OXFORD CITY COUNCIL

Oxford City Council Air Quality Action Plan 2026-2030 (DRAFT)

In fulfilment of Part IV of the Environment Act 1995
(as amended by the Environment Act 2021) Local Air Quality Management

January 2026

Building a world-class city for everyone

Foreword

Clean air is not a luxury: it is a basic right. Yet air pollution remains one of the biggest threats to our health, damaging lungs and hearts, cutting lives short, and falling hardest on the most vulnerable in our communities.

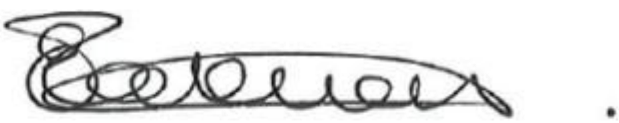
Oxford has shown that progress is possible. Over the past decade, nitrogen dioxide levels in our city have fallen by more than half (52%). Since our last Air Quality Action Plan began in 2021, we have seen a further 25% drop in NO_2, supported by ambitious measures such as introducing the world's first Zero Emission Zone, rolling out 159 electric buses, delivering a citywide Smoke Control Area, and launching Europe's most powerful electric vehicle charging hub at Redbridge.

But while this progress is encouraging, we cannot be complacent. There is no safe level of air pollution. Even at lower levels, dirty air harms our health and widens inequalities. In 2023, people living in the 20% most deprived areas were exposed to 8% higher average air pollution levels than those in the least deprived, despite being least likely to contribute to It [a]*. That's why, in 2021, Oxford was the first city in the UK to set its own local air quality target: to reduce annual mean nitrogen dioxide levels to 30µg/m³ by 2025 ("30 by 25.)" We are on track to meet that goal.*

So now it's time to raise our ambition again. This Action Plan commits Oxford to go further, with a new target of "20 by 30" - 20µg/m³ by 2030. This matches the latest World Health Organisation recommendations and the new EU standards, going further than the UK's own legal limit.

Achieving this will require bold action. Working with Oxfordshire County Council and many other partners, we will continue to transform how people move around our city, tackle emissions from heating and industry, and empower residents with the information and choices they need.

Air pollution may be invisible, but its impact is not. Through this Action Plan, Oxford will continue to take the next steps towards delivering cleaner air, healthier communities, and a fairer future for everyone in Oxford.



Councillor Anna Railton
(Deputy Leader, Cabinet Member for a Zero Carbon Oxford)

[a] Royal College of Physicians. A breath of fresh air: responding to the health challenges of modern air pollution. RCP, 2025

Executive Summary

This Air Quality Action Plan (AQAP) has been developed in accordance with Oxford City Council's statutory responsibilities under the Local Air Quality Management framework. It sets out the measures Oxford City Council and its partners intend to implement to improve air quality in Oxford City between 2026 and 2030. The plan also supports the City's broader goals to enhance public health, reduce pollution, and address the climate crisis. Our vision for this AQAP is to:

Deliver Cleaner Air for everyone who lives in, works in, or visits the city of Oxford

This vision is anchored in three important premises:

- ✓ **Air pollution affects everyone** throughout the different life stages and can harm all organs of the body.
- ✓ **There is no safe level of exposure to air pollution** - even low, long-term exposure can impact future health.
- ✓ **Air pollution contributes to health inequalities**, disproportionately affecting vulnerable groups.

The core aims that we have set up in this action plan to help us deliver it are:

- ✓ **Alignment with the World Health Organisation Air Quality Guidelines**. These guidelines will serve as the city's reference standard and long-term target. This AQAP commits to pursuing WHO's Interim Target III for NO_2.
- ✓ **To raise public awareness of the health impacts of air pollution**, empowering residents with information and encouraging behavioural change.
- ✓ **To influence change and lead by example through local action and policy,** demonstrating the Council's commitment to cleaner air and healthier communities.

