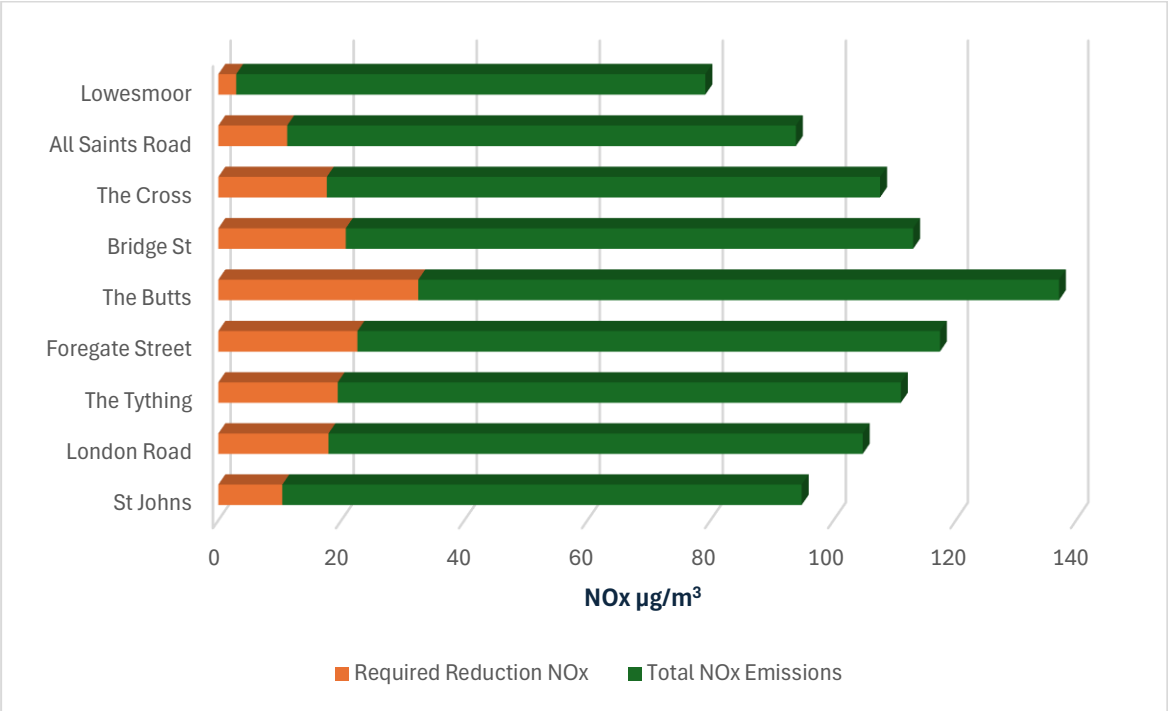
The assessment concluded targeting individual types of vehicles in isolation within most areas of concern is unlikely to lead to the annual mean objective being achieved unless the reductions are very large.

Table 3.2 - Emission reduction required

Location	Emission Reductions Required to Meet Objective (NO_2)	All Vehicle Reduction to Meet Objective (% NOx)	Reduction for 5% b/l objective (% NOx)	Reduction for 10% b/l objective (% NOx)	Highest Roadside Contributor	2nd Roadside Contributor	Single Vehicle Reduction to Achieve Objective
St Johns	4.76	16.8	24.6	32.1	Buses - 36.36%	Diesel Cars - 35.16%	Cars 50% / Buses 50%
London Road	8.06	28.1	35.4	42.5	Diesel Cars - 41.12%	HGVs- 30.62%	Cars 70% / HGVs 100%
The Tything	8.91	26.5	32.7	38.8	Diesel Cars 41.89%	Diesel LGVs - 18.3%	Cars 60%
Foregate Street	10.34	29.6	35.6	41.4	Diesel Cars - 30.12%	Buses - 30.08%	Cars 90% / Buses 100%
The Butts	14.63	37.7	43	48.1	Buses - 57.03%	Diesel Cars - 19.15%	Buses 70%
Bridge Street	9.61	27.8	33.9	39.9	Diesel Cars - 43.38%	Diesel LGVs - 20.09%	Cars 60%
The Cross	8.22	24.7	31	37.3	Buses 48.1%	Diesel Cars - 20.15%	Buses 60%
All Saints Road	5.28	17.2	24.2	31.1	Diesel Cars - 39.03%	Buses - 22.90%	Cars 40% / Buses 80%
Lowesmoor	1.38	5.1	13.1	21	Buses - 58.19%	Diesel Cars - 16.44%	Buses 10% / Cars 30% / LGVs 50% / Taxis 70%

Figure 3.8 below shows the required reduction in NOx emissions to achieve compliance and total emissions in each area of concern.

Figure 3.8 - Required improvements NOx for each hotspot



3.5 Key Priorities

Worcester City Council has identified the following priorities for the development and implementation of the air quality action plan:

Priority 1 – Reducing Emissions from Transport

Considering the outcomes of the source apportionment assessment a key priority is to implement direct interventions which reduce emissions of NO_2 from vehicles. Measures proposed include removal of HGV parking within city centre area, improvements to council operated fleets and public transport fleets, directing non-city destination freight/ traffic away from traversing the city centre, and anti-idling awareness for taxi drivers.

Priority 2 - Public Health and Wellbeing

Air pollution impacts on human health and, therefore, a priority for Worcester City Council are measures raising awareness, increasing community understanding and

encouraging behavioural change to reduce individual's exposure to and impact on air quality.

Measures proposed, in conjunction with Public Health at Worcestershire County Council and WRS, include encouraging awareness through publicly available real time monitoring information, developing a communications plan, publicising via events such as annual Clean Air Day, working with local schools and supporting the behavioural change officer post at WRS.

Priority 3 – Sustainable Travel and Transport

Increased uptake of more sustainable travel and transport options has a significant impact on reducing emissions from the local vehicle fleet and improving air quality. Sustainable measures proposed within the action plan include installation of additional public EV charging points and a strategy for future charging, implementation of a public bike hire and share scheme across the city, active travel guides for Business, and delivery of the Local Cycle Walking and Infrastructure Plan (LCWIP).

Priority 4 - Planning for Future Development

Planning for future development to limit its impact or improve existing air quality and protect the future site occupants through good design or mitigation measures is a key priority. Building on existing local policy and guidance Worcester City, in collaboration with neighbouring local authority partners, are developing an Air Quality Supplementary Planning Document (SPD) as part of the emerging South Worcestershire Development Plan (SWDP).

4 Development and Implementation of Worcester City Council AQAP

4.1 Consultation and Stakeholder Engagement

In developing this AQAP, the Council have worked with other local authorities, agencies, and the local community to improve local air quality. Schedule 11 of the Environment Act 1995 requires local authorities to consult the bodies listed in Table 4.1.

In addition, we have undertaken the following stakeholder engagement:

- Public consultation via Worcester City Council's website
- Local press release
- Social media

The response to our consultation stakeholder engagement is given in Appendix A: Response to Consultation.

Table 4.1 – Consultation Undertaken

Consultee	Consultation Undertaken
The Secretary of State	Yes
The Environment Agency	Yes
The highways authority	Yes
All neighbouring local authorities	Yes
Other public authorities as appropriate, such as Public Health officials	Yes
Bodies representing local business interests and other organisations as appropriate	Yes

4.2 Steering Group

Following declaration of the Worcester City AQMA in June 2019, a steering group, comprising officers of WRS and Worcester City, was formed to progress an AQAP in the autumn of 2019.

The COVID-19 pandemic, unfortunately, led to the suspension of the district AQAP working group and public health action group's programmes in spring 2020.

In September 2022, WRS initiated discussions with Worcestershire County Council colleagues with a view to forming a new Steering Group and producing a new plan of actions to improve air quality across the county, to comply with recent legislative changes, Environment Act 2021, and revised guidance published in August 2022 (LAQM.TG22 and PG22).

The group membership expanded considerably for an inaugural meeting on 2nd February 2023, comprising officers from Worcester City Council, Worcestershire County Council and WRS from public health, technical pollution (air quality), strategic planning, sustainability, highways and transport disciplines, and also representation from the NHS.

Senior representatives from Worcester City and Worcestershire County Councils were appointed as co-chairpersons in February 2023.

Group members:

- Lloyd Griffiths (Co-chair), Corporate Director (Operations, Homes & Communities), Worcester City Council
- Emily Barker (Co-chair), Head of Planning and Transport Planning, (Directorate of Economy and Infrastructure), Worcestershire County Council
- Adrian Allman, Technical Pollution (Principal Officer), Worcestershire Regulatory Services
- Chris Poole, Technical Pollution (Air Quality), Worcestershire Regulatory Services
- Heather Dawes, Sustainability Manager (Programme Manager), Worcestershire County Council
- Mark Cox, Technical Services (Manager), Worcestershire Regulatory Services

- Mark Kelly, Principal Transport Planner, Worcestershire County Council
- Matthew Fung, Public Health (Consultant), Worcestershire County Council
- Natasha Friend, Place Planning Team (Principal Planner), Worcestershire County Council
- Nick Kay, Economic Development and Regeneration, Worcester City Council
- Rachel Cockayne, Public Health (Practitioner), Worcestershire County Council
- Rebecca Hocknell, Sustainability Team (Active Travel), Worcester City Council
- Ruth Corrall, Sustainability Team (Leader), Worcester City Council
- Victoria Moulson, Public Health (Senior Practitioner, Health Protection) Worcestershire County Council

The group have also engaged with the sustainability manager, Katy Boom, at the University of Worcester and Transport Consultant's Systra during the process.

4.2.1 Steering Group Activity

The Steering Group has overseen the development of this AQAP following the guidelines set out in Chapter 2 of LAQM.TG22 and with reference to best practice examples provided by Defra online and through events.

The Steering Group was supported by four discipline specific sub- working groups: Transport, Sustainability, Public Health and Planning to determine potential measures informed by the available source apportionment work.

The Steering Group met monthly between 2nd February 2023 to 17th April 2024.

The Sub-groups formed for shorter periods and generally met monthly or even more frequently:

- The Transport sub-group met on 7 occasions between June 2023 and December 2023 including three specific workshops to determine and finalise shortlist of Transport related measures. Additionally, a briefing was given to Worcestershire County Council Directors of Highways Department in May 2023. The sub-group members varied between officers from WCC, or officers from Worcester City and WCC at different times, supported by WRS.

- The Sustainability sub-group met on 8 occasions between July and December 2023 consisting of officers from Worcester City and WCC, supported by WRS and the University of Worcester (UoW) were represented by the Sustainability manager at some meetings.
- The Air Quality Public Health working group met on 13 occasions over the 12 months beginning April 2023, initially formed to progress actions for Clean Air Day in June 2023. The group consisted of officers from Worcester City and Public Health at WCC, supported by WRS, and attended by an NHS representative.
- The Planning sub-group met on 6 occasions between October 2023 and April 2024 to progress the emerging Air Quality SPD. The group included planning strategy managers from all the South Worcestershire councils and WCC, and supported by WRS.

Going forward, it is anticipated the Steering Group will continue to meet at least annually or bi-annually, potentially as part of a countywide focussed group, to regularly review progress and impact of air quality improving interventions.

The Air Quality Public Health working group was established in 2023 to progress specific interventions and to begin work on a strategy for improving air quality and public health across Worcestershire, following the finalisation of this AQAP.

At the time of writing, the future focus, contributors, and responsibilities of the working group is under review with air quality partners. It is anticipated this will be resolved in the coming months and the group will be reformed and continue work in early 2025.

4.2.2 Timeline of works

The timeline for the various stages and delivery of a revised countywide AQAP, and establishment of a new countywide Air Quality Strategy, were set out in the ASR 2023. However, following the introduction of new enforcement policy by Defra in June 2023, it has been necessary to amend the planned framework to prioritise production of separate AQAPs for each district in Worcestershire with an AQMA.

Following discussions with Defra LAQM Team in September 2023, Worcester City Council were granted an extension to the timeline for delivery of a draft AQAP to July

2024 to allow for newly elected council members to be consulted on the plan post local elections in May 2024, with a final version due publication in December 2024.

Table 4.2 shows the timeline of works undertaken by the Steering Group and timescale for publication of final plan.

Table 4.2 - Timeline of Steering Group work and publication of plan

Timeline	Phase
Sept – Dec 2022	Initial countywide cross discipline and partner discussions, and requirements established for AQAP following publication of revised LAQM Technical and Policy Guidance Aug 2022
Jan 2023 – Feb 2023	New Steering Group formed, and inaugural meeting held. Appointment of district and county co-chairpersons
Mar - Sept 2023	Identification of potential district and county council measures, and input from other organisations for consideration
July – Dec 2023	Establishment of subject focussed sub-groups. Feasibility filter of potential measures, establish timelines and funding sources including workshops
Sept – Oct 2023	Discussions with Defra LAQM team and establishment of revised timeline
Oct – Nov 2023	Establish approach to Qualitative Assessment (Stage 1) to assist measures selection and Impact assessment and cost benefit analysis (Stage 2) of measures
Jan – Mar 2024	Modelling of Quantifiable focus measures
Mar 2024	Impact assessment and cost benefit analysis of measures
March - April 2024	Drafting of AQAP report
May – June 2024	Submission of Draft AQAP to Corporate Leadership Team, Licensing and Environmental Committee, Environment Committee and Director of Public Health for approval (post local elections) and revisions
July – Sept 2024	2 month public and statutory consultation on Draft AQAP

Timeline	Phase
Oct – Nov 2024	Revisions and submission of Final AQAP for review by Senior Management Team and approval by Political Committees at Worcester City Council
Dec 2024	Publication of Final AQAP and submission to DEFRA
Mar - May 2025	Annual review and update for Annual Status Report
June 2025	Publication of Annual Status Report

4.2.3 Approach to shortlisting of measures and assessment of impact

All potential measures were subjected to an established measure selection process comprising two stages:

- Stage 1 Qualitative Assessment
- Stage 2 Impact Assessment/Cost Benefit Analysis

The process for both stages has been established with reference to LAQM guidance and review of available best practice AQAPs and is summarised in Figure 4.1 and Figure 4.2 below.

For the Stage 1 Qualitative Assessment the Steering Group member's professional expertise and knowledge were applied to potential measures to determine:

- an anticipated timeline for implementation,
- level of social and political support for measure,
- practicality of implementing within AQMA hotspots,
- feasibility of delivery considering the above 3 categories
- potential reduction in NO_2 emissions

The assessment also included identification of available sources of data to assist quantifying impact of measures progressed to the next stage or the potential for data becoming available within the lifetime of the AQAP. Further detail on the Stage 1 process is provided in Appendix C: Qualitative Assessment of Measures (Shortlisting).

The group also considered a number of other factors at this stage:

- number of hotspot areas improved,
- sources impacted (e.g., cars, vans, buses, HGVs),
- identify potential funding sources or opportunities.

Measures were ranked based utilising a RAG (Red, Amber, Green) scale, and 6 groups of measures were established:

1. **Focus Measures -** quantifiable or non-quantifiable shortlisted measures progressing to Stage 2 – Impact Assessment as shown in Table 5.1 and detailed in Section 5 - AQAP Measures.
2. **Potential Future options -** measures with potential to be developed or delivered in future not shortlisted at this time due to timeline, lack of support, information or data, or practicality of delivery or combination of those. Further detail is provided in Appendix D.
3. **Measures not being pursued** - measures identified as non-deliverable due to social or political opposition, cost, lack of funding, practicality of delivery, or no or little AQ impact anticipated within AQMA hotspots, or combination thereof. These are identified in Appendix B.
4. **Duplications** – Individual measures put forward that duplicated or were incorporated within others. These are also shown in Appendix D.
5. **No Air Quality Improvement** – actions with no discernible emissions reducing impact. These are also shown in Appendix D.
6. **In place** - actions identified as already being delivered and contributing to air quality improvements at the time, not considered further.

The outcome of the Stage 1 Qualitative Assessment is shown in Appendix D: Outcomes of Stage 1 Shortlisting Process.

Figure 4.1 - Stage 1: Qualitative Assessment of Measures

RAG	Timeline for implementation	Support for measure	Practical Application	Deliverability	Anticipated Air Pollutant reduction	Data to quantify impact	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in the future
Green	Within 5 years	Likely Social and political support	Feasible	Yes	Significant	Available	Yes/No (Green/Red)	Potentially Within lifetime of AQAP
Amber	Potentially within 5 years	Potential social and/or political support	Potentially feasible	Potentially	Low to Medium impact or insufficient info to make a determination	Not available at time of drafting plan, anticipated within 5 years		Post lifetime of this AQAP, consideration for
Red	Greater than 5 years	Unlikely social and political support	Not feasible	No	Negligible or Negative	Not available or forthcoming in next 5 years		Unlikely to be progressed in the future

Figure 4.2 - Stage 2: Impact Assessment

AQ Improvement / Cost		Negligible	small	medium	large	Very large
		1	2	3	4	5
Neutral	8	8	16	24	32	40
Low	7	7	14	21	28	35
Low - Medium	6	6	12	18	24	30
Medium	5	5	10	15	20	25
Medium - High	4	4	8	12	15	20
High	3	3	6	9	12	15
High – Very High	2	2	4	6	8	10
Very High	1	1	2	3	4	5

For the Stage 2 Impact Assessment, a cost benefit analysis was applied to the identified focus measures.

Costs were scored according to the bandings identified below, adopted from LAQM guidance. The amounts for each measure were determined either from known costs, where a measure is currently being implemented, or application of professional experience and knowledge for measures at an earlier stage of development.

Table 4.3 - Description of cost bandings

Cost Bandings	Anticipated overall costs
Neutral	No additional cost or part of existing spend
Low	<£10k
Low - Medium	£10k – £50k
Medium	£50k - £100k
Medium - High	£100k - £500k
High	£500k - £1m
High – Very High	£1m - £10m
Very high	> £10m

The impact of measures were scored according to the bandings below. The bandings were determined from the source apportionment work and identified required reduction in NOx concentrations to achieve compliance within each hotspot area. For example, a maximum reduction in NOx of 37.7%, i.e. a very large impact, is required to achieve compliance in all areas.