The overarching objective of this AQAP for the entire Oxford city area is to:

Pursue a local annual mean NO_2 target of 20 µg/m³ by 2030

"20 by 30"

This Action Plan outlines **30 targeted actions and measures** to be delivered by a range of partners, including Oxfordshire County Council - who are the Transport Authority for Oxfordshire and as such, have played a key role in shaping this draft AQAP. These actions are grouped under four strategic priority areas:

- **Promoting Active Travel and Reducing the Need to Drive.**
- **Accelerating the Transition to Low and Zero Emission Transport.**
- **Reducing Emissions from Domestic Heating, Industry, and Services.**
- **Facilitating Behaviour Change by enhancing public awareness and fostering collaborative partnerships**

The plan is built around three transport initiatives currently being pursued by Oxfordshire County Council in its role as the Lead Local Transport Authority:

- **Trial Traffic Filters**
- **Workplace Parking Levy**
- **Zero Emission Zone Expansion**.

While the expected air quality improvements from these measures, underpin this strategy, many elements of these schemes are still subject to public consultation and political approval, meaning their scope and final design may evolve as the process unfolds.

In addition, Oxford City Council and its partners aim to reopen the Cowley Branch Line for passenger services by 2030. This project will connect key residential and employment areas to the city centre in under 10 minutes, supporting over one million passenger journeys annually. This modal shift from car to rail is expected to ease congestion - especially during peak hours - and reduce commuter traffic into the city centre. All these transport schemes are designed to **enhance connectivity and reduce congestion**, freeing up space for active travel and significantly cutting road transport-related air pollution during the AQAP's implementation period (2026–2030).

The Zero Carbon Oxfordshire Partnership (ZCOP) is also expected to play an important role in reducing air pollution over the next five years. By convening stakeholders from the public, private, and academic sectors, ZCOP fosters coordinated action to decarbonise buildings and energy systems (key contributors to air pollution) through initiatives such as:

- Electrification of heating
- Promotion of renewable energies
- Support for low-carbon technologies in industry and commerce.

This AQAP is a cornerstone of Oxford's broader environmental and public health strategy. It aligns with local transport, climate, and planning policies and directly supports two of Oxford City Council's corporate priorities:

- **Pursue a Zero Carbon Oxford** – aiming for city-wide zero carbon emissions by 2040. This AQAP contributes by improving air quality and mitigating climate change.

- **Support Thriving Communities** – recognising that clean air is essential for physical and mental health. The AQAP helps reduce health inequalities and prevent pollution-related illnesses, including those linked to mental health.

While DEFRA requires this AQAP to focus primarily on reducing NO_2 levels - so that the city's Air Quality Management Area can eventually be revoked[1] - many of the proposed measures will also indirectly reduce $PM_{2.5}$ emissions, which pose serious health risks.

[1] Under the Local Air Quality Management (LAQM) regime in England, an Air Quality Management Area (AQMA) is typically only revoked after five consecutive years of measured compliance with legal limit values. Oxford has achieved compliance with the annual mean NO_2 limit for three consecutive years (2022-2024), and while this marks significant progress, the AQMA remains in place pending further sustained compliance.

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Glossary of Terms

Terms and Abbreviations	Description
Air Quality Action Plan (AQAP)	A detailed plan of measures, actions, achievement dates and (AQAP) implementation methods, which must be prepared by the local authority as part of the Local Air Quality Management (LAQM) process, if an Air Quality Management Area is designated, and that shows how the local authority intends to reduce air pollution levels.
Air Quality Management Area (AQMA)	An area where air pollutant concentrations exceed / are likely to exceed the UK legal air quality objectives for specific air pollutants.
Air Quality Strategy (AQS)	Document produced by UK Government and that sets out all the national plans and policy options for dealing with all sources of air pollution in the UK from today into the long term.
Air Quality Objectives (AQS)	Limit values for pollutants set by UK Government, usually expressed as a maximum concentration to be achieved within a specified timescale, possibly with a permitted number of exceedances.
Annual Mean NO_2	The average NO_2 concentrations measured over a 12-month period (Calendar year). The current UK Annual Mean limit value for NO_2 is set at 40 µg/m^3.
AURN	National network of automatic monitoring stations that measure concentrations of key air pollutants across urban and rural locations in the UK. It is the primary network used for compliance reporting against the Ambient Air Quality Directives and supports public health and environmental policy.
COPD	Chronic Obstructive Pulmonary Disease (COPD) is the name for a group of long-term lung conditions that cause breathing difficulties. It primarily includes emphysema and chronic bronchitis.
Local Annual Mean NO_2 Target	The annual mean target set by Oxford City Council, to be achieved in all locations of relevant public exposure in Oxford City.
Air Quality Annual Status Report (AQ ASR)	Document that reviews on an annual basis current and likely future air quality and assess whether air quality objectives are currently being achieved or are likely to be achieved.
Concentration	The amount of a substance in a volume (of air) typically expressed as a mass of a pollutant per unit volume of air, e.g. micrograms per cubic metre (µg/m^3).
DEFRA	Department for Environment, Food and Rural Affairs
DT	Diffusion Tube: is a simple, cost-effective device used to measure the concentration of gaseous pollutants in the air, particularly over a period of time (typically 4 weeks).
EU	European Union.
Exceedance	When a UK air objective is not achieved
LAQM	Local Air Quality Management - A UK Government policy framework that requires local authorities to periodically review and assess the current and future air quality in their areas
LAQM TG22	Local Air Quality Management -Technical Guidance 2022
LAQM PG22	Local Air Quality Management – Policy Guidance 2022
Limit Value	Legally binding pollution levels that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
LTP	Local Transport Plan.
Microgramme (µg)	One millionth of a gram.