Table 4.4 - Description of Air Quality Impact bandings

AQ Impact	Proportion of Emissions Reduction	Approx equivalent concentration (NOx)
Negligible	<0.2%	<0.3 µg/m^3
Small	0.2 – 3%	0.3 – 2 µg/m^3
Medium	3 – 15%	2 – 9 µg/m^3
Large	15 - 30%	9 - 22 µg/m^3
Very Large	>30%	>22 µg/m^3

The impact of each measure was determined via modelling where sufficient and appropriate data was available to enable quantification. However, it is recognised, within guidance (LAQM.PG22), that it is easier to quantify some measures more than others. For example, a reduction in emissions can be calculated from improvements in combustion engines such as replacing a Euro Code (EC) IV fleet with EC VI vehicles. Other measures, such as those designed to encouraging a change in travel behaviour, are more difficult to quantify as the likely number of removed vehicle journeys is unpredictable.

The approach taken has been to assume a negligible or small impact at best where it has not been possible to quantify the impact of a measure, and the application of professional experience and knowledge to determine which banding is most applicable. Further information on the approach to modelling is outlined within the next section.

After the application of the process outlined above an additional score was added to reflect the number of hotspot areas impacted by a particular measure to give a greater weighting to those measures reducing emissions in the most locations.

(Cost Score x Impact Score) + No. of Hotspots Benefitting = Overall Score

The measures are then ranked in order of overall score from highest to lowest and a qualitative weighting applied to reflect those measures that have confirmed funding where scores for measures are equal. The ranked order is reflected in Table 5.1. A summary of the Stage 2 Impact Assessment outcomes is provided in Appendix E: Outcomes of Stage 2 Impact Assessment.

4.2.4 Approach to modelling and quantification of measures

For modelling purposes, WRS has used the most recent available Emissions Factor Toolkit (EFT) v12.0.1 to calculate reduction in emissions of NOx (in g/km (grammes per kilometres)). This complies with LAQM guidance, and additionally is the approach used within the source apportionment studies.

For each quantifiable measure, WRS has used the EFT to calculate the reduction in emissions of NOx (in g/km) within each hotspot compared with the outcomes of the source apportionment studies. This complies with advice received from LAQM helpdesk operated by Bureau Veritas on behalf of Defra.

The EFT is published by Defra to assist local authorities in carrying out assessments of local air quality as part of LAQM duties under the Environmental Act 1995 as amended by the Environment Act 2021. The EFT allows users to calculate road vehicle pollutant emission rates for NO_x, and other pollutants, for a specified year, road type, vehicle speed and vehicle fleet composition. It utilises COPERT v5.6 NO_x and PM speed-based emissions factors as taken from the European Environmental Agency (EEA) emission calculation tool.

Output from the EFT is provided as total emissions of NOx in g/km broken down by vehicle type over specified link distance (length of AQMA) and period (year).

It should be noted that model outputs are based upon national fleet assumptions embedded within the Emissions Factor Toolkit (EFT). These may not be wholly representative of the local vehicle fleet composition. Therefore, where local data is available, such as bus fleet data, this has been used to update the corresponding assumptions within the EFT to provide outputs more representative of local fleet emissions.

Additionally, the results of the modelling approach should be considered as indicative only, rather than determined concentration reductions. Furthermore, the EFT does not include spatial impacts of street canyon effects, weather impacts or idling at junctions. Modelling of such impacts requires a more complex model, supporting data and resource which were not available during the production of this AQAP.

Common Modelling Parameters

The proportions of each vehicle type determined from the source apportionment studies for each hotspot location has been used as a baseline for each modelling scenario.

A number of modelling scenarios using the latest toolkit (EFT 12.0.1) were ran with amendments to proportions of vehicle types from the source apportionment baseline determined from reductions to vehicle parcs projected by specific measure impacts with consideration for appropriate fleet growth factors in 2029. Inputs and outputs of each modelled scenario are shown in Appendix G: Modelled Measures in the accompanying Technical Appendices document.

The various scenarios for each modelled measures were then compared to determine minimum, maximum and average achievable emissions reduction from implementation of the measure.

The' All Vehicle Type' option was selected for most scenarios though measures requiring less detail for each vehicle type, such as buses, were run using 'Detailed Option 2'. All modelled scenarios were run providing outputs in emission rates of NOx (g/km) and additional breakdown by vehicle. Details of all model options are outlined within the EfT v12.0.1 User Guide.

A number of input parameters within the 'All Vehicle Type' option required additional detail determined from local fleet data or research of nationally available projections:

- Split between diesel and EV power trains for Rigid and Arctic HGVs from available DfT road traffic statistics and projections for 2023 – 2029.
- Petrol, Diesel and Low Emission Vehicle (LEV) splits for cars and LGVs were determined from the National EV Insight and Support (NEVIS) and DfT projections.
- Local taxi fleet data was used as a baseline to determine proportions of diesel, hybrids and (Battery Electric Vehicles) BEV within fleet.
- Growth factors for 2029 have considered for all vehicle types except buses from NEVIS and DfT projections.

Modelled measures and parameters

Measures supporting Electric Vehicle (EV) uptake: Public EV Charging Points, EV Charging Strategy, Low Emission Vehicle Infrastructure (LEVI) Funding.

Reductions in emissions have been calculated utilising forecast data from NEVIS on EV uptake for car and LGV fleet in Worcester and Worcestershire. Calculations have also taken into consideration vehicle growth in these fleets as forecast for 2029 within NEVIS, and from available Department for Transport (DfT) data[7]. A number of model scenarios have been run assuming a Low or Medium uptake within each hotspot location. The High uptake forecast was not considered following government announcement in 2023 to push back date of ban on sales of petrol and diesel vehicles from 2030 to 2035 to provide a degree of conservatism within the modelling.

Directional Signage to deter non-city destination HGV freight traffic from traversing the city.

Reductions in emissions and forecast vehicle journeys have been calculated from data provided by WCC Traffic Monitoring team of HGV movements on the Strategic Road Network between 2019 and 2023. COVID pandemic impacted years 2020 – 2021 were disregarded within the assessment. Growth of the fleet was not considered as information from DfT indicates the national fleet has remained consistent in last 30 years, however predicted transition to EV of 4.11% of fleet by 2029 was included in calculations[7].

Bike Hire and Bike Share Scheme

Data on anticipated car journeys replaced by bike hire across the city per annum, average length of journeys and projected hub locations have been provided by the service operator Beryl. From this data an Average Annual Daily Traffic (AADT) of 132 replaced car journeys was established and consideration given to how many of those journeys anticipated through each hotspot would be replaced from proposed bike hub locations assuming a single central Worcester City destination. The baseline vehicle journeys (flow data) and car proportions in each hotspot were then recalculated for

[7] National Road Traffic Projections, 2022

each hotspot. A number of model scenarios for each hotspot location have been run taking into consideration a Low to Medium vehicle fleet growth as forecast for 2029 within NEVIS, and from available Department for Transport (DfT) data.

Bus fleet improvements.

Data was provided by WCC Highways of First Bus fleet details and changes including Euro Code composition for the period 2017 to Jan 2024. First Bus is the largest service provider within the city and this data has been used as a proxy for the whole bus fleet operating within the city in the absence of additional information.

The bus fleet changes over the period were used as a baseline to calculate average changes each year and project potential Euro Code Fleet composition and size of the bus fleet in 2029.

The pre-defined Bus Fleet Euro Code Composition within the EFT for 2029 forecast was amended to reflect the projected local Eurocode compositions using the 'Bespoke Euro Fleet' option and model run to determine reduced emissions within each hotspot.

Removal of HGV Parking in Croft Road car park

This measure involves removal of 8 HGV spaces in Croft Road in the city centre and reduction in HGV journeys on certain strategic roads.

The baseline vehicle journeys (flow data) and HGV proportions in each hotspot were recalculated for model input to reflect the maximum number of HGV journeys within each impacted hotspot (London Road, Bridge Street and All Saints Road).

Growth of the fleet was not considered as information from DfT indicates the national fleet has remained consistent in last 30 years, however predicted transition to EV of 4.11% of fleet by 2029 was included in calculations. Modelling assessment outcomes and required reduction in emissions[7].

The EFT outcomes for each measure and scenario in the AQMA hotspots were averaged and the resulting figures compared with the source apportionment emissions to determine a minimum, maximum and average predicted proportion emission reduction for the purposes of the Stage 2 Impact Assessment.

4.2.5 Predicted Emissions Reduction

The forecast emissions reduction in NOx in each hotspot for 2029 from all quantified measures has been compared to the source apportionment outcomes and required emission reduction to achieve compliance.

Table 4.5 - Predicted and required emissions reduction of NOx compared with total emissions from source apportionment in each AQMA hotspot.

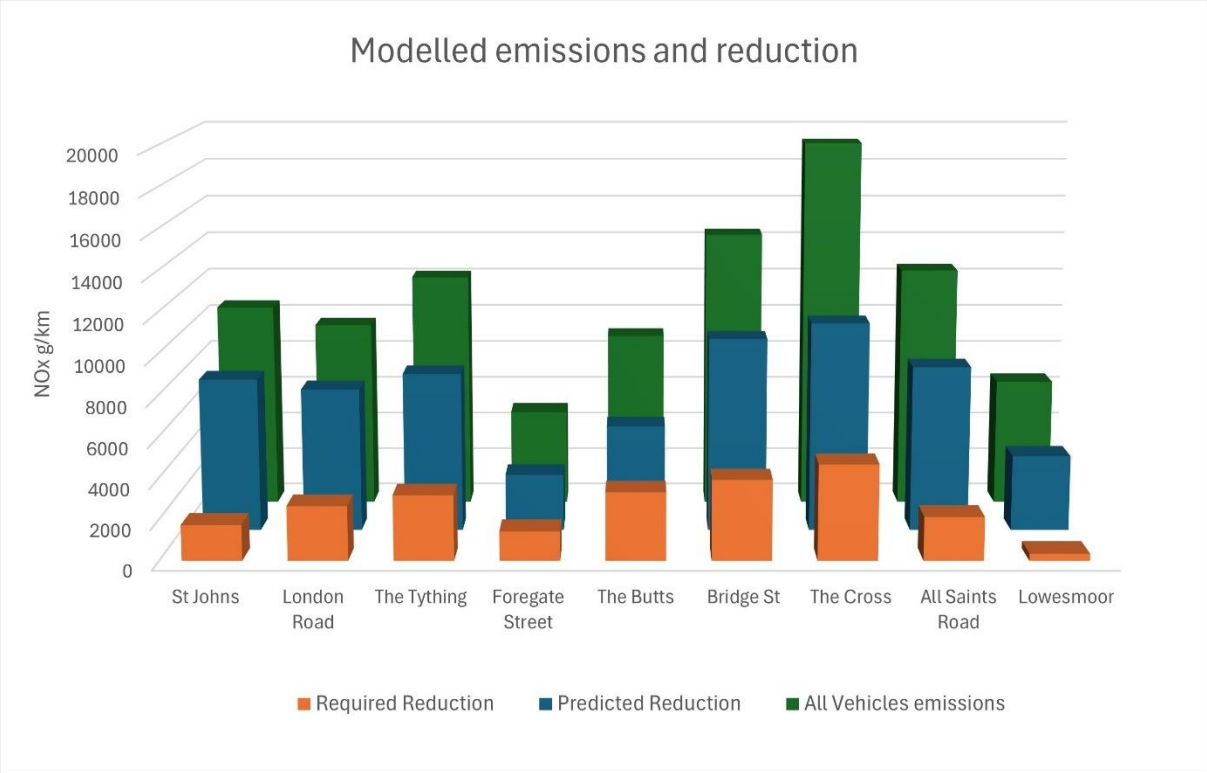
Source Name	All Vehicles Emissions NOx (g/km)[1]	Required Reduction NOx (g/km)[2]	2018 - 29 Modelled Reduction NOx (g/km)[3]	Reduction Achieved
St Johns	10544	-1792	-7820	Yes
London Road	6458	-1840	-4904	Yes
The Tything	12151	-3281	-8115	Yes
Foregate Street	4899	-1470	-2886	Yes
The Butts	9017	-3427	-5398	Yes
Bridge St	14426	-4039	-9927	Yes
The Cross	19247	-4812	-10716	Yes
All Saints Road	12523	-2192	-8468	Yes
Lowesmoor	6538	-360	-3856	Yes

[1]All Vehicles Emission NOx (g/km) calculated from Source Apportionment (2022) outputs
[2]Required Reduction NOx (g/km) calculated from Source Apportionment (2022) assessment
[3]Modelled Reduction NOx (g/km) calculated total of quantifiable measures

Further explanation on the modelling process, EFT outputs and modelled measures is provided is section 4.2.4 above. Inputs and outputs of each modelled scenario are shown in Appendix G: Modelled Measures in the accompanying Technical Appendices document.

Figure 4.3 below shows the predicted modelled emissions reduction achieved (middle column) compared with total emissions within each hotspot determined from the source apportionment study (back) and the required emissions reduction to achieve compliance (front).

Figure 4.3 Total emissions, predicted and required emissions reduction of NOx in each AQMA hotspot



In accordance with guidance received, consideration has been given to the date at which compliance is expected to be achieved, both with and without the implementation of the AQAP measures.

The impact assessment indicates the proposed measures are sufficient to achieve compliance with the current AQO for annual average NO_2 of 40µg/m^3 in all areas of the Worcester City AQMA within the lifetime of this AQAP (2024-29).

It is challenging to predict if compliance with the AQO will be achieved without the measures in this AQAP due to the following factors:

- Limited available long term trend data (only 2 full calendar years 2022-23) since traffic levels returned to near pre-pandemic levels;
- Variability in climate – weather has significant impact on concentrations of air pollutants in any given period and varies from season to season, year to year;
- Unpredictable impact of EV uptake without supporting charging infrastructure and the measures contained within this AQAP;

- Unpredictable improvements to the commercial bus fleet without Bus Service Improvement Plan and Enhanced Partnership intervention;
- Unpredictable impacts of behavioural change aspects.

Table 2.1 demonstrates the variability in air pollution concentrations and unpredictable nature of air quality trends. The monitoring data shows nitrogen dioxide concentrations have generally declined year on year between 2019 – 2023 in Worcester City, when removing the pandemic impacted years of 2020-21 from the trend analysis. Some locations have seen rises in concentrations between 2019-22 and a decrease between 2022-23. However, measured concentrations at The Butts have risen between 2019 and 2022, and again in 2023 and remain well above the AQO. This would indicate that compliance is unlikely without the interventions outlined within this action plan. However, further monitoring data and long-term trend analysis is required to provide greater confidence and accuracy in this prediction.

4.2.6 Maintaining compliance

Worcester City Council will continue to monitor pollutants within its political boundary to ensure air quality standards and objectives are maintained after compliance has been achieved.

The Steering Group will meet at least annually or bi-annually to review progress of measures within the plan and ascertain if Key Performance Indicators have been achieved. Consideration will be given to inclusion of any emerging impactful developments on local air quality and/or additional measures required to maintain compliance with the AQO within Worcester City.

Worcester City Council will report on monitoring, long term trends, progress of measures and amendments to the AQAP in the Annual Status Report of air quality.

5 AQAP Measures

Table 5.1 below shows the Worcester City AQAP measures. It contains:

- a list of the actions that form part of the plan
- the responsible individual and departments/organisations who will deliver this action
- estimated cost of implementing each action (overall cost and cost to the local authority)
- expected benefit in terms of pollutant emission reduction
- the timescale for implementation
- how progress will be monitored

NB: Please see future ASRs for regular annual updates on implementation of these measures

The following section provides more detail on the focus measures within this AQAP.

5.1 Focus Measures

5.1.1 Electric Vehicles – general

As part of the Net Zero agenda to reduce carbon emissions government propose to introduce a ban on the sale of new petrol and diesel vehicles in 2035.

The transition of the vehicle fleet from conventional internal combustion engine (ICE) powered vehicles to electric vehicles is predicted to deliver significant reductions in NOx emissions, nationally and locally.

In addition to reduced CO_2 and NOx emissions, the transition to a battery electric vehicle (BEV) fleet will contribute towards reduction in PM emissions from tailpipes and noise generated from road transport.

Local EV projections available from NEVIS have been utilised to model the predicted emissions reduction from the local car and van (LGV) fleet to 2029. The NEVIS data predicts the local car fleet will comprise 25.64% to 33.86% BEV by 2029 with hybrids registering a further 3.15% to 3.81%. BEVs will also comprise 26.25% to 34.52% of

the local LGV vehicle parc and a further 1.28% to 1.62% of this fleet consisting of hybrids.

The results of modelling undertaken indicate the emissions reduction forecast from transition to BEV vehicle parc predictions in 2029 varies greatly dependent on the proportion of cars and LGVs contribution within individual hotspots: minimum of 5.15% (Lowesmoor) to maximum of 81.60% (Bridge Street) with average 30.42% reduction in NOx emissions across all AQMA hotspots by 2029.

This transition to high proportions of BEV within local vehicle parc requires supporting EV charging infrastructure (EVCI) to meet the growing demand.

A 2022 survey by Zap-Map highlighted that whilst 82% of EV drivers (nationally) have access to charging at home, 93% of EV drivers use public charging networks, most commonly motorway service areas and charge-points at supermarkets for opportunity charging. Workplace, public car parks and business sources such as hotels are also opportunity locations for charging. As the access to and reliability of public EVCI grows, the 33% of households in Worcester without a private driveway for the installation of a chargepoint will be more likely to invest in an EV.

Local authority has a role to play in ensuring adequate levels of EVCI are available to support the transition to EV through the provision of charging in public car parks, on street charging or local hubs for those without ability to charge at home, and setting requirements of new residential and commercial development through planning policy.

Four shortlisted measures have been identified that will contribute towards greater provision of EVCI and the emissions reduction forecast in the AQMA:

- Public EV Charging Points (Worcester City)
- EV Charging Strategy (Worcestershire County Council)
- Local Electric Vehicle Infrastructure (LEVI) Capacity Funding
- Air Quality Supplementary Planning Document

5.1.2 Public EV Charging Points

In June 2023, Worcester City Council set out their approach to accelerating the transition to electric vehicles within their Electric Vehicle Charging Strategy 2023-

2025. The following public EV charging stations are identified within the strategy and have been installed since the declaration of the Worcester City AQMA:

- St Martins Gate council run multi-storey car park is located in the city centre, proximal to Lowesmoor, and since November 2021 includes a charging hub comprising six 50kw rapid and six 22kw fast EV charging points.
- University of Worcester (UoW) has invested in a significant charging hub at their Riverside campus, in St John's on the west side of Worcester. As of 2023, the hub has 6 rapid charge points (to charge 12 vehicles simultaneously) and spaces for 104 vehicles to charge on 7kW chargers. The facility is open to students and members of the public to use during the opening hours of the campus.
- In 2023, the City Council installed four fast chargers at King Street car park, allowing eight electric vehicles to charge simultaneously. Six fast chargers are expected to be ready for use from July 2024 in Tallow Hill car park, allowing 20 vehicles to charge simultaneously. These car parks are located near to London Road and Lowesmoor hotspots respectively and communities without available off-street parking.
- Worcestershire Parkway has 25 7kW (standard) chargers installed when the station was built in 2020.

The strategy identifies potential locations for future charging infrastructure from City Council owned land and priorities based on likely highest usage. Business cases for expanding the council network will be prepared as further investment arises.

- Emissions Reduction: 30.42% (part contribution)
- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £50k - £100K (Tallow Hill and Kings Street)
- Funding Sources: On Street Residential Charge-point Scheme and Worcester City Council investment

5.1.3 Worcestershire EV Charging Strategy

The Local Electric Vehicle Infrastructure (LEVI) Fund supports local transport authorities to plan and procure charging infrastructure (EVCI) solutions primarily for residents without dedicated off-street parking.

LEVI Capability funding has assisted the development of the Worcestershire County Council's Electric Vehicle Charging (EVCI) Strategy to support delivery of LEVI. Consultation on the draft of the strategy concluded in September 2024 and WCC are due to adopt and publicise the strategy later in the year. The strategy sets out the approach to the delivery of EVCI across the County over the next 5 years which will be delivered through the LEVI funding.

- Emissions Reduction: 30.42% (part contribution)
- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £50k - £100K
- Funding Sources: LEVI capability funding

5.1.4 LEVI Capacity Funding

Following the publication of the Worcestershire EV charging strategy, LEVI funding will enable the full roll out of on street EV charging to enable an accelerated transition to EVs for the 33% of Worcester City households without off-street parking[8].

Capital funding of £3.5m has been allocated to Worcestershire County Council for the delivery of EVCI across the County.

The funding is subject to the successful submission of a three-stage business case and approval from the Office of Zero Emission Vehicles (OZEV).

- Emissions Reduction: 30.42% (part contribution)

[8] Worcester City Electric Vehicle Charging Strategy 2023

- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £1million - £10million
- Funding Sources: LEVI capability funding

5.1.5 Air Quality Supplementary Planning Document

Malvern Hills District, Worcester City and Wychavon District Councils have joined together to prepare the South Worcestershire Development Plan (SWDP) with the aim of ensuring that future development within South Worcestershire is well planned, managed effectively and has a positive impact on the environment.

In collaboration with Worcestershire County Council and support from WRS, the South Worcestershire District Councils have produced a draft Air Quality SPD to provide planning assistance to reduce impacts of new development on air quality and reduce the impacts of air pollution on residents of new development.

The SPD collates existing national and county-wide guidance in respect of air quality with the SWDP policies. Mitigation measures outlined within the SPD are not limited to reducing NOx pollution or installation of EV charging points, however EVI are a recommendation for new development as part of good design. WRS Technical Guidance Note for Planning and WCC Streetscape Design Guide outline the requirements for EVI within new developments consisting of 10 residential properties or more, or a commercial property with 10 or more parking spaces, as follows:

- **Commercial Development**: Electric vehicle charging points should, as a minimum, be installed in 10% of the allocated parking spaces of a commercial development.
- **Domestic Development**: An EV charging point should be installed within each proposed dwelling in accordance with Worcestershire County Council Streetscape Design Guide. For developments with unallocated parking i.e. flats/apartments 1 EV charging point per 10 spaces (as a minimum).

The draft AQ SPD will be published for consultation at same time as this AQAP in July 2024.

- Emissions Reduction: 30.42% (part contribution)

- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £10k - 50k
- Funding Sources: South Worcestershire authorities, WCC and WRS in-house resources

5.1.6 Directional Signage (HGVs)

Larger road vehicles such as Heavy Good Vehicles (HGVs) contribute disproportionate amounts of NOx emissions compared to their numbers on local roads. HGVs make up 1.17% to 2.43% of vehicles within the AQMA hotspots but are predicted to contribute between 4.50% and 12.94%, average 9.1%, of local traffic emissions. The exception is London Road where heavy freight vehicles are the second highest contributor at 30.62% NOx emissions from 7.45% of local traffic.

Traffic data provided from WCC Highways indicates HGV through traffic on strategic routes has reduced since the completion of widening and improvement works to the carriageway of the Southern Link Road (SLR).

It is predicted further reductions can be achieved through enhanced signage on key routes to encourage use of the SLR and further discourage transit through city centre via other strategic roads. This WCC led improving action is at an early stage of development at this time and detail of the mechanism for delivering the signage is yet to be determined.

The result of modelling undertaken indicate the emissions reduction forecast from this measure is minimum of 2.49% (Lowesmoor) to maximum of 28.72% (London Road) with average 8.31% reduction in local road NOx emissions across all AQMA hotspots by 2029.

Additionally, the reduction in HGV fleet transit through the city will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport.

- Emissions Reduction: 8.31%
- Sources impacted: HGVs
- No. of AQMA hotspots benefitting: 5 (Strategic Routes)

- Cost: £100k - £500k
- Funding Sources: Not yet identified

5.1.7 Behavioural Change Officer Post (Countywide Air Quality Strategy)

Actions to encourage behavioural change can deliver future and continuing benefits for air quality, carbon reduction and public health. WRS has funded a Behavioural Change Officer (BCO) post for up to 3 years from March 2024. The post is funded from s106 contributions from new planning developments to provide air quality improvements.

The BCO role will focus on working with schools and other community settings across the county, providing information and advice about local air quality, and encouraging sustainable behaviours, such as switching from short car journeys to active travel modes of transport. The BCO, working in close partnership with WCC Public Health, will utilise monitoring and survey data to inform future work programmes.

As a first step WCC Public Health, in collaboration with WRS, have undertaken an Air Quality Behaviour Change survey to establish baseline behavioural patterns and understanding regarding air quality. A summary of the key findings from the survey are provided in Appendix F: Air Quality Survey Summary.

In addition to contributing towards this AQAP for Worcester City, this work also forms part of the evolving Air Quality Strategy for Worcestershire. The vision for this strategy is to improve the health and wellbeing of the local population and provide air quality improvements across the county. The strategy will contribute towards compliance with national air quality standards and policy but extend beyond the specific focus of district AQAP's. The strategy will be a continuing area of work undertaken by the Public Health Sub-group. At this time the strategy is at an early stage and will be developed further work once priority work, such as this AQAP, have been completed in 2024-2025.

This measure aligns with other Behavioural Change encouraging focus measures, specifically those progressed as part of the developing Air Quality Strategy for Worcestershire, Travel Choices and Sustainable Modes of Travel to School .

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure has the potential to deliver a small, <3%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, improve residents' health through increased activity and encourage long term sustainable and healthy travel behaviours within early age groups.

- Emissions Reduction: <3%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £100k - £500k
- Funding Sources: s106 funds

5.1.8 Encouraging Awareness via Public Portal of Real Time Monitoring Data (Countywide Air Quality Strategy)

In February 2023, WRS were successful in a bid to the Defra Air Quality Grant Scheme 2022/23 to establish an enhanced real-time air quality monitoring network across Worcestershire. The scope of the bid was to establish a real-time air quality monitoring network across the main areas of air quality concern in Worcestershire for purposes of providing enhanced monitoring data on a range of pollutants. Additionally, the proposal included informing the public and vulnerable groups of the status of air pollution in real time to encourage behaviour change.

The scheme involves the installation of 'low-cost Air Quality Monitors' across the county which measure NO_2, PM_{10}, and $PM_{2.5}$. Ten of the twenty-six monitors across the county were installed in Worcester City in January 2024 and are funded to operate for 3 years. The sensors, known as 'Zephyrs' are provided, operated and serviced by Earthsense who also provide data access.

Earthsense and WRS have designed a publicly accessible portal to the real time monitoring data which launched in May 2024.

In addition to contributing towards this AQAP for Worcester City, this work also forms part of the evolving Air Quality Strategy for Worcestershire – refer to section 5.1.7 above for further information.

This measure aligns with other Behavioural Change encouraging focus measures, specifically those progressed as part of the developing Air Quality Strategy for Worcestershire, Travel Choices and Sustainable Modes of Travel to School .

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure has the potential to deliver a small, <3%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, improve residents' health through increased activity and encourage long term sustainable and healthy travel behaviours within early age groups.

- Emissions Reduction: <3%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £100k - £500k
- Funding Sources: Defra Air Quality Grant (90%) and 6 Worcestershire District Authorities match funding (10%)

5.1.9 Encouraging awareness and behavioural change interventions linked to focussed real time monitoring data (Countywide Air Quality Strategy)

The aim of this measure is to utilise available real time monitoring in locations within proximity of poor air quality in Worcester to inform actions to protect most vulnerable communities.

WRS in collaboration with WCC Public Health will work with identified local schools, communities and organisations to implement positive interventions and action through raising awareness of air pollution and encouraging behavioural change.

This measure will also utilise the outcomes of the baseline Air Quality Behaviour Change survey which was undertaken in 2024 by WCC Public Health. A summary of

the key findings from the survey are provided in Appendix F: Air Quality Survey Summary.

In addition to contributing towards this AQAP for Worcester City, this work also forms part of the evolving Air Quality Strategy for Worcestershire – refer to section 5.1.7 above for further information.

This measure aligns with other Behavioural Change encouraging focus measures, specifically those progressed as part of the developing Air Quality Strategy for Worcestershire, Travel Choices and Sustainable Modes of Travel to School .

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure has the potential to deliver a small, <1%, emissions reduction by 2029.

- Emissions Reduction: <1%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 4
- Cost: £50k - £100k
- Funding Sources: Not yet identified

5.1.10 Bike Hire and Bike Share Scheme

Bike share is any scheme where bikes or e-bikes are available to multiple users. Can be a mixture of pedal and bikes with the intention of replacing short car trips with more sustainable active travel modes.

Worcester City Council are introducing a bike share scheme across Worcester comprising 225 bicycles - 175 of them electric bikes – available to hire, from over 50 parking stations across the city. Customers will be able to choose from a number of hire options, including paying by the minute and monthly subscriptions.

The contract to deliver a bikeshare scheme was awarded to experienced operator Beryl with the scheme launching in 2024.

Based on Beryl Bikes standard ridership metrics it is predicted the scheme will deliver approximately 146,000 cycle trips annually with 48,180 of these replacing a private vehicular trip.

The result of modelling undertaken indicate the emissions reduction forecast from this measure is <1% reduction in NOx emissions across all AQMA hotspots by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion and improve residents' health through increased activity.

The funding for the capital investment required to establish this scheme has been secured as part of the Council's Town Fund bid, with a total of £700,000 being allocated. There is the potential to seek additional funding for E-Cargo bikes in the future.

- Emissions Reduction: <1%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £500k - £1m
- Funding Sources: Towns Fund

5.1.11 Bus Fleet Improvements

Larger road vehicles, such as buses, contribute disproportionate amounts of NOx emissions compared to their numbers on local roads. Buses comprise between 0.60% (London Road) to 10.48% (Lowesmoor) of vehicle journeys within the AQMA hotspots but are predicted to contribute between 4.57% and 58.19%, average 29.38%, of local traffic emissions.

Worcestershire County Council will work with bus operators to increase proportion of EC VI vehicles within the local fleet through the Bus Service Improvement Plan (BSIP) and an Enhanced Partnership (EP) agreement which was concluded in November 2023.

As of January 2024, 59% of First Bus fleet (largest fleet operator in Worcester) are currently EC VI with EC V equipped with EGR (Exhaust gas recirculation) making up 36% and the remaining 5% consisting of EC III or IV buses. The fleet has been

continually improved since 2018 when the fleet comprised only 18% EC VI, 21% EC V, and 47% being EC III or older.

First Bus have confirmed they are no longer purchasing new diesel vehicles. At present there are currently no plans to convert the fleet serving Worcester to electric. Application to future Zero Emission Bus Regional Areas (ZEBRA) funding rounds maybe considered in the future.

Therefore, it is likely improvements to local fleet will occur via cascading of EC VI buses from other parts of the Midlands. A conservative projection for the 2029 fleet of 78% EC VI and 22% EC V has been assumed for modelling purposes based on trajectory of fleet upgrades between 2017 and 2023.

The result of modelling undertaken indicate the emissions reduction forecast from this measure is minimum of 1.21% (Lowesmoor) to maximum of 33.47% (London Road) with average 14.66% reduction in local road NOx emissions across all AQMA hotspots by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions generated from road transport.

- Emissions Reduction: 14.66%
- Sources impacted: Buses
- No. of AQMA hotspots benefitting: 9
- Cost: £1m - £10m
- Funding Sources: Not yet identified

5.1.12 Travel Choices

Worcestershire County Council propose to refresh measures to promote sustainable travel choice including real time information boards on active travel corridors, promotion of cycling events, installation of cycle parking, signage to improve wayfinding and potentially involving new apps.

The original 5-year Travel Choice scheme, Choose How You Move CHYM, achieved notable changes in travel mode choice across Worcester between 2004 and 2008. Based on surveys with representative samples of more than 4,000 people before and after CHYM, there was a relative:

- Reduction of 7 per cent in car-as-driver trips per person per year
- Reduction of 4 per cent in car-as-passenger trips
- Increase of 11 per cent in walking trips
- Increase of 19 per cent in bicycle trips
- Increase of 20 per cent in bus trips
- Estimated saving of around 3,900 tonnes of CO^2 per year from personal car use

This measure aligns with other Behavioural Change encouraging focus measures, particularly those progressed as part of the developing Air Quality Strategy for Worcestershire.

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure has the potential to deliver a small, <3%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion and improve residents' health through increased activity.

- Emissions Reduction: <3%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £500k - £1m
- Funding Sources: Not yet identified

5.1.13 Active Travel Guides for Business

In June 2023 Worcester City Council published their first ever Active Travel Plan 2023-25. Objectives of the Active Travel Plan are to:

- Increase rates of active travel in Worcester particularly amongst groups with low participation
- Make active travel inclusive and accessible for all

- Increase the number of schools engaged with active travel
- Increase participation and engagement in active travel-related events
- Increase usage and awareness of key active travel routes in Worcester including the riverside and canal paths

One of the actions identified from the plan is to support and encourage businesses to reduce travel emissions (from cars and vans) through provision of online Active Travel Guides. Subject to sourcing of funding, it is anticipated the guides will be available in 2025 and take up will be measured through online downloads of guide and behavioural change surveys.

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, and reduce congestion.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £10k - £50k
- Funding Sources: Not yet identified

5.1.14 Raising Awareness Events (Countywide Air Quality Strategy)

The aim of this measure is to promote behavioural change and raise awareness of air pollution and positive action that can be taken through a programme of annual action days. The Public Health (Steering Group) Sub-group members initial collaborative event was Clean Air Day in June 2023, followed by Clean Air Night in January 2024.

At this time of writing, the future focus, contributors, and responsibilities of the working group is under review. Following resolution with air quality partners it is anticipated a programme of annual events will be scheduled as part of work towards

the evolving Air Quality Strategy for Worcestershire in 2025 – refer to section 5.1.7 above for further information.

This measure aligns with other Behavioural Change encouraging focus measures, specifically those progressed as part of the developing Air Quality Strategy for Worcestershire, Travel Choices and Sustainable Modes of Travel to School .

It has not been possible to quantify impacts of this measure, at this time, due to the continuous application and the unpredictable outcomes of behaviour change actions. It is considered the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion and improve residents' health through raised awareness and behavioural change or increased activity.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars, LGVs
- No. of AQMA hotspots benefitting: 9
- Cost: £10k - £50k
- Funding Sources: Not yet identified

5.1.15 Communications Plan (Countywide Air Quality Strategy)

The formation of a countywide (county and district authorities) strategy for communicating messages, details of events and advice is considered a key component of the evolving Air Quality Strategy for Worcestershire – refer to section 5.1.7 above for further information.

At this time this is at an early stage of development, though many of the other measures outlined within this AQAP will be developed and incorporated within the Communication Plan.

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, and improve residents' health through raised awareness and behavioural change or increased activity.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £10k - £50k
- Funding Sources: Not yet identified

5.1.16 Worcester Local Cycling and Walking Infrastructure Plan (LCWIP)

Government has set targets for half of all short urban journeys being walked, wheeled, or cycled by 2030 in their Cycling and Walking Investment Strategy (2017). To help to achieve this Worcestershire County Council are currently developing a Local Cycling and Walking Infrastructure Plan (LCWIP) for Worcester City due for completion in late 2024.

The LCWIP, funded through Active Travel England, will set out cycling and walking improvement plans for Worcester City over a 10-year period and will form part of the Local Transport Plan (LTP5).,

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the development stage of the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029 with the implementation stage predicted to deliver a small impact, <3%, as a minimum by completion of the programme.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, and improve residents' health through increased activity.

- Emissions Reduction: <0.2% (Development Stage, <3% (Delivery Stage)
- Sources impacted: Petrol and diesel cars

- No. of AQMA hotspots benefitting: 9
- Cost: £50k - £100k (Development stage), >£10m (Delivery Stage)
- Funding Sources: WCC, Active Travel England

5.1.17 Sustainable Modes of Travel to School

The charity Living Streets concluded in their 'Swap The School Run for a School Walk' that 1 in 4 morning peak cars are school traffic. Assuming a similar volume in evening peak hours, local school traffic approximately accounts for 6.4% of car AADT which translates to 2.38% on average of emissions within applicable AQMA hotspots. It is considered likely school bound traffic will be concentrated on the SRN and local roads, and limited in the AQMA hotspot areas adjacent to the high street.

Worcester City Council with air quality partner Worcestershire County Council will encourage and support schools to become ModeSHIFT star accredited through the introduction and implementation of travel plans, cycling and create long-term change in travel habits for school aged children and their parents.

Whilst some schools in Worcester are registered for ModeSHIFT it has been identified more support and resource is required to help schools within Worcester develop Travel Plans and put into action.

This measure aligns with other Behavioural Change encouraging focus measures, particularly those progressed as part of the developing Air Quality Strategy for Worcestershire, outlined above.

This measure is at an early stage of development and the outcomes of behaviour change actions are unpredictable. A 10% reduction in school travel by car/van in participating schools is considered feasible and it is anticipated the measure will deliver a negligible to small impact, <1%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, improve residents' health through increased activity and encourage long term sustainable and healthy travel behaviours within early age groups.