Microgrammes per cubic metre of air (µg/m^3)	A unit describing the concentration of an air pollutant in the atmosphere, as a mass of pollutant per unit volume of clean air.
NHS	National Health Service
NO	Formed from nitrogen (N) in the atmosphere during high temperature combustion. Commonly known as Nitric Oxide.
NO_2	Formed in small amounts in the atmosphere during high temperature combustion, but the majority is formed in the atmosphere through the conversion of nitric oxide (NO) in the presence of ozone (O_3). Commonly known as Nitrogen Dioxide.
NOx	A collective term used to refer to NO and NO_2. These are produced from the reaction of nitrogen and oxygen gases in the air during combustion, especially at high temperatures. At normal temperatures, oxygen and nitrogen gases do not react together. Nitrogen oxides are produced from fuel combustion in mobile and stationary sources. The combustion of fuel in cars emits NOx into the atmosphere (mobile source). Stationary emissions come from coal fired power plants, electric power plants and domestic heating.
NRMM	Refers to a broad category of mobile equipment and transportable industrial machinery powered by internal combustion engines, which are not designed for transporting goods or passengers on public roads. Examples include equipment such as diesel generators, construction machinery, and certain types of agricultural or industrial vehicles.
O_3	Refers to ground-level ozone (often called “bad” ozone). Prolonged exposure to high concentrations can lead to respiratory issues such as coughing, throat irritation, reduced lung function, and the worsening of conditions like asthma and COPD. It also causes inflammation of the airways and contributes to environmental damage, harming crops, forests, and other vegetation
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.
UK	United Kingdom.
WHO	World Health Organisation.
ZEZ	Zero Emission Zone: an area in Oxford where only zero-emission vehicles (such as electric cars, bikes, and hydrogen vehicles) can enter without paying a charge. Other vehicles—such as petrol, diesel, and hybrid vehicles—are allowed but must pay a daily charge to drive within the zone, unless they qualify for a discount or exemption.

Introduction

This Action Plan sets out the measures that Oxford City Council and its partners will implement between 2026 and 2030 to reduce air pollutant concentrations and limit public exposure to air pollution. These actions aim to improve the health and quality of life for everyone who lives in, works in, or visits the city of Oxford.

The plan has been developed in accordance with the Council's statutory duty under Part IV of the Environment Act 1995 (as amended by the Environment Act 2021), and in line with the requirements of the Local Air Quality Management (LAQM) framework.

Importantly, this Action Plan goes beyond mere legal compliance with air pollution limits. Building on the achievements of the previous plan, it introduces a new and even more ambitious local target for annual mean nitrogen dioxide (NO_2). The new proposed target - an annual mean of 20 µg/m³ - is completely aligned with the World Health Organisation's recommended Interim Target II for NO_2 (published in September 2021[2]) and mirrors the European Union's newly adopted legal limit, effective from December 2024[3].

This alignment underscores the strong commitment from the City and County Councils to achieving the lowest feasible levels of air pollution in the city over the next five years and to taking decisive, proactive steps to safeguard public health.

Transparency is fundamental to the success of this Action Plan. To ensure accountability and drive continuous improvement, the plan will be subject to annual reviews. Progress on the implementation of its measures will be reported through the Annual Status Reports (ASRs), which are annually appraised by the Department for Environment, Food & Rural Affairs (DEFRA) and published by Oxford City Council as part of its statutory duties under the Local Air Quality Management (LAQM) framework.