- Emissions Reduction: <1%
- No. of AQMA hotspots benefitting: 6

- Cost: £100k - £500k
- Funding Sources: Not yet identified

5.1.18 Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicles

Reducing the emissions from its own vehicle fleet is a priority for Worcester City Council and to this end the council have a rolling programme of vehicle replacement.

The replacement of 8 current RCV's with newer EC VI vehicles are planned between 2024 and 2029. RCVs contribute to the emissions attributable to HGVs, see section 5.1.6 for details of HGV emissions.

The council are exploring the potential to transition to an electric fleet and depot in the future but that is unlikely to occur within the timescale of this AQAP.

Additionally, Worcester City Council are restructuring the fleet of Light Commercial Vehicles (LCVs), sweepers, mules, mowers to reduce the number of vehicles the Council require and look to replace diesel powered vehicles with battery powered electric vehicles.

The council's fleet of pool cars is currently a mix of electric, diesel and petrol powered, and the local authority are looking at restructuring these as well to reduce the overall number and aim to be 100% electric within the next replacement cycle (within financial year 2025-26).

It is considered the measure is likely to deliver no greater than a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions generated from road transport.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars, LCVs, HDVs
- No. of AQMA hotspots benefitting: 9
- Cost: £100k - £500k
- Funding Sources: Worcester City Council

5.1.19 Additional cycle parking / storage

Encouraging and providing more opportunities for sustainable travel and transport options is a key priority for Worcester City Council. There is an identified opportunity to install new secure cycle parking in the city centre, based on consultation responses and stakeholder engagement. Limited existing provision is a clear barrier to cycling with high levels of concern regarding bike theft. This action is dependent on the identification of additional funding.

It has not been possible to quantify impacts of this measure, at this time, due to the early stage of development and the unpredictable outcomes of behaviour change actions. It is considered the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion, and improve residents' health through increased activity.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £100k - £500k
- Funding Sources: Not yet identified

5.1.20 Bus stop infrastructure – bus shelter provision

Worcestershire County Council propose to improve and upgrade bus shelters to promote bus use and increase modal shift from cars to public transport. This measure would include display screens to provide up to date information such as service routes. Potentially this measure would be delivered as part of the Bus Service Improvement Plan (BSIP) and Enhanced Partnership (EP).

It is considered the measure is likely to deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, reduce congestion and improve residents' health through increased activity such as walking to bus stops.

- Emissions Reduction: <0.2%
- Sources impacted: Petrol and diesel cars
- No. of AQMA hotspots benefitting: 9
- Cost: £500k - £1m
- Funding Sources: Not yet identified

5.1.21 Remove City Centre HGV Parking

Worcester City Council will consider the removal of HGV parking spaces from a city centre car park to reduce unnecessary HGV journeys traversing the city. It is considered the removal of 8 HGV spaces in Croft Road car park will remove a proportion of HGVs journeying into the heart of the city from the M5 motorway - London Road – Bridge Street and out via All Saints Road – London Road.

This proposal is in tandem with other measures to reduce emissions from HGV fleet within the city - see 5.1.6 for details of HGV emissions.

The result of modelling undertaken indicate the emissions reduction forecast from this measure is minimum of 1.42% (London Road) to maximum of 2.03% (Bridge Street) across the 3 impacted AQMA hotspots with average 0.12% reduction in local road NOx emissions across all AQMA hotspots by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport, and reduce congestion.

- Emissions Reduction: <0.2%
- Sources impacted: HGVs
- No. of AQMA hotspots benefitting: 3
- Cost: £10k - £50k
- Funding Sources: Not funded

5.1.22 Anti-Idling Awareness for Taxis Drivers

Taxis are predicted to contribute between 3.87% (All Saints Road) and 13.61% (Foregate Street), average 7.88% of local traffic emissions. NB No data is available for London Road and St Johns.

As outlined in the Executive Summary, Worcester City have already introduced measures to incentivise transition to electric vehicles and recue emissions from the local taxi fleet.

Worcester City Council propose to encourage Taxi drivers to switch off engines whilst waiting in ranks. By the nature of their business taxi drivers spend significant amounts of time waiting to collect passengers. During these periods there is a tendency to leave engines idling, often in areas where there are people in close proximity.

NB It is acknowledged available modelling does not allow for the contribution to local emissions from idling in hotspots to be assessed. To calculate this contribution requires a more sophisticated study and dataset, and modelling technique than available at this time. However, in view of contribution of the taxi fleet to source emissions, the council recognise the requirement to incorporate additional measures within this AQAP in line with the key priority of reducing emissions from transport.

In Sept 2022, Worcester City Council introduced engine idling as a specific offence in the taxi penalty point scheme outlined within the Hackney Carriage and Private Hire Licensing Policy.

Provisional proposals for this measure include:

- Raising Awareness campaign via Taxi newsletters (emailed), leaflets, Social media posts, Taxi forums, speaking at local community groups and places of worship, Press articles and WhatsApp groups.
- Include the topic in New Driver Training as part of Drivers Competency Certificate
- Enforcement and compliance checks

Considering the limited locations of taxi ranks within the AQMA hotspots it is likely the measure will deliver a negligible impact, <0.2%, emissions reduction by 2029.

Additionally, this measure will contribute towards a reduction in $PM_{2.5}$ and carbon emissions and noise generated from road transport.

- Emissions Reduction: <0.2%
- Sources impacted: Taxis
- No. of AQMA hotspots benefitting: 2
- Cost: £10k - £50k
- Funding Sources: Not funded

Table 5.1 – Air Quality Action Plan Measures

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
1	Public EV Charging Points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2023	2024	WCC, **City Council**	On Street Residential Charge-point Scheme and council investment	N	Funded	£50k-£100k	Implementation	**30.42%***	Number of vehicles charging / number of new users	Kings car park completed 2023. Tallow Hill due to go operational in July 2024	
2	Worcester-shire County Council EV Charging Strategy	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2025	2025	**WCC,** City Council	LEVI capability funding	N	Fully Funded	£50k - £100k	Planning	**30.42%***	Publication of Strategy	Funding secured	
3	LEVI Capacity Funding	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2025	2028	**WCC,** City Council	£3.4m local EV Infrastructure Fund	N	Fully Funded (subject to business case process)	£1 million - £10 million	Planning	**30.42%***	Number of EV chargers installed	Planning Phase	subject to 3-stage business case process

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
4	Air Quality Planning and Policy Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2024	2024	**WCC**, City Council, WRS	WCC, South Worcestershire Authorities, WRS	N	Not funded	£10k - £50k	Planning	**30.42%***	Adoption of plan by South Worcestershire Councils	Consultation on draft SPD completed September 2024. Updated and Final version due early 2025.	Difficult to determine contribution of future development on improving current air quality concentrations
5	Directional Signage	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2025	2030	**WCC**	Not Yet Identified	N	To Be Confirmed	£100k-£500k	Planning	8.31%	Scheme delivery monitoring (e.g. City centre HGV counts)	Planning Phase	Funding availability
6	Countywide AQ Strategy - Behavioural Change Officer Post	Public Information	Via other mechanisms	2024	2026	**WRS**	S106	N	Funded	£100k - £500k	Implementation	<3%	Future Stakeholder engagement	Interviews for post 01/24, post begun 25/02/24	
7	Countywide AQ Strategy - Encouraging awareness via Public Portal of real time monitoring data	Public Information	Via the Internet	2024	2027	**WRS**, Earthsense, WCC, District Councils	Defra, Districts	Yes	Fully Funded	£100k - £500k	Completed	<3%	Number of website hits on public portal	Monitors deployed Jan 2024, Public Portal due April 2024	

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
8	Countywide AQ Strategy - Encouraging awareness and behavioural change interventions linked to focussed real time monitoring data	Public Information	Via other mechanisms	2024	2027	WRS, **WCC**, District Councils	Not Yet Identified	N	To Be Confirmed	£10k-50k	Planning	<1%	Number of responses to survey, hits on website, data captured. Changed behaviour identified from repeat survey in future	Baseline AQ Survey running Feb - May 2024	
9	Bike hire and bike share	Transport Planning and Infrastructure	Public cycle hire scheme	2024	2029	**City Council, WCC**	Towns Fund	N	Fully Funded	£500k - £1 million	Implementation	<1%	Number of journeys / number of journeys replacing vehicle use	Supplier secured, Implementation Stage	4 year minimum contract, intended to be financially sustainable after the upfront capital funding
10	Bus fleet improvement (local bus services)	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2026	2029	**Bus Operators,** WCC,WRS	Not Yet Identified	N	To Be Confirmed	£1 million-£10million	Planning	14.66%	% of bus fleet Euro 6	Planning Phase	Funding availability, Operator Agreement
11	Travel Choices	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2025	2030	**WCC** incl. Public Health/ City Council, key stakeholders - schools, UoW	Not Yet Identified	N	To Be Confirmed	£500k-£1million	Planning	<3%	Number of walking, cycling, scooting and number of participating organisations and activities delivered	Planning Phase	Funding availability

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
12	Active Travel Guides for business	Promoting Travel Alternatives	Other	2025	2027	WCC, City Council	Not yet identified	N	To be confirmed	£10k-50k	Planning	<0.2%	Number of businesses engaged , number of downloads of guides or website hits, behavioural change confirmed through surveys	Planning	Funding availability
13	Countywide AQ Strategy - Raising awareness events	Public Information	Other	2023	Ongoing	**WCC Public Health**, WRS	Not yet identified	N	To be confirmed	£10k-50k	Implementation	<0.2%	Support minimum of 3 national events. Number of events attended. Number of people engaged	Clean Air Day 06/2023, Clean Air Night 01/2024 promotion undertaken. Further events planned for 2024	
14	Countywide AQ Strategy - Communications Plan	Policy Guidance and Development Control	Other	2025	Ongoing	**WCC Public Health**, WRS	Not yet identified	N	To be confirmed	£10k-50k	Planning	<0.2%	Production of communication plan	Planning Phase	
15	Worcester Local Cycling and Walking Infrastructure Plan (Develop-ment)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2024	2025	**WCC** inc. Public Health, City Council, key stakeholders, Active Travel England	WCC, Active Travel England	N	Fully funded	£50k-£100k	Planning	<0.2%	LCWIP completed by March 2025	Planning Phase	

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
16	Travel to School	Promoting Travel Alternatives	School Travel Plans	2025	2030	WCC inc. Public Health/City Council/ Schools & Colleges	Not Yet Identified	N	To Be Confirmed	£100k-£500k	Planning	<1%	Number of walking, cycling, scooting, car, and park & stride trips; Number of participating schools and of activities delivered	Planning Phase	Funding availability
17	Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicle	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2024	2029	**City Council**	City Council	N	Funded	£100k-£500k	Implementation	<1%	Replacement of vehicles	Rolling replacement programme	
18	Additional cycle parking / storage	Promoting Travel Alternatives	Promotion of Cycling	2026	2026	**City Council**	Not yet identified	N	To be confirmed	£100k-£500k	Planning	<0.2%	Number of new secure bike parking spaces provided	Planning	Funding and site availability, responsibility for ongoing maintenance
19	Bus stop infrastructure – bus shelter provision	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2025	2030	**WCC,** Bus operators	Not Yet Identified	N	To Be Confirmed	£500k-£1million	Planning	<0.2%	Bus patronage (passenger demand)	Planning Phase	Funding availability

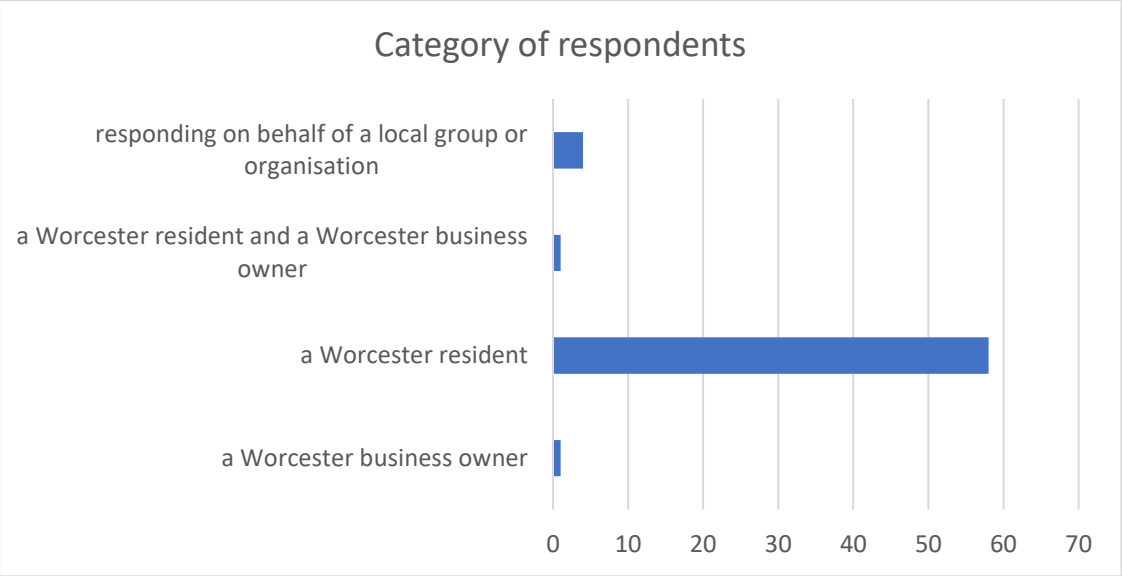
Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
20	Worcester Local Cycling and Walking Infrastructure Plan (Scheme Delivery)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2025	2035	**WCC** inc. Public Health/City Council/key stakeholders, Active Travel England	Active Travel England	N	To Be Confirmed	>£10million	Planning	<3%	Scheme delivery monitoring (e.g. cycle counts)	Planning Phase	Funding availability
21	Remove City Centre HGV Parking	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2025	2025	**City Council**	Not Funded	N	Not funded	£10k - £50k	Planning	<0.2%	Removal of Parking	Planning Phase	
22	Anti Idling awareness for Taxis	Traffic Management	Anti-idling enforcement	2025	Ongoing	**City Council,** WRS	Not Funded	N	Not funded	£10k - £50k	Planning	<0.2%	Reduction in penalty points issued	Included as specific penalty point in Taxi Policy	

Appendix A: Response to Consultation

Worcester City Council undertook an online consultation of the Draft Worcester City AQAP between 16th July and 15th September 2024. The consultation was publicised on the council's website and through local media outlets. Paper versions of the consultation were made available at the Guildhall, High Street, Worcester. Named statutory consultees as outlined in section 4.1 were contacted directly and invited to provide comments via the website.

Consultees were asked for their views on the four key priorities for the AQAP and on each of the measures as outlined in section 3.5 and section 5 respectively. 64 responses were received from local residents, businesses and organisations.

Figure A.1 Category of respondents to consultation



No responses were received from statutory consultees with the exception of Defra – see below for further information, and a few local organisations.

Respondents were broadly in favour of the key priorities and measures outlined within the plan, responses are summarised in Figures A.2 and A.3 below.

Figure A.2 Summary of responses on key priorities

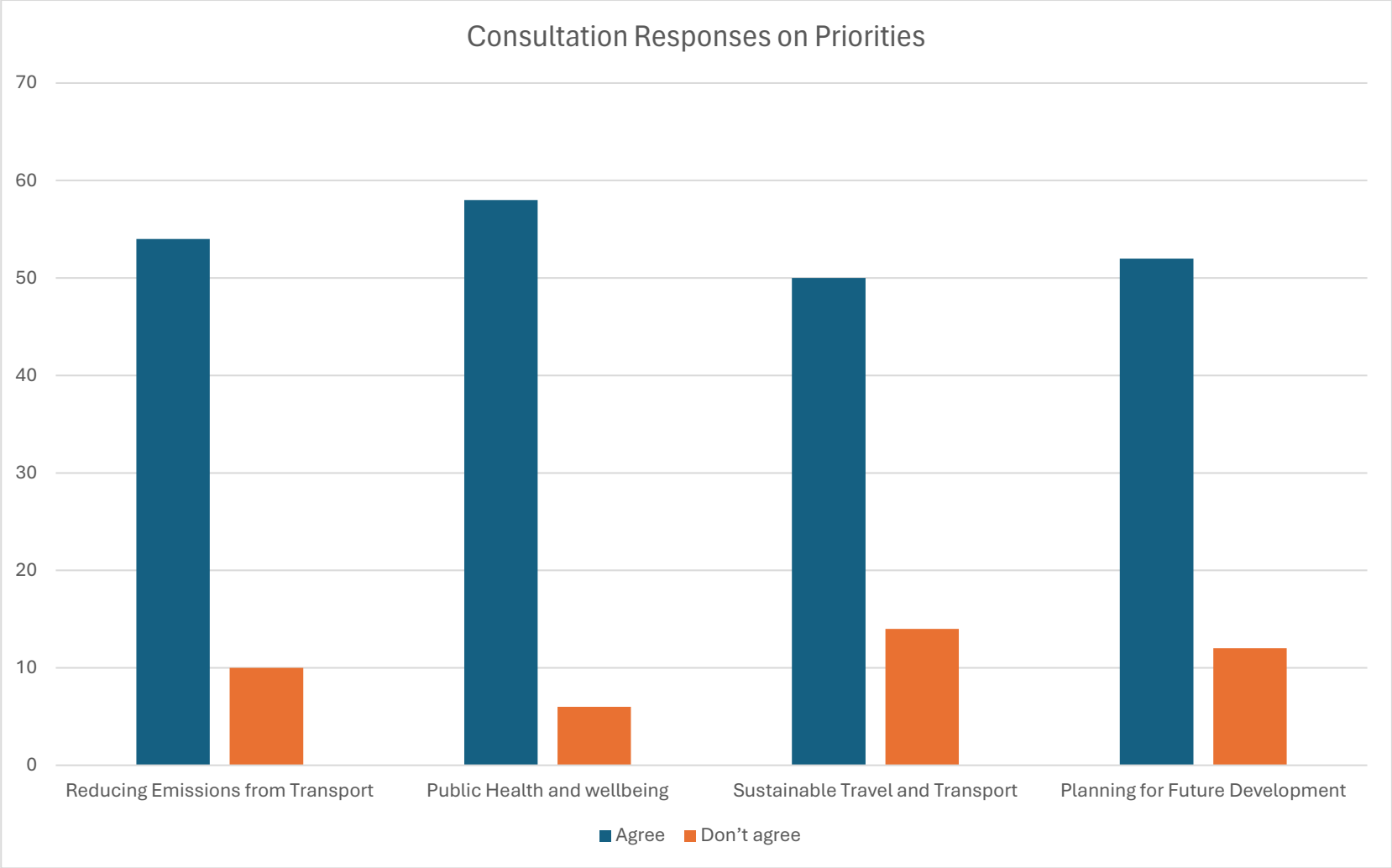
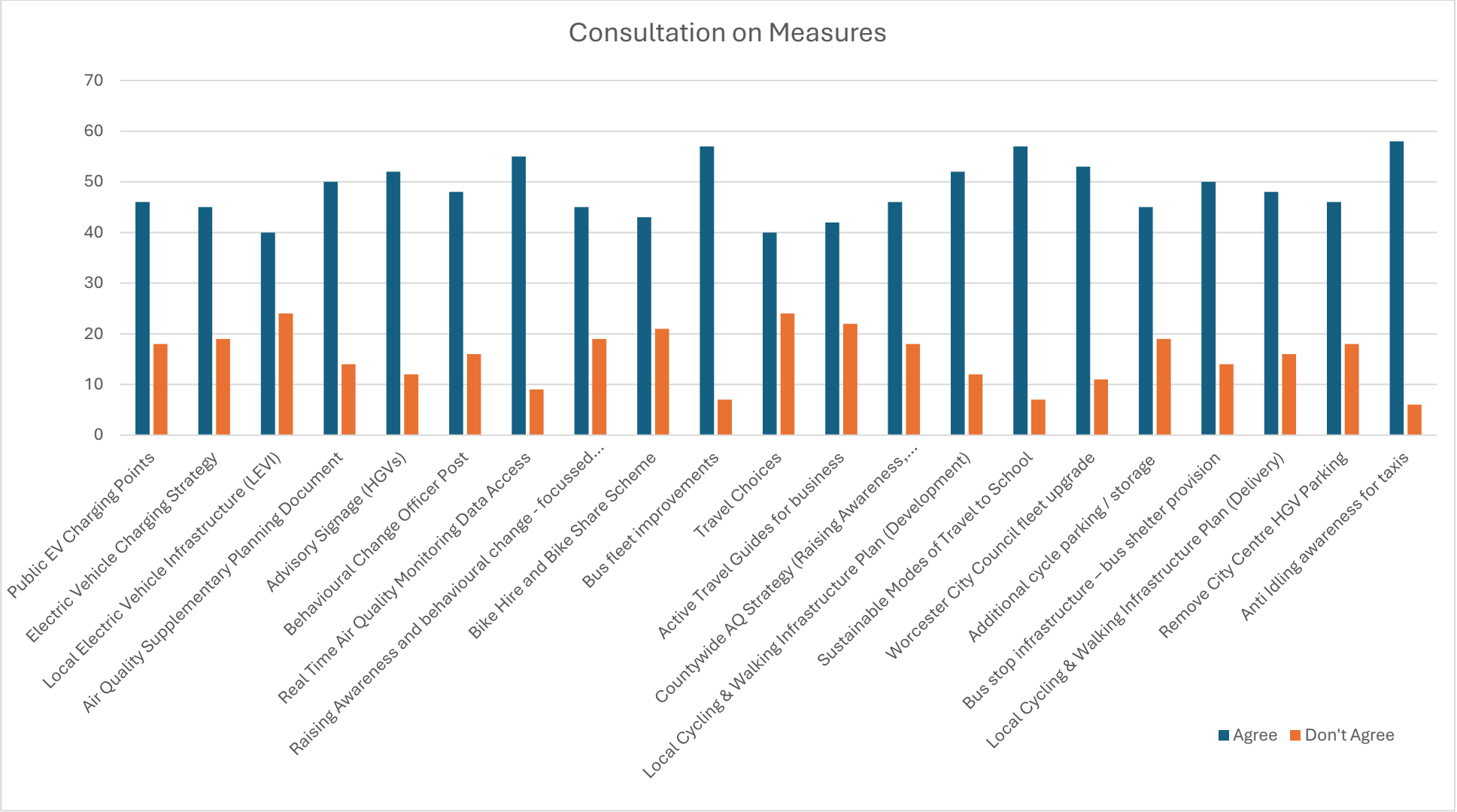


Figure A.3 Summary of responses on AQAP measures



Additional comments received have been grouped into a number of broad themes and are summarised in Figure A.4 and Table A.1 below. Comments are from Worcester City residents unless indicated otherwise.

Figure A.4 Summary of additional public comments

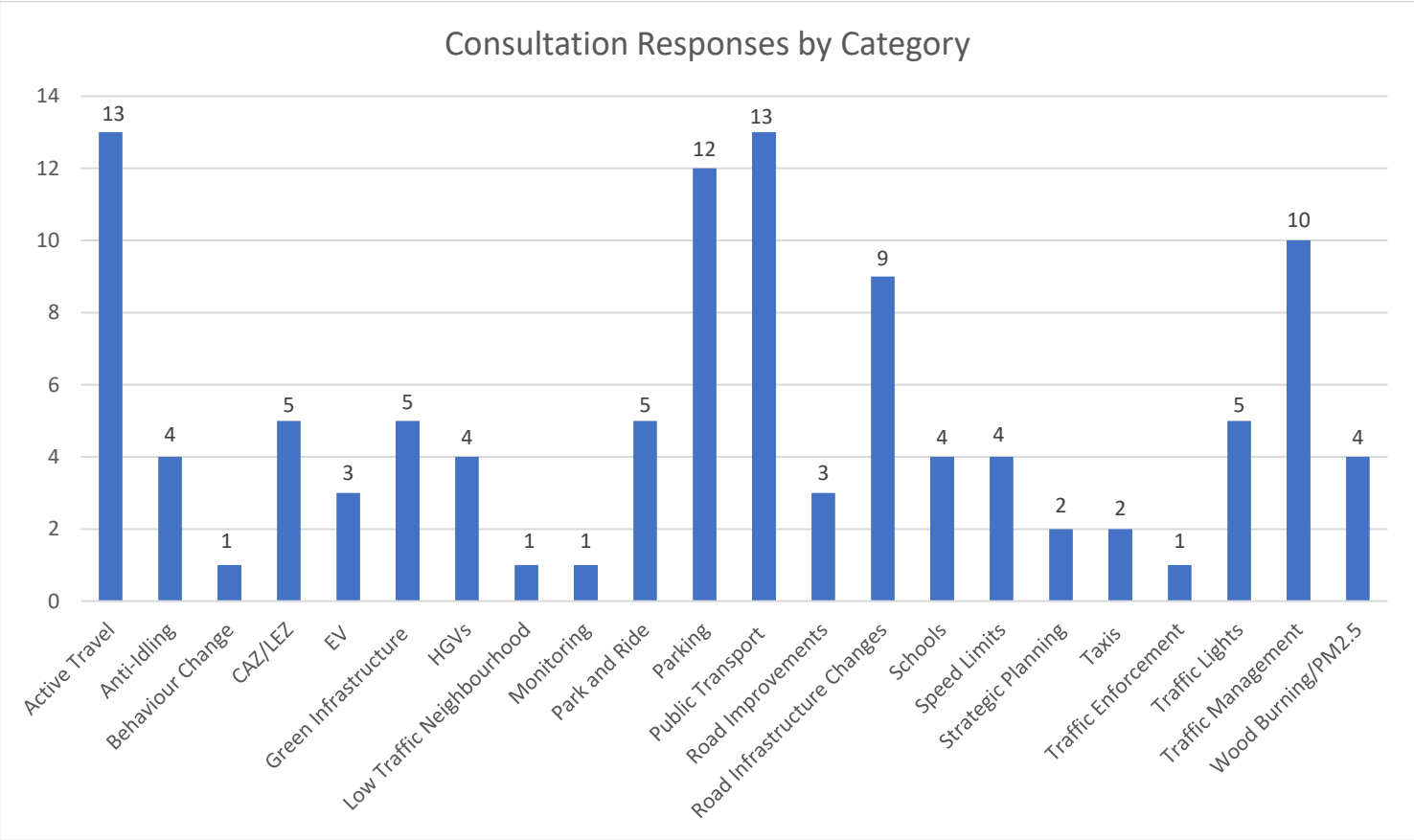


Table A.1 – Summary of additional comments

Category	Comment Summary	Response
Active Travel	1. Segregated routes for cycling from County and safe routes across the city centre 2. Provide safe cycling routes 3. Segregated cycle route and better-quality pedestrian routes. 4. Update info on safe walking and cycling routes, bike parking etc. 5. More safe cycle routes[1] 6. Make safe cycling routes for London Road, Newtown Road and Tolladine Road 7. There needs to be better cycling and pedestrian infrastructure into and around the city centre.[1] 8. Better cycling routes for surrounding villages. (Example: Clifton Upon Teme and Leominster) 9. Beryl bikes extended to surrounding villages to reduce cars coming in. 10. Provide cycle access to cycle parking and public transport. 11. More pedestrianised streets. 12. Car-free days/streets, expand pedestrianised areas, change road junctions to prioritise cyclists 13. Incentives given to encourage alternative means of transport	1 – 9. Covered by measure 5.1.16 – Local Cycle and Walking Infrastructure Plan 5. Linked to measure 5.1.19 – Cycle Parking Storage, WCC will review and update information on council website 9. WCC Beryl Bike scheme extends to areas within its political jurisdiction 10. Potential Future option: Appendix D – Mobility Hubs 11. – 12. Pedestrianised Streets - Potential Future option: Appendix D - Worcester City Centre Transport Strategy 12. Car free days covered by measure 5.1.14 Raising awareness events 13. Covered by various measures involving behavioural change actions, active travel, public transport and future options in Appendix D
Anti Idling	1. Fines for idling, particularly near schools 2. Ban idling outside schools 3. Dissuade Idling, particularly outside schools	1 – 4. Potential future option: Appendix D – Anti Idling Campaign in schools. It should be noted there are limited number of school campuses (1)

Category	Comment Summary	Response
	4. Discourage idling of all motor vehicles	within AQ hotspots and it is anticipated this action would have no impact on resolving AQMA. 4. Covered by measure 5.1.22 Anti Idling for Taxis and above. Further consideration is provided Appendix B
Behaviour Change	1. Encourage people to walk and cycle	1. Covered by various measures involving behavioural change actions, active travel, travel choices and future options in Appendix D
CAZ/LEZ	1. Introduction of emission charges for some areas, and the charges from this contribute to an improved bus system 2. Consider Class A/B Clean Air Zone 3. Make it more difficult to drive an ICE car 4. Introduce a charging Clean Air Zone 5. Implement a Low Emission Zone in city centre	1 – 5. Considered in Appendices B and D
EVs	1. Incentives for EV affordability 2. On street EV charging points, for areas where there is no private parking e.g. Arboretum 3. No electric scooters or bikes - they are deadly	1. Considered as a number of potential future options in Appendix D 2. Covered by measures 5.1.3 EVCI Strategy & 5.1.4 LEVI 3. Low emission vehicles are a significant part of the solution to resolving poor air quality in Worcester City. It is anticipated measure 5.1.16 – Local Cycle and Walking Infrastructure Plan will provide safer travel environments for all road users
Green Infrastructure	1. More trees	1 – 5. Considered in Appendix B. Not applicable to this AQAP as GI has no significant impact on

Category	Comment Summary	Response
	2. Take action to stop the paving over of front gardens or use of 'fake' grass, and consequent reduction in trees/greenery on local streets. Having more greenery would mean a significant improvement in air quality 3. Light weight, Low sedum/pollinator native green roof covering anywhere applicable 4. Plant more trees 5. Green Infrastructure has a very important role to play in improving AQ for example removing particulate matter (PM). To optimize the contribution of trees to air quality (AQ) improvement, it is crucial to carefully select tree species and strategically plan their placement. Poorly designed urban landscapes can inadvertently decrease AQ and exacerbate pollution problems. However, these challenges can be very effectively mitigated by considering tree species and urban design. While it is acknowledged that the relationship between trees, green infrastructure (GI), and air quality (AQ) is more complex than commonly perceived, we recommend revising the wording in Appendix B. Additionally, it is recommended that GI be integrated into the action plan or reference should be made to the ongoing work the city council is undertaking to develop a Tree Strategy[1]	reducing NO_2 pollution. More appropriate to consider within future Countywide AQ Strategy that will have a wider focus than this AQAP (i.e. reducing NO_2 from traffic in AQMA hotspots and street canyons.) 5. Appendix B has been updated in acknowledgement of the comprehensive comments provided
HGVs	1. Reduce HGVs, encourage local businesses to use cleaner delivery methods such as E Cargo Bikes 2. Reduce HGVs travelling through city, stronger actions than proposed (advisory notices) required to redirect to Southern Link Road 3. Reduce HGVs specifically in Wylds Lane, Fort Royal 4. Manage deliveries to city centre by HGVs[1]	1. E Cargo bikes are identified as a number of potential future options in measure 5.1.10 and Appendix D 2. Further options for freight may be considered as part of the forthcoming Worcestershire Local Transport Plan revision – see Appendix D

Category	Comment Summary	Response
		3. Not AQ hotspots though connected to London Road, covered by measures 5.1.6 Directional Signage, 5.1.21 - Remove HGV parking 4. Quiet time freight deliveries to city centre in place
Low Traffic Neighbourhood	1. Make more streets residents access only to discourage drivers in city centre residential areas	1. Considered in Appendices B & D
Monitoring	1. Provide live displays of pollution levels in The Butts, Lowesmoor etc	1. Covered by measure 5.1.8 - Public Access to Real time monitoring
Park & Ride	1. Bring back park and ride 2. Bring back the Park and Ride 3. Have park & rides from each direction around the city with frequent bus services into centre 4. Park and ride to keep traffic out of the city centre 5. Park and Ride, linked with limited city centre parking and higher parking charges	1 – 6. Potential Future Option: Appendix D
Parking	1. Reduce the number of car parks in the city centre 2. Increase cost of city centre parking 3. Increase parking charges, and charge for on street parking in the city centre. Increase enforcement of illegal parking 4. Reduce on-street free parking places 5. Move parking provision further out of the city centre except for blue badge and short stay. Increase fees for parking in prime locations. Get rid of all the car park on prime locations by the river	1 – 8. Potential Future Options: Appendix D - Worcester City Centre Transport Strategy 9 – 12. Covered in Appendix B. It should be noted that AQ hotspots in the city are located on the Strategic Road Network and parking restrictions in residential areas are unlikely to have a significant benefit

Category	Comment Summary	Response
	6. Better management of parking replacing multiple small car parks with better managed larger car parks[1] 7. Cheap or free edge of city parking to allow walking/cycling in centre[1] 8. No parking on main roads 9. Implement strategy for less roadside parking particularly in residential areas 10. Abolition of free commuter parking in all city residential areas with Controlled Parking Zones and RPS adopted throughout the city 11. Support residents with parking/deter commuters from parking in residential areas 12. Convert Moor Street and Back Lane into residents only parking	
Public Transport	1. Work with bus operators to deploy lowest emitting vehicles on services 2. Only permit electric buses 3. Remove Diesel buses from fleets 4. Focus on improving public transport 5. Easier and cheaper to use public transport 6. Better bus connections for surrounding villages, example Clifton Upon Teme and Leominster 7. Better bus services for surrounding towns and villages to discourage car use into city centre 8. Improve bus journey times into city to encourage uptake 9. Ensure that public transport is reliable and regular 10. Incentives given to encourage alternative means of transport	1 – 4. Covered by measure 5.1.11 Bus Fleet improvements 4 - 5. Links to measure 5.1.20 Bus Stop Infrastructure enhancements 6 - 10. Covered by Worcestershire County Council's Bus Service Improvement Plan and Enhanced Partnership. 11. Rail services are the responsibility of the train operating companies. Worcestershire County Council support improvement to rail services through membership of West Midlands Rail Exec and Midlands Connect. The Worcestershire Rail Investment Strategy sets priorities for rail investment, including a new station at Rushwick

Category	Comment Summary	Response
	11. Increase train routes and open St John's train station. Increase train reliability 12. Reduce GWR diesel trains idling at Shrub Hill Station 13. Establishing transport hubs - trial a 'mobile' hub, Increasing public transport, Shared ticketing- affordable pricing	which would serve St Johns. Delivery is dependent on Worcestershire re-signalling. 12. All lines into Worcester City are electrified, no diesel in operation 13. Potential Future Option: Appendix D – Mobility Hubs
Road Improvements	1. Better co-ordination of road works 2. Better planned road works to reduce congestion. A plan to increase budget / efficiency of repairing potholes as result of heavier EVs[2] 3. Repair the roads to reduce particulate emissions from tyres	1 – 2. Where possible Worcestershire County Council SteetWorks team plan access requests to minimise disruption. However a number of organisations such as the statutory undertakers have the right to access the road network for emergency works which can cause issues. 2. Worcestershire County Council note the comments. Maintenance budgets come from a number of sources including central government. Worcestershire remains in the upper quartile for road condition in the country and WCC aims to maintain this. 3. The Exec Summary and s2 of the report outline the AQAP is a regulatory requirement to address elevated levels of NO_2 in current AQMA only. The future countywide Air Quality Strategy may include specific actions to address PM.
Road Infrastructure changes	1. Completion by County Council the outer ring road 2. Build a new road bridge to the north and make it part of a proper ring road as other cities have 3. More restrictions on junctions to remove queuing traffic 4. Reduce number of traffic lights and replace with roundabouts to reduce idling	1 – 6. Referred to Worcestershire County Council for consideration within future Local Transport Plans which will direct investment in transport infrastructure 7. Unlikely significant AQ impact in hotspots areas which are all part of the Strategic Road Network