The following sections provide an overview of the current air quality challenges in Oxford, the sources of pollution, and the progress achieved to date. They also identify the key priority areas for intervention and detail the specific actions and measures that City and partners expect to deliver under each area, to meet the city's new local air quality target for NO_2.

[2] On the 22nd of September 2021, the World Health Organisation (WHO) updated its global air quality guidelines for outdoor air pollution. Clear evidence was finally provided of the damage air pollution inflicts on human health at much lower concentrations than previously understood. The new WHO guidelines establish a much more stringent set of concentrations (called guideline values) for several pollutants, (including for NO_2) which highlight the value at which the pollutant become health impacting. The WHO has also set a number of interim targets for NO_2 concentrations aimed at promoting a gradual shift from high to lower levels of air pollution.

[3] The new EU Air Quality Directive (Directive (EU) 2024/2881) significantly strengthens air quality standards, aiming to align with World Health Organisation (WHO) recommendations by 2030. Key changes include tighter legal limit values for several pollutants, especially $PM_{2.5}$ and NO_2, and provisions for access to justice and compensation for all those affected by air pollution.

Understanding the UK's Air Quality Obligations

The UK's approach to managing air quality in our towns and cities is underpinned by a legal and regulatory framework that combines national strategy with local implementation. This framework is primarily established through Part IV of the Environment Act 1995 (as amended by the Environment Act 2021), and which mandates the central government to develop a National Air Quality Strategy and assigns air quality statutory duties to local authorities in England, under the Local Air Quality Management (LAQM) system.

National Responsibilities

Under the Environment Act, the Secretary of State is required to publish and periodically review a national strategy for air quality. This strategy sets out:

- ✓ **The existing air quality standards and objectives** (as set out by the Air Quality Standards Regulations 2010) for key pollutants such as nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), and others.
- ✓ **The complete list of national policies and measures** that support the achievement of these objectives.

The strategy[4] must be reviewed at least every five years, or sooner, if necessary, to ensure it remains effective and aligned with evolving scientific evidence and public health priorities.

Local Authority Duties

Oxford currently has a Two-Tier Local Authority structure. Oxford City Council, as a Tier 2 authority, has the core duty to deliver air quality improvements for Oxford through the Local Air Quality Management (LAQM) framework[5]. It is required to:

- **Regularly assess and review** air quality in their areas.
- **Designate Air Quality Management Areas** (AQMAs) where national air quality objectives are not being met or are at risk of being breached.
- **Develop and implement Air Quality Action Plans** (AQAPs) that outline targeted measures to reduce pollution and protect public health.

Recent amendments under the Environment Act 2021 have reinforced these responsibilities and broadened the scope of public bodies required to actively collaborate on local air quality improvements - these now include County Councils, NHS bodies, National Highways, the Environment Agency, and the UK Health Security Agency. The Act also introduces clearer accountability mechanisms, including enhanced annual air quality status reporting to DEFRA and the issuance of warning letters to local authorities that fail to comply with their statutory duties.

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[4] England's current Air Quality Strategy was published on the 28th April 2023 and can be found here.

[5] The LAQM framework is a statutory system in the UK that requires local authorities to assess and manage air quality in their areas. It was established under the Environment Act 1995 and is overseen by the Department for Environment, Food & Rural Affairs and the devolved administrations. For more details, please consult Local Air Quality Management Policy Guidance 2022 (LAQM PG22).

1. What is Air Pollution and why it matters?

Air pollution is the presence of harmful substances in the air we breathe. These substances can be in the form of gases or particles, and they can damage our health, the environment, and the climate.

1.1 Key Urban Air Pollutants and Their Sources

1.1.1 Gases

These are invisible to the human eye and include pollutants like:

- **Nitrogen Dioxide (NO_2) -** Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation. NO_2 has a clear local pattern and is mostly concentrated where it is emitted: in urban areas and by busy roads, due to its relatively short lifetime (a few hours).

- **Ground level[6] Ozone (O_3)** - Ozone is not emitted directly into the atmosphere in significant quantities but is a secondary pollutant[7] produced by reaction between nitrogen dioxide and hydrocarbons, in the presence of sunlight. Peak ozone episodes