Category	Comment Summary	Response
	5. Build the Northern Link and give the through traffic an alternative route 6. Complete ring road 7. Close some roads to traffic[1] 8. Improvement to roads to accommodate new developments 9. Reduce space for cars	8. Standard Planning consideration for significant new developments. Links to measure 5.1.5 – Supplementary planning Document 9. Potential Future Option: Appendix D - Worcester City Centre Transport Strategy
Schools	1. Get children walking to school by linking to health and wellbeing 2. Discourage driving to schools and enforce more 'School Streets' 3. Traffic free zones around schools (School Streets) 4. Reduce catchment areas for schools so that the children are not driven to/from school	1 – 3. Covered by measures 5.1.7 - Behavioural Change, 5.1.9 - Focussed Interventions, 5.1.17 - Travel To School 2 – 3. Potential Future Option: Appendix D – School Streets 4. More easily addressed via other means - school bus provision, travel plans, bus services
Speed Limits	1. 20 mph speed limit throughout city 2. Reduce speed limits 3. Desperately need 20 MPH zones in built up areas such as Henwick road and Comer road to discourage speeding contributing to poor AQ 4. Speed Cameras to reduce speeding, Henwick Road and Hylton Road given as examples	1 – 4. Considered in Appendices B and D. Worcestershire County Council advise there are currently no proposals for 20mph zones in the city. Where 20mph streets have been delivered these have been to support specific active travel routes. 3 – 4. Not identified hotspot areas of poor AQ and therefore actions unlikely to significant impact on resolving AQMA. 4. Worcestershire County Council advise all such requests are referred to the Network Management team for their investigation.
Strategic Planning	1. Public transport links for new developments (e.g. Norton, Kempsey)	1. Public transport provision is a requirement for significant new developments (NPPF)

Category	Comment Summary	Response
	2. Stop building on green space	2. There are no green spaces within AQ hotspots (urban centre)
Taxis	1. Ban taxis that are licensed outside of Worcester City 2. Only permit electric taxis	1. Not permissible under licensing regulations 2. Covered in Exec Summary pg ii and Potential Future Option in Appendix D
Traffic Enforcement	1. Stop cars and van parking on pavements and cycling on pavements to encourage walking	1. Unlikely significant AQ impact in hotspots areas as traffic enforcement already in place along most routes
Traffic Lights	1. Sequencing traffic lights and crossings, also crossing waiting time should be increased to allow more vehicles to pass, for example Barbourne 2. Allow traffic to flow more freely on major routes into the city by streamlining public crossings and traffic lights, better co-ordinating traffic light changes (to reduce idling) and allowing no parking. Examples London Road, Tything and St. Nicholas Street, Foregate 3. Improve traffic light system to reduce idling in city centre 4. Implement intelligent phasing of traffic lights (for example at Newtown Road/Sheriff Street/Midland Road and Saint Nicolas Street/Foregate junctions) to avoid long queues of traffic with idling engines 5. Reduce dwell timers for pedestrian crossings to prioritise pedestrians	1 – 5. Covered by Exec Summary pg i. Worcestershire County Council confirm traffic lights have been fitted with sequencing technology. Further reviews of this are dependent on future Local Transport Plans which will direct investment in transport infrastructure 3 – 4. Stop start tech in modern cars & transition to EV will reduce engine idling in queuing traffic 5. Pedestrian crossing times are set to prioritise pedestrians and provide sufficient time for them to cross safely
Traffic Management	1. Reroute traffic from city centre 2. Stopping through traffic 3. Requires a comprehensive integrated transport strategy for the city	1 – 2. Covered by measure 5.1.6 - Advisory Signage 1 – 4. Potential Future Option: Appendix D - Worcester City Centre Transport Strategy

Category	Comment Summary	Response
	4. Worcester City Centre Transport Plan to reduce through traffic[1] 5. Real-time road management with live information for users 6. Dissuade use of side streets such as Moor Street and Back Lane as rat runs 7. Discourage use of rat runs in city, forcing vehicles to only use outer ring roads where feasible 8. Dissuade drivers driving through town to go across the river 9. Allow motorcycles to use bus lanes 10. Open Lansdown road to EVs during the 3:30-6:30 restriction. Making EVs take a longer route increases congestion while doing nothing to reduce pollution	5. Real time information on parking availability is in place reducing wasted trips to full car parks. Worcestershire County Council advise further improvements are a matter for future Local Transport Plans which will direct investment in transport infrastructure 6 – 8. No discernible improvement in AQ hotspots 9. Considered in Appendix B 10. Likely referring to Traffic Regulation Order in place in Lowesmoor. Worcestershire County Council advise current available traffic light technology is not able to support this (to allow EVs to pass whilst preventing ICE cars)
Wood or Domestic Burning/ Particulate Matter	1. Only a brief mention of particulate matter (PM). 2. The AQAP does not address national PM2.5 targets outlined in the Air Quality Strategy 2023. 3. Wood burning is a major contributor to poor air quality. Why no mention of council's powers in the smoke control areas? 4. Reduce the amount of waste burning/bonfires and houses that have an open fire/wood burner	1 – 4. The Exec Summary and s2 of the report outline the AQAP is a regulatory requirement to address elevated levels of NO_2 in current AQMA only. The future countywide Air Quality Strategy may include specific actions to address PM. WRS are currently assisting Defra with design of a tool to aid LA's contribution towards AQS 2023 targets. 3 – 4. Wood/Domestic burning is a source of PM, and therefore as outlined above, SCAs are not relevant to this AQAP.

1. Response from Local Group or Organisation
2. Response from Local Business Owner

Defra Appraisal

The Draft AQAP was submitted to Defra for statutory consultation in accordance with the LAQM requirements. Formal appraisal and approval of the draft AQAP dated 26th July 2024 has been received. Conclusions of the appraisal and commentary, and WCC subsequent actions where required are as follows:

'Defra recommends that Directors of Public Health approve AQAPs. Sign off is not a requirement, however collaboration and consultation with those who have responsibility for Public Health is expected to increase support for measures to improve air quality, with co-benefits for all. Please bear this in mind for the submission of your final AQAP and future iterations.

This commentary is intended to inform the amendment of, or an update to, an AQAP specifically however, should the authority be in position to revoke the AQMA before the next update, the points raised in this appraisal report can also be used to help inform the content of a future local air quality strategy.

On the basis of the evidence provided by the local authority the conclusions reached in the report are **accepted** for all sources and pollutants. Following the completion of this report, WCC should consider the comments below for the final AQAP.'

Commentary

1. The AQAP summarises key relevant plans and policy documents for WCC and the wider County Council. It would be beneficial to include further discussion on how these will work in conjunction with the draft AQAP, e.g. is the AQAP to be integrated with the Local Transport Plan?

WCC response: The majority of the policies detailed in the AQAP are previously published standalone strategies and therefore likely the AQAP will exist as a complimentary policy. In respect of the Local Transport Plan, Worcestershire County Council have advised they are awaiting guidance from government on the content of the forthcoming revision to the LTP.

2. WCC have reported on recent monitoring data at hotspot locations, highlighting that an exceedance of the air quality objective has returned at one location (But2) in 2022, following two years of below 40 µg/m^3 annual mean NO_2 concentrations (2020-2021) likely due to the impacts of COVID-

19 pandemic. 2023 monitoring data is likely now available and should be reported in the final version of the AQAP to confirm the latest trends.

WCC response: Section 2 has been updated accordingly.

3. A source apportionment exercise was undertaken, with not just NO_x but NO_2 considered. Due to the non-linear relationship between these pollutants as per paragraph 7.109 of LAQM.TG(22), the addition of source apportionment of NO_2 in welcomed.

4. It is noted source apportionment has been calculated on 2018 NO_2 monitoring data but using pre-pandemic 2020 and 2021 traffic surveys. It is advised for more recent NO_2 monitoring data to be used.

WCC response: Whilst it is acknowledged that renewing the source apportionment exercise with up-to-date monitoring data may amend some concentrations of the various traffic source contributions, in WCC opinion, it is unlikely to fundamentally alter the proportions of vehicles as to influence the comprehensive measure options included in the plan, to justify the significant work required to implement.

Furthermore, WCC note LAQM.TG22 7.104 states:

'Source apportionment need not be carried out with absolute precision but should be detailed enough to allow the authority to identify the predominant sources that contribute the air quality exceedances within its AQMA….'

Due to the substantial work involved, WCC established there was insufficient capacity to repeat the source apportionment assessment and complete required updates to the AQAP, prior to deadline of 15th October for consideration and approval of the plan through the scheduled local political process.

WCC raised concerns with the Defra LAQM team and helpdesk that actioning this would have significant consequences for compliance with the submission date (1st December) to Defra of the final version of the AQAP. Defra have previously advised that deadline is non-negotiable and failure to comply would incur enforcement procedures.

In September 2024 Defra concurred an update to the source apportionment information within the final AQAP was not required.

5. It would be beneficial if it was made clearer where measures have drawn on the results of source apportionment.

WCC response: All measures included in the plan have drawn on the results of the source apportionment work as outlined in the aims and objectives, the key priorities and sections on source apportionment and steering group work. However additional detail of which vehicle types (sources) each measure addresses has been added in section 5.

6. Similarly, the required reduction in emissions has been estimated based on 2018 concentrations. This does not account for more recent monitoring data and thus likely overestimated the required reduction. This should be updated.

WCC response: The estimated reduction is taken from the completed (2022) source apportionment assessment when 2018 was the most reliable monitoring data available at the time. The assessment is not being repeated for the reasons outlined in 4. Above.

7. Some measures have had their projected impact on air quality quantified as per paragraph 2.85 of LAQM Technical Guidance (TG22), this is welcomed. The general approach has been outlined within the AQAP, though it would be beneficial to provide an appendix with further detail. The text indicates modelling was undertaken, though limited information is provided on the modelling methodology.

WCC response: Enquiries were made with Defra LAQM team and helpdesk, in August 2024, as to the benefit of further detail as WCC perceive this would appeal to a very limited audience due to the highly technical nature and volume of the information. Defra concurred with WRS proposals to produce a separate Technical Appendices to be submitted with the final AQAP.

8. Table 4.5 presents the modelled reduction in NO_x emissions at hotspot locations and compares this to the required reduction in emissions calculated previously. It is assumed this is the projected impact arising from the full implementation of the AQAP. This could be clearer – there is no text directly referring to and discussing the results in Table 4.5. In addition, for the EV uptake measures, there were ‘low’ and ‘medium’ uptake levels

considered; it is not clear which scenario was applied to produce the model results in Table 4.5.

WCC response: Some further text has been provided on Table 4.5 and further detail on EV uptake measures will be provided within a separate Technical Appendices.

9. The date at which compliance is expected to be achieved, both with or without the implementation of AQAP measures, has not been provided.

WCC response: Section 4.2.5 has been updated to address this.

10. A detailed cost benefit analysis of the measures has been provided and allows the reader to understand the likely efficacy of each measure easily and quickly, and compare them against each other, to determine which are likely to be the highest priorities.

11. It is acknowledged that public consultation and stakeholder engagement is not complete and is reported to be taking place between July and September 2024. Responses to consultation must be outlined within the Final AQAP in Appendix A, with signposts to places within the document showing how the comments received were directly considered.

WCC response: Actioned above

12. The role of the Steering Group is clear, with detailed information of their meeting schedule provided.

13. The AQAP should also set out how WCC will ensure air quality standards and objectives are to be maintained after compliance has been achieved.

WCC response: An additional section 4.2.6 has been included to address this

Appendix B: Reasons for Not Pursuing Action Plan Measures

Table B.1 – Action Plan Measures Not Pursued and the Reasons for that Decision

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
Freight and Delivery Management	HGV delivery access management - whole city centre (advisory routes)	Covered by others actions such as Directional signage and potentially included in a freight delivery strategy in future. Anticipated delivery beyond 5 years, not currently supported and insufficient information on potential measure to determine AQ impact at this time.
Policy Guidance and Development Control	City Centre Streets - Greening and Trees Programme	Published literature advises removal of pollution via deposition on plants is minimal and unlikely to make measurable difference to air quality (AQEG, WM-Air). Furthermore, tree canopies further limit air flow in existing street canyons exacerbating pollutant concentrations at street level.
Promoting Low Emission Transport	Worcester City Vehicle Fleet Upgrade – convert RCV and HCV fleet to Hydrotreated Vehicle Oil (HVO) fuel	Undesirable climate impacts. Research indicates conversion to HVO fleet, whilst potentially delivering AQ benefits, has detrimental impact (globally) on

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
	source, and replace current LCV with Battery EV	carbon emissions due to additional deforestation required to replace vegetable oil diverted from other destination markets (livestock feed) (EST)
Promoting Low Emission Transport	Procuring alternative refuelling infrastructure other than EV recharging such as Biofuels, Compressed Natural Gas (CNG) or Liquid Natural Gas (LNG), Hydrogen	Not feasible to focus on numerous alternative fuel technology infrastructure within lifetime of this AQAP. Focus on EV which has greatest impetus from national policies, manufacturing industry and public support at this time. Potential for hydrogen in future but in infancy locally at this time.
Promoting Low Emission Transport	Clean Air Zone or Low Emission Zone	Worcester City are not one of the LA mandated or supported by government to implement a Clean Air Zone or undertake a feasibility study to do so supported by Clean Air Funding in 2017. Research indicates significant resource: research, data, studies, costs and time are required in setting up a CAZ. No such resource is currently available. Additionally determined focus measures are anticipated to deliver required reductions without requirement for consideration of a CAZ.

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
Promoting Low Emission Transport	Emission Based Parking or Permit Charges	Limited on street parking charged in City, impact anticipated to be negligible, and not supported or deliverable within lifetime of AQAP.
Promoting Travel Alternatives	Promote use of inland waterways to move freight as a low emissions alternative	Insufficient information at this time on timeline for implementation, social or political support, or potential uptake. Considered uptake unlikely to be provide more than negligible impact on reducing NOx in AQMA hotspot areas.
Traffic Management	Low Traffic Neighbourhoods (LTNs)	Designed to reduce traffic in residential streets, rather than Strategic Road Network characteristic in all hotspots except The Butts which is a primary bus route. Not feasible within hotspot areas.
Traffic Management	Speed reduction to 20mph zone	Research indicates lack of real time studies available focussing on AQ impact. Additionally considered unfeasible on Strategic Road Network characteristic in all hotspots.
Traffic Management	Road User Charging/Congestion Charging	Similar to CAZ (above) significant resource required to implement. Unlikely to be actioned within lifetime of

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
		this AQAP, not supported and determined focus measures are anticipated to deliver compliance with current AQO without need for such a scheme.
Traffic Management	Anti Idling Enforcement (Fixed Penalty Notices issue for stationary idling when parked under The Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002	Insufficient data on impact of idling in hotspots and no clear evidence on AQ benefits. Additionally, unlikely support for measure and significant cost to operate, maximum FPN £20 only. Anti idling outside schools, or other environments, campaign may be considered separately as part of raising awareness and encouraging behavioural change actions.
Traffic Management	Vehicle priority and High Occupancy Vehicle (HOV) lanes	Already in place for buses in parts of The Tything, The Foregate and The Butts. Expansion to other vehicle types and hotspots not considered feasible or supported due to limited road space.
Traffic Management	Testing Vehicle Emissions and issue of FPNs for non-compliance	Not supported at this time or likely to be delivered within lifetime of this AQAP.
Traffic Management	Workplace Parking Levy (WPL) - a charge LA can impose on employers	Not supported at this time or likely to be delivered within lifetime of this AQAP.

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
	and education organisations based on the number of parking spaces provided	
Transport Planning and Infrastructure	Removing some bus stops to reduce dwell times and journey times	Concern this would discourage public transport users and is counter intuitive to encouraging behavioural change aspects of this plan and other local strategies.
Vehicle Fleet Efficiency	Vehicle Retrofitting programmes – fitting devices to reduce emissions such as Diesel Particulate Filters (DPF) to buses	Evidence that retrofitting programmes do not deliver required benefits over time. Costly and more efficient in long term to replace vehicle nearing end of life.

Appendix C: Qualitative Assessment of Measures (Shortlisting)

Table C.1 Stage 1 Qualitative Assessment of Measures

RAG	Timeline for implementation	Support for measure	Practical Application	Deliverability	Anticipated Air Pollutant reduction	Data to quantify impact	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in the future
Green	Within 5 years	Likely Social and political support	Feasible	Yes	Significant	Available	Yes/No (Green/Red)	Potentially Within lifetime of AQAP
Amber	Potentially within 5 years	Potential social and/or political support	Potentially feasible	Potentially	Low to Medium impact or insufficient info to make a determination	Not available at time of drafting plan, anticipated within 5 years		Post lifetime of this AQAP, consideration for
Red	Greater than 5 years	Unlikely social and political support	Not feasible	No	Negligible or Negative	Not available or forthcoming in next 5 years		Unlikely to be progressed in the future

Stage 1 – a RAG qualitative stage using officer experience and professional opinion to filter out measures (specific to that AQMA(s)) for progressing to quantified Cost Benefit Analysis Stage 2 or including as a non-quantified focus measure. Filtering process considers timeline for deliverability, political and social support and practical application which combined determine deliverability within this AQAP and consideration as a focus measure. The first three categories are weighted in that if a measure has a red classification, it is not progressed to Stage 2 Impact Assessment at this time. The anticipated pollutant reduction and availability of data is then considered to determine if progress to quantification of the measure is appropriate. Measures are sorted according to deliverability and anticipated NO_2 reduction and shown in Appendix D in the groups outlined in section 4.2.3 Approach to shortlisting of measures and assessment of impact.

Key to categories in Stage 1 qualification of benefit of proposed and potential measures

Timeline for implementation – of measure such that is contributing to reduction in air pollution with consideration for lifetime of this AQAP.

Support for Measure – Strategic support for delivering action.

Practical Application - can the action be practically implemented within the AQMA hotspots.

Deliverability – summary of above 3 categories to determine feasibility for delivering within lifetime of this AQAP.

Anticipated Air Pollutant Reduction – in the context of this AQAP this relates specifically to reduction in concentration of nitrogen dioxide within current AQMA hotspots. Measures classified Green are anticipated to deliver a significant measurable reduction in pollutant concentration, red classified measures are anticipated to not deliver any measurable impact or potentially even a detrimental impact within the AQMA. Amber classification is somewhere in between two extremes and includes measures where there is insufficient information at time of AQAP to make a firm determination.

Data to quantify impact – Availability of data to enable quantification of amount of pollutant reduction to assist in Stage 2 analysis of impact.

Focus Measure – Top quantifiable and non-quantifiable AQAP measures Worcester City and Worcestershire County Councils have determined to focus on delivering

Progress to Stage 2 – Progress to second stage to assess impact of measures on pollutant concentration and cost of measure

Potential progress in future – additional information on actions with potential for further progression as part of future works, policies or strategies for consideration within future updates to the AQAP.

Appendix D: Outcomes of Stage 1 Shortlisting Process

Table D.1 Outcomes of Shortlisting

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
EV Charging Strategy	EV strategy will be developed in 2024	Within 5 years	Supported	Feasible	Yes	Significant	Available	Yes	N/A	Focus Measure
Public EV Charging Points	Installation of public/residential EV charging points/hubs to support transition of local vehicle parc to BEV	Within 5 years	Supported	Feasible	Yes	Significant	Yes	Yes	N/A	Focus Measure
Bus fleet improvements (local bus services)	Work with bus operators to aid their procurement of EC VI or above and provide cleaner local bus fleet. A phased and targeted approach including all bus operators	Within 5 Years	Likely support	Feasible	Yes	Significant	Yes	Yes	N/A	Focus Measure

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Bike hire and bike share	Bike share is any scheme where bikes or e-bikes are available to multiple users. Can be a mixture of pedal and bikes with the intention of moving people away from the car.	Due in 2024	Likely support	Feasible	Yes	Potential Measurable Benefit	Available	Yes	N/A	Focus Measure
Directional Signage	Signage on strategic routes into city to encourage use of Southern Link Road and discourage transit through city centre	Within 5 years	Likely support	Feasible	Yes	Insufficient info at this time	Available	Yes	N/A	Focus Measure
Travel to School	Encourage and support schools to become ModeSHIFT star accredited through the introduction and implementation of travel plans. Support schools in implementing cycling and walking buses. Create long-term change in travel habits for school aged children and their parents.	Within 5 years	Support-ed	Feasible	Yes	Potential Measurable Benefit	Potentially within lifetime of AQAP	Yes	N/A	Focus Measure
Countywide AQ Strategy - Encouraging awareness and behavioural change linked to use of real	Publicly available real time monitoring data from 26 low cost sensors (Zephyrs) installed around the County, monitoring range of pollutants and sources. To encourage public	Within 5 Years	Likely support	Feasible	Yes	Insufficient info at this time	Not available	Yes	N/A	Focus Measure

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
time monitoring data	awareness and behavioural change.									
Countywide AQ Strategy - Encouraging awareness and behavioural change interventions linked to focussed real time monitoring data	Use of real time monitoring data in locations near schools and/or areas of deprivation to inform actions and work with local schools/ communities/ organisations to implement interventions through awareness and behaviour change.	Within 5 Years	Likely support	Feasible	Yes	Negligible	Potentially in lifetime of AQAP	Yes	N/A	Focus Measure
Countywide AQ Strategy - Behavioural Change Officer Post	Funded Behavioural Change officer post for period of 2.5 years to focus on working with schools and communities across the County, utilising monitoring data to inform programmes	Within 5 Years	Likely support	Feasible	Yes	Potential Measurable Benefit in future	Potentially in lifetime of AQAP	Yes	N/A	Focus Measure
Air Quality Planning and Policy Guidance	Additional planning support to assist with reducing emissions from new development	Within 5 years	Likely support	Feasible	Yes	Insufficient info at this time	Not available	Yes	N/A	Focus Measure

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Additional cycle parking / storage	Introduce Additional cycle parking outside the front entrance to the Museum and Art Gallery and investigate improvement of and facilities at City Council owned buildings and spaces.	Within 5 years	Likely support	Feasible	Yes	Insufficient info at this time	Not available	Yes	N/A	Focus Measure
Travel Choices	To refresh 'soft' measures to promote sustainable travel choice focussed on web and app-based journey planners - to provide travel information and promote sustainable modes (Public Transport/Active Travel)	Within 5 years	Likely support	Feasible	Yes	Insufficient info at this time	Potentially within lifetime of AQAP	Yes	N/A	Focus Measure
Anti Idling awareness for Taxis	Encouraging Taxi drivers to switch off engines whilst waiting in ranks.	Within 5 years	Potential support	Feasible	Yes	Insufficient data at this time	Not available	Yes	N/A	Focus Measure
Worcester Local Cycling and Walking Infrastructure Plan	Report setting out cycling, walking and wheeling plans over 10 year period. LCWIPs to form part of Local Transport Plans. Jacobs commissioned by County to undertake Worcester LCWIP during 2023-24 (to be completed late	Potentially within 5 years but Up to 10 years	Likely support	Feasible	Potentially	Insufficient info at this time	Potentially within lifetime of AQAP	Yes	N/A	Focus Measure

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
	2024); monies to write LCWIP provided through Active Travel England									
Active Travel Guides for business	Continue to support and encourage businesses to reduce travel emissions through active travel Guides, templates.	Within 5 years	Likely support	Feasible	Yes	Negligible	Not available	Yes	N/A	Focus Measure
Countywide AQ Strategy - Raising awareness events	Promoting behavioural change and awareness through programme of annual action days such as Clean Air Day, Clean Air Night, International Clean Air for Blue Skies Day	ongoing in lifetime of AQAP	Likely support	Feasible	Yes	Negligible	Not available	Yes	N/A	Focus Measure
Countywide AQ Strategy - Communication Plan	Countywide (County and partners authorities) joined up communication for events/ messaging/website advice	Within 5 Years	Likely support	Feasible	Yes	Negligible	Not available	Yes	N/A	Focus Measure

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicle	Purchase of 7 RCV EC VI vehicles in 2023/24 and 2024/25	Within 5 years	Support-ed	Feasible	Yes	Negligible	Available	Yes	N/A	Focus Measure
HGV Parking	Removal of HGV parking in Croft Road (City centre) car park to reduce unnecessary HGV journeys through AQMA hotspots	Within 5 years	Support-ed	Feasible	Yes	Negligible	Available	Yes	N/A	Focus Measure
Bus stop infrastructure – bus shelter provision	Improvements and upgrades to bus shelters that would include display screens to provide update info on routes etc.to promote modal shift to public transport. Potentially as part of Bus Service Improvement Plan / Enhanced Partnership.	Within 5 years	Likely support	Feasible	Yes	Negligible	Potentially in lifetime of AQAP	Yes	N/A	Focus Measure
Public Health vision for Worcestershire AQ Strategy	Aim and Vision as part of the Countywide Strategy for improving air quality and reducing impacts on health	Within 5 Years	Likely support	Feasible	Yes	Negligible	Not available	No	To be developed further as part of countywide AQ Strategy	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
SAMHE Project	Monitoring indoor air pollution for schools with devices provided through national project, encouraging awareness and behavioural change	Within 5 Years	Likely support	Feasible	Yes	Negligible	Not available	No	To be developed further as part of countywide AQ Strategy	Potential Future option
Demand Response Travel (DRT)	Potential expansion of existing DRT (Worcestershire On Demand) to other areas.	Within 5 years	Potential social and/or political support	Potentially Feasible	Potentially	Insufficient info at this time	Potentially Available	No	Potentially within lifetime of this AQAP	Potential Future option
Countywide AQ Strategy - Link to workplace health schemes	Communication: Health based campaigns - Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer.	Within 5 years	Likely support	Potentially Feasible	Potentially	Negligible	Not available	No	To be developed further as part of countywide AQ Strategy	Potential Future option
Countywide AQ Strategy -Anti idling -schools campaign	Anti-idling initiatives in educational settings - for awareness-raising, campaign work and signage in the vicinity of schools can be an effective mechanism for reducing idling emissions from vehicles during school drop-offs and pick-ups.	Within 5 years	Potential social and/or political support	Potentially Feasible	Potentially	Negligible	Not available	No	To be developed further as part of countywide AQ Strategy	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Relocate bus station/ interchange	Develop and review options for the bus station / bus interchange	Greater Than 5 Years	Likely support	Potentially Feasible	No	Potentially Significant	Not available	No	Potentially will form part of Enhanced Partnership	Potential Future option
WCC fleet improvements	WCC fleet including gritters and minibuses, move to Euro 6 engines in line with the targets set out in the Net Zero Plan	Greater Than 5 Years	Likely support	Feasible	No	Potential Measurable Benefit from school buses	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option
Rail Station Facilities	Enhancements to improve sustainable access to Foregate Street and Shrub Hill including improved walking and cycling routes and infrastructure.	Greater Than 5 Years	Support-ed	Feasible	No	Negligible	Likely not available until end of this AQAP	No	Potentially in next AQAP. Part of Shrub Hill Masterplan.	Potential Future option
Rail based Park & Ride	A form of integrated transport that allows private car users to park their vehicles close to a rail station and travel into a town/city centre or other major destination using a rail service.	Greater Than 5 Years	Likely support	Feasible	No	Insufficient info at this time to determine	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Active travel – clean air route finder	Development of a walking / cycling tool such as Clean Air Route Finder (cleanairroutes.london)	Insufficient info at this time to determine	Likely support	Feasible	Potentially	Insufficient info at this time to determine	Not available	No	Insufficient info at this time to determine	Potential Future option
Active travel - bike ability	Roll out of adult / family bike ability training on a city wide basis, based from the community centres and other hubs	Insufficient info at this time to determine	Likely support	Feasible	Potentially	Negligible	Not available	No	Insufficient info at this time to determine	Potential Future option
Accelerate transition to EVs – salary sacrifice	Introduce a salary sacrifice scheme for City Council employees to purchase an EV in a tax efficient manner	Insufficient info at this time to determine	Potential social and/or political support	Feasible	Potentially	Negligible	Not available	No	Unlikely	Potential Future option
Accelerate transition to EVs - businesses	Plan and install an ultra-rapid charging hub with no height barrier, to encourage the use of EVs by delivery and business vehicles, and taxis	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Potential Measurable Benefit	Potentially available	No	Insufficient info at this time to determine	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Accelerate transition to EVs - businesses	Charging facilities aimed at larger vehicles such as lorries and coaches, to encourage their use locally	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Potential Measurable Benefit	Potentially available	No	Insufficient info at this time to determine	Potential Future option
Accelerate transition to EVs – salary sacrifice	Encourage local businesses to introduce a salary sacrifice scheme for EVs	Insufficient info at this time to determine	Potential social and/or political support	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Not available	No	Insufficient info at this time to determine	Potential Future option
Accelerate transition to EVs - businesses	Campaign including roadshows, information, trial opportunities, partnerships with dealerships etc to encourage businesses to transition to EVs	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Insufficient info at this time to determine	Not available	No	Insufficient info at this time to determine	Potential Future option
Council fleet route optimisation	Route optimisation to avoid hotspot areas where possible by City fleet (RCVs in particular)	Insufficient info at this time to determine	Potential social and/or political support	Potentially Feasible	Potentially	Negligible	Potentially available	No	Insufficient info at this time to determine	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Driver training and ECO driving aids	ECO driving/driver skills development (for LA fleets) - Eco-driver training teaches fleet operatives to adopt a safer and more economic approach to driving. It can help to reduce fuel costs for the employer (estimated at up to 6% in the long term for fleets by the Energy Saving Trust) and reduces emissions of local air pollutants.	Insufficient info at this time to determine	Potential social and/or political support	Potentially Feasible	Insufficient info at this time to determine	Negligible	Potentially Available	No	Insufficient info at this time to determine	Potential Future option
Freight Strategy	Freight Strategy to form part of refresh of LTP - review HGV routing	Likely beyond 5 years	Potential social and/or political support	Potentially Feasible	No	Insufficient info at this time	Likely not available until end of this AQAP	No	Will form part of LTP5	Potential Future option
Mobility hubs	Mobility hubs bring together shared transport with public transport and active travel in spaces designed to improve the public realm for all.	Likely beyond 5 years	Potential social and/or political support	Potentially Feasible	No	Insufficient info at this time	Likely not available until end of this AQAP	No	Will be considered as part of LTP5	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicle and other Heavy and Light Commercial Vehicle Upgrades	Replace remaining HCV and all LCV fleet with BEV in future	Likely beyond 5 years	Potential social and/or political support	Potentially Feasible	No	Negligible	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option
WCCTP Focus Area 2 - Foregate Street North: Opportunities	Scheme in Worcester City Centre Transport Plan (WCCTP) to enhance public realm and connectivity in Foregate Street North	Greater Than 5 Years	Potential social and/or political support	Potentially Feasible	No	Negligible	Not available	No	Will be considered as part of LTP5	Potential Future option
Traffic Signal Bus Priority (soft measures)	Tracking via the RTI system -Priority is given to buses by extension to or early recall of the green phase and by reducing green time for other traffic, for example at entry point to roads with heavy bus flows and reduces bus idling.	Likely beyond 5 years	Potential social and/or political support	Potentially Feasible	No	Negligible	Not available	No	Potentially as part of BSIP/Enhanced Partnership process	Potential Future option
WCCTP City Centre Streets - programme of pocket park / seating every 200m in city centre and on	Scheme identified in Worcester City Centre Transport Plan (WCCTP) - to enhance public realm and connectivity	Likely beyond 5 years	Potential social and/or political support	Potentially Feasible	No	Negligible	Not available	No	Requires further scheme details	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
key pedestrian routes in.										
Out of Centre HGV parking	Identify out of city centre location for HGV parking	Greater Than 5 Years	Potential social and/or political support	Potentially Feasible	No	Negligible	Not available	No	Likely beyond lifetime of AQAP	Potential Future option
Low Emission Deliveries	Cycle couriers - The “last mile” is a term used to describe the movement of goods from a main distribution centre to the final destination i.e. local homes and businesses via more sustainable transport modes.	Greater Than 5 Years	Potential social and/or political support	Potentially Feasible	No	Potentially Significant	Not available	No	Likely beyond lifetime of AQAP	Potential Future option
Emission control equipment for small and medium sized stationary combustion sources / replacement	NRMM - Non-Road Mobile Machinery (NRMM) means any mobile machine, transportable equipment or vehicle with or without bodywork or wheels which isn’t intended for carrying passengers or goods on the road and which incorporates a combustion engine.	Likely beyond 5 years	Not supported	Feasible	No	Insufficient info at this time	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Freight Partnerships for city centre deliveries	Freight Quality Partnerships - Freight Quality Partnerships (FQPs) are groups and/or forums between the freight industry, local authorities, local businesses, the local community, environmental groups and others who may have an interest in freight.	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potentially Significant	Not available	No	Likely as part of future Freight Strategy	Potential Future option
Park and ride provision	Bus based Park & Ride	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potentially Significant	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option
Freight Consolidation Centre	Freight consolidation/low emission last mile schemes - movement of goods from an outside of town distribution centre to the inner city destination i.e. local homes and businesses via sustainable transport modes such as electric LGVs or E-Cargo bikes	Likely beyond 5 years	Not supported	Potentially Feasible	No	Potentially Significant	Not available	No	Likely beyond lifetime of AQAP	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Grants for electric taxis	Provide grants to enable / encourage the transition to electric taxis by significant numbers of the fleet	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potentially Significant	No	No	Likely beyond lifetime of AQAP	Potential Future option
Car park locations	Undertake a strategic car park review to rationalise the number of car parks and replace some with a number of multi-storey car parks (incl. HGV parking)	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potentially Significant	Not available	No	Likely beyond lifetime of AQAP	Potential Future option
Review car parking charging	Worcester City Centre Transport Strategy to 'review car parking charging'	Likely beyond 5 years	Not supported	Potentially Feasible	No	Insufficient info at this time	Insufficient info at this time	No	Likely beyond lifetime of AQAP	Potential Future option
Fleet efficiency and recognition schemes (FORS)	Fleet Recognition Schemes Fleet Recognition Schemes are voluntary accreditation schemes which measure fleet performance and aim to drive up standards across areas such as fuel efficiency, vehicle emissions and safety.	Likely beyond 5 years	Not supported	Potentially Feasible	No	Insufficient info at this time	Potentially Available	No	Likely beyond lifetime of AQAP	Potential Future option

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Bus priority measures /bus lanes (hard measures)	Potential for additional bus lanes in city via future BSIP/Enhanced Partnership process	Likely beyond 5 years	Not supported	Potentially Feasible	No	Negligible	Not available	No	Potentially as part of BSIP/Enhanced Partnership process	Potential Future option
Countywide AQ Strategy - School streets	The closure of roads around schools during the morning drop-off and evening pick-up to reduce children's exposure to high levels of air pollution. Over 350 School Streets have been installed in London (where the majority of schools are situated on main roads (SRN) since April 2020, and have been introduced in other areas.	Likely beyond 5 years	Potential social and/or political support	Not Feasible	No	Negligible	Not available	No	Unlikely	Potential Future option
HGV delivery access management - whole city centre	Routing/delivery planning - Efficient routing and delivery planning can help to reduce the number of journeys associated with deliveries, working with freight companies and other stakeholders.	Likely beyond 5 years	Not supported	Potentially Feasible	No	Insufficient info at this time	Insufficient info at this time to determine	No	Unlikely	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
City Centre Streets - Greening and Trees Programme	Worcester City Centre Transport Strategy proposed scheme	Potentially within 5 years	Likely Support	Not Feasible in hotspot locations	No	Detrimental in hotspots	Not available	No	Unlikely	Not being pursued
Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicle and other Heavy and Light Commercial Vehicle Upgrades	Convert newly purchased and replace remaining HCV fleet to Hydrotreated Vehicle Oil (HVO) fuel source, and replace current LCV with Battery EV	Potentially within 5 years	Not supported	Feasible	No	Negligible	Potentially Available	No	Unlikely	Not being pursued
Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles other than EV charging	Fuel Additives - chemical treatments for engines that reduce exhaust emissions. Biofuels - Biodiesel is known to reduce emissions of particulate matter and hydrocarbons, but due to having a higher oxygen content it can result in higher NOx emissions. Gas refuelling - Compressed Natural Gas (CNG) or Liquid Natural Gas (LNG) are widely reported to significantly reduce CO2, PM and NOx emissions.	Greater than 5 years or N/A	Not supported	Not feasible to focus on numerous options	No	Potential Measurable Benefit	Not available	No	Likely beyond lifetime of AQAP	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
	Hydrogen vehicles- Hydrogen vehicles use hydrogen as a fuel for motive power.									
Emissions charging/Clean Air Zones /Low Emission Zones (CAZ/LEZ)	If your vehicle exceeds emission standards, you may have to pay a charge if you drive in a clean air zone	Greater Than 5 Years	Not supported	Potentially Feasible	No	Significant	Not available	No	Unlikely	Not being pursued
Priority parking for LEVs	On-street parking strategies - Preferential parking rates can also be used to influence vehicle ownership choices with differential rates being made available for smaller or ultra-low emission vehicles.	Likely beyond 5 years	Not supported	Potentially Feasible	No	Insufficient info at this time	Not available	No	Unlikely	Not being pursued
Promote use of rail and inland waterways	Inland waterways - Moving freight by water has the potential to offer a lower-emission alternative to an equivalent journey by road. Included in Minerals Local plan	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Negligible	Not available	No	Unlikely	Not being pursued
Low Traffic Neighbour-hoods (LTNs)	A Low Traffic Neighbourhood is a scheme introduced by the Government to try and reduce traffic in residential areas through a series of different	Greater Than 5 Years	Not supported	Not Feasible	No	Negligible	Not Available	No	Unlikely	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
	measures. The aim is to lower the number of vehicles on the roads, increase the number of people walking or cycling, and reduce crime. Local residents and businesses can still use cars within LTNs, as well as receive visitors and deliveries, but non local traffic cannot drive through the area.									
Speed Reduction	Speed reduction to 20 mph zones. May be considered as part of LCWIP development and LTP refresh.	Potentially within 5 years but up to 10 years	Not supported	Not Feasible	No	Insufficient info at this time	Not Available	No	Likely beyond lifetime of AQAP	Not being pursued
Road User Charging (RUC)/ Congestion charging	Congestion charging - Congestion charges relate to a charge being made for a vehicle to drive within a certain area or on a certain road with the primary reason for the charge being to reduce congestion i.e. implemented specifically to create a disincentive to travel by private transport.	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potential Measurable Benefit/ Insufficient info at this time	Not available	No	Unlikely	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Anti-idling enforcement	Leaving engines running when parked (stationary idling) causes unnecessary emissions, wastes fuel and adds to noise levels. The Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002 and the Road Traffic (Vehicle Emissions)(Fixed Penalty)(Scotland) Regulations 2003 give discretionary powers to authorised persons acting on behalf of the local authority to issue Fixed Penalty Notices (FPNs) to drivers who allow their vehicle engines to run unnecessarily whilst the vehicle is stationary on the public highway.	Greater Than 5 Years	Not supported	Potentially Feasible	No	Potential Measurable Benefit/ Insufficient info at this time	Not available	No	Unlikely	Not being pursued
UTC, Congestion management, traffic reduction	Vehicle priority and High Occupancy Vehicle (HOV) lanes - Re-prioritising road space involves shifting road space away from one type of user to facilitate uptake by a different type of user. In the UK, vehicle priority schemes are usually aimed at	Greater Than 5 Years	Not supported	Not Feasible	No	Negligible	Insufficient info at this time	No	Unlikely	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
	providing more space for buses, taxis, bicycles and pedestrians. Urban Traffic Management Control (UTMC) systems allow different components within an area-wide traffic management systems to communicate and share information with each other.									
Testing Vehicle Emissions	If a local authority has designated an Air Quality Management Area., then the council can test vehicles at the roadside and issue fixed penalties to drivers whose vehicles fail.	Greater Than 5 Years	Not supported	Potentially Feasible	No	Negligible	Insufficient info at this time	No	Unlikely	Not being pursued
Workplace Parking Levy, Parking Enforcement on highway	Workplace Parking Levy (WPL) - A Workplace Parking Levy (WPL) is a charge local authorities can make to employers and education organisations in their areas based on the number of parking spaces they provide that are regularly used by employees and students	Greater Than 5 Years	Not supported	Not Feasible	No	Insufficient info at this time	Not available	No	Unlikely	Not being pursued
Bus stop rationalisation	Removing some bus stops to reduce dwell times and journey times	Greater Than 5 Years	Not supported	Not Feasible	No	Negligible	Not available	No	Unlikely	Not being pursued

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Vehicle Retrofitting programmes	Retrofits/upgrades - Retrofitting a full Diesel Particulate Filer (DPF) can reduce particulate emissions by 85-99%. A partial DPF, can reduce particulate emissions by 30-50%.	Greater Than 5 Years	Not supported	Not Feasible	No	Insufficient info at this time	Insufficient info at this time	No	Unlikely	Not being pursued
Cycle events programme	Scheme in Worcester City Centre Transport Plan (WCCTP)	Within 5 years	Likely support	Feasible	Yes	Negligible, potential benefit as part of package of BC measures	Not available	No	Considered as part of Travel Choices	Incorpora ted into other measures
Events to support / promote cycling and wheeling	Scheme in Worcester City Centre Transport Plan (WCCTP)	Within 5 years	Likely support	Feasible	Yes	Negligible, potential benefit as part of package of BC measures	Not available	No	Considered as part of Travel Choices	Incorpora ted into other measures
Worcester City Council e-bikes	Annual campaign promoting e-bikes for staff to increase usage for business travel Action: Bundle Up1	Within 5 years	Support-ed	Feasible	Yes	Negligible	Not available	No	Considered as part of Bike Share scheme	Incorpora ted into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Low Emission Commuting	Offer Bike ability training to all staff Expand SHIFT scheme to councillors. Action: Bundle Up1	Within 5 years	Support-ed	Feasible	Yes	Negligible	Not available	No	Considered as part of Travel Choices	Incorpora ted into other measures
Low Emission Commuting	Continue to promote the Cycle to Work schemes, active travel induction materials for staff. Continue to expand/improve staff cycle parking and facilities.	Already implemente d	Support-ed	Feasible	Yes	Negligible	Not available	No	Considered as part of Bike Share scheme	Incorpora ted into other measures
Community Engagement	Promote active travel at large events such as the Worcester Show and Victorian Fayre. Support Car Free Day event.	Already implemente d	Likely support	Feasible	Yes	Negligible	Not available	No	Considered as part of AQ Strategy - Raising Awareness	Incorpora ted into other measures
Car parking displays	Provision of signage to for better wayfinding to car parks and reduce vehicle trips	Within 5 years	Likely support	Feasible	Yes	Negligible	Not available	No	Included in Car Park Rationalisat ion	Incorpora ted into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Active Travel Stakeholder Group	Participate in the Worcestershire County Council's Active Travel Stakeholder Group.	Ongoing	Likely support	Feasible	Yes	None	Not available	No	Included in specific delivery schemes	Incorporated into other measures
City Centre Streets - Wayfinding Design and Delivery Plan	Scheme in Worcester City Centre Transport Plan (WCCTP)	Within 5 years	Potential social and/or political support	Feasible	Yes	Negligible	Not available	No	Considered as part of Travel Choices	Incorporated into other measures
Communic-ations	Include an 'Active Travel' page under 'Climate Emergency' on Council website to highlight actions to reduce emissions (carbon footprint)	Insufficient info at this time to determine	Likely support	Feasible	Yes	None	Not available	No	Considered as part of AQ Strategy - Communications Plan	Incorporated into other measures
Clean Air Poster Competition	For schools to encourage understanding	Insufficient info at this time to determine	Likely support	Feasible	Yes	Negligible	Not available	No	Considered as part of AQ Strategy - Raising Awareness & Behavioural Change	Incorporated into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Cycle Information Displays	Installing real time displays at locations near or on active travel corridors to inform and promote active travel. Can be linked to app to provide users with useful information on their journey and possible rewards.	Insufficient info at this time	Likely support	Feasible	Potentially	Negligible, potential benefit as part of package of BC measures	Not available	No	Considered as part of Travel Choices	Incorporated into other measures
Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles in line with Net Zero plan	Insufficient info at this time	Likely support	Insufficient info at this time	Insufficient info at this time	Potential Measurable Benefit	Potentially Available	No	Considered as part of EV Charging Strategy	Incorporated into other measures
E-cargo bike hire and grants aimed at families Action: Bundle Up2	E-cargo bike hire and grants aimed at families	Insufficient info at this time to determine	Potential social and/or political support	Feasible	Potentially	Insufficient info at this time to determine	Not available	No	Considered as part of Bike Share scheme	Incorporated into other measures
Low emission deliveries	Provide start-up funding and a services hub for establishing commercially viable e-cargo bike last mile delivery and first mile collection services in the city	Insufficient info at this time to determine	Potential social and/or political support	Feasible	Potentially	Insufficient info at this time to determine	Not available	No	Considered as part of Freight Consolidation	Incorporated into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Low emission deliveries	E-cargo bike hire aimed at businesses	Insufficient info at this time to determine	Potential social and/or political support	Feasible	Potentially	Insufficient info at this time to determine	Not available	No	Considered as part of Freight Consolidation	Incorporated into other measures
Low emission deliveries	E-cargo bike grants, enabling businesses to fully transition to the use of e-cargo bike for local deliveries	Insufficient info at this time to determine	Potential social and/or political support	Feasible	Insufficient info at this time to determine	Insufficient info at this time to determine	Not available	No	Considered as part of Freight Consolidation	Incorporated into other measures
Taxi Fleet Improvements	Fleet improvements and EV charging infrastructure	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Not available	No	Considered as part of EV Charging Strategy	Incorporated into other measures
Park Street going into Foundry Street contraflow	Scheme in Worcester City Centre Transport Plan (WCCTP)	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Negligible	Not available	No	Considered as part of LCWIP	Incorporated into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Canal access improvements - Tallow Hill	Scheme in Worcester City Centre Transport Plan (WCCTP)	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Negligible	Not available	No	Considered as part of LCWIP	Incorporated into other measures
Canal access improvements - Diglis to 6 Ways	Scheme in Worcester City Centre Transport Plan (WCCTP)	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Negligible	Not available	No	Considered as part of LCWIP	Incorporated into other measures
City Centre Streets - New access to canal from London Rd	Scheme in Worcester City Centre Transport Plan (WCCTP)	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Insufficient info at this time	Negligible	Not available	No	Considered as part of LCWIP	Incorporated into other measures
WCCTP Focus Area 1 - Cornmarket Opportunities	Scheme identified in Worcester City Centre Transport Plan (WCCTP) to enhance public realm and connectivity	Greater Than 5 Years	Potential social and/or political support	Potentially Feasible	No	Insufficient info at this time	Not available	No	Considered as part of LTP refresh	Incorporated into other measures

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Transport model development to allow testing of parking consolidation, traffic management changes and modal shift	Scheme in Worcester City Centre Transport Plan (WCCTP)	Greater Than 5 Years	Insufficient info at this time	Insufficient info at this time	No	Insufficient info at this time	Not available	No	Included in Car Park Rationalisation	Incorporated into other measures
Explore options for the realignment of Croft Road to remove/reduce the risk of flooding	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit
Monitor availability and distribution for disabled parking	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit
Public Realm Impact - Arches	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Focus area1 - Cornmarket decluttering	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit
City Centre Streets - Tactile Programme	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit
Crom and Security measures programme	Scheme in Worcester City Centre Transport Plan (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit
City Centre Streets - Side Road crossover programme	Destination spaces and city centre streets. this detail takes the footway across a side road junction or raises the carriageway and provides tight side road radii (WCCTP)	N/A	N/A	N/A	N/A	Negligible	Not available	No	No	No AQ benefit

Measure	Further detail	Timeline for implement-ation	Strategic support	Practical appli-cation	Deliver-ability	Antici-pated NO_2 reduction in AQMA	Data to quantify	Progress to Stage 2 Impact Assessment	Potential to progress to Stage 2 in future	Outcome
Equality	Ensure all communications and media posts related to active travel are inclusive in their language and imagery.	N/A	N/A	N/A	N/A	None	Not available	No	No	No AQ benefit
Data Collection	survey to establish a post COVID-19 baseline in staff travel patterns. Allows progression to be measured and targets set	N/A	N/A	N/A	N/A	None	Not available	No	No	No AQ benefit

Appendix E: Outcomes of Stage 2 Impact Assessment

Table E.1 Outcomes of Impact Assessment

Measure	Cost	Cost Score	Min Impact	Max Impact	Avg. Min	Avg. Max	Overall Avg. Impact	Impact Score	CBA score	Hotspots	Overall score	Funded	Ranking
Public EV Charging Points	£50k-£100k	5	-5.15%	-81.60%	-21.97%	-38.88%	<15%	3	15	9	24	Y	1*
LEVI Deliverability Funding	£1 million - £10 million	2	-5.15%	-81.60%	-21.97%	-38.88%	>15%	4	8	9	17	Y	1*
Air Quality Planning and Policy Guidance	£10k - £50k	6	-	-	-	-	< 0.2%	1	6	9	15	N	1*
EV Charging Strategy	£50k - £100k	5	-	-	-	-	< 0.2%	1	5	9	14	Y	1*
Directional Signage	£100k-£500k	4	-2.49%	-28.72%	-2.96%	-25.51%	-8.31%	3	12	5	17	N	2
Countywide AQ Strategy - Encouraging awareness via Public Portal of real time monitoring data	£100k - £500k	4	-	-	-	-	< 3%	2	8	9	17	Y	3
Countywide AQ Strategy - Behavioural Change Officer Post	£100k - £500k	4	-	-	-	-	< 3%	2	8	9	17	Y	3
Countywide AQ Strategy - Encouraging awareness and behavioural change interventions linked to focussed real time monitoring data	£10k-50k	6	-	-	-	-	< 1%	2	12	4	16	N	4

Measure	Cost	Cost Score	Min Impact	Max Impact	Avg. Min	Avg. Max	Overall Avg. Impact	Impact Score	CBA score	Hotspots	Overall score	Funded	Ranking
Bike hire and bike share	£500k - £1 million	3	-0.14%	-0.82%	-0.22%	-0.60%	-0.43%	2	6	9	15	Y	5
Bus fleet improvements (local bus services)	£1 million-£10million	2	1.21%	-33.47%	-3.95%	-24.92%	-14.66%	3	6	9	15	N	7
Travel Choices	£500k-£1million	3	-	-	-	-	< 3%	2	6	9	15	N	8
Active Travel Guides for business	£10k-50k	6	-	-	-	-	< 0.2%	1	6	9	15	N	9
Countywide AQ Strategy - Raising awareness events	£10k-50k	6	-	-	-	-	< 0.2%	1	6	9	15		9
Countywide AQ Strategy - Communications Plan	£10k-50k	6	-	-	-	-	< 0.2%	1	6	9	15		9
Worcester Local Cycling and Walking Infrastructure Plan (Development)	£50k-£100k	5	-	-	-	-	< 0.2%	1	5	9	14	Y	10
Travel to school	£100k-£500k	4	-	-	-	-	< 1%	2	8	6	14	N	11
Worcester City Vehicle Fleet Upgrade - Refuse Collection Vehicle	£100k-£500k	4	-	-	-	-	< 0.2%	1	4	9	13	Y	11
Additional cycle parking / storage	£100k-£500k	4	-	-	-	-	< 0.2%	1	4	9	13	N	11

Measure	Cost	Cost Score	Min Impact	Max Impact	Avg. Min	Avg. Max	Overall Avg. Impact	Impact Score	CBA score	Hotspots	Overall score	Funded	Ranking
Bus stop infrastructure – bus shelter provision	£500k-£1million	3	-	-	-	-	< 0.2%	1	3	9	12	N	12
Worcester Local Cycling and Walking Infrastructure Plan (Scheme Delivery)	>£10million	1	-	-	-	-	< 3%	2	2	9	11	N	15
Remove City Centre HGV Parking	£10k - £50k	6	0.00%	-2.03%	0.00%	-0.39%	-0.10%	1	6	3	9	N	16
Anti Idling awareness for Taxis	£10k - £50k	6	-	-	-	-	< 0.2%	1	6	2	8	N	17

*Combined contribution from implementation of all EV infrastructure to support forecast EV take up averages 30.42%

Appendix F: Air Quality Survey Summary

The survey, conducted over three months (February to May 2024), gathered responses from 1326 participants, primarily adults aged 31 to 60, (50% of the respondents). Key findings include:

Health Impact Awareness: 35-43% of respondents expressed concern about air pollution's effects on health, while 56% understood that air pollution affects all ages but especially vulnerable groups like such as children, the elderly, and those with heart and lung conditions. Half of the respondents were aware that inhaled pollutants can reach the bloodstream and organs.

Sources of Pollution: 88% of respondents identified road traffic as the main source of outdoor air pollution, followed by home domestic burning (30%), industrial activities (28%), and construction (27%). For indoor air pollution, 60% linked it to outdoor sources, such as vehicle emissions, with cleaning products (42%) and solid fuel burning (39%) also significant. A small percentage cited alternative sources (something else), like such as garden fires and poor ventilation.

Travel Habits: Over half of the respondents (54%) travel less than 4 miles to work, and 58% primarily use cars. Short journeys (<2 miles) are also dominated by car use (44%).

Air Quality Improvement: Walking more (67%) was the most common suggestion for improving air quality, while 69% of respondents do not use log burners or open fires at home.

Behavioural Change: Respondents voiced concerns about public health, the environment, urban planning, and quality of life. These insights will inform strategies to raise awareness, reduce air pollution exposure, and promote air quality information. However, further targeted surveys to obtain more additional input from younger populations (students) is recommended for a comprehensive understanding.

Glossary of Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values
AQEG	Air Quality Expert Group - an expert committee of Defra drawn from those with a proven track record in the fields of air pollution research and practice
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQO	National Air Quality Objectives and Air Quality Standards Regulations limit and target values with which the UK must comply
AQS	Air Quality Strategy
ASR	Air quality Annual Status Report
BCO	Behavioural Change Officer
CHYM	Choose How You Move
CO_2	Carbon Dioxide
COVID-19	Coronavirus Disease 2019
Defra	Department for Environment, Food and Rural Affairs

Abbreviation	Description
DfT	Department for Transport
EFT	Emissions Factor Toolkit
EST	Energy Savings Trust
EV	Electric Vehicle
EVI	Electric Vehicle (Charging) Infrastructure
HGV	Heavy Goods Vehicles
LA	Local Authority
LAQM	Local Air Quality Management
LCV	Light Commercial Vehicle
LCWIP	Local Cycling and Walking Infrastructure Plan
LEV	Low Emissions Vehicle
LGV	Light Goods Vehicles (vans)
LTP	Local Transport Plan
$\mu g/m^3$	Microgrammes per meter cubed (international standard units of air pollution)
NEVIS	National Electric Vehicle Insight and Support
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PHE	Public Health England

Abbreviation	Description
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
RCV	Refuse Collection Vehicle
RTI	Real Time Infrastructure
SAMHE	Schools Air Quality Monitoring for Health and Education Programme
SLR	Southern Link Road (A4440)
SPD	Supplementary Planning Document
SRN	Strategic Road Network
SWDP	South Worcestershire Development Plan
UoB	University of Birmingham
UoW	University of Worcester
WCC	Worcestershire County Council
WHO	World Health Organisation
WRS	Worcestershire Regulatory Services

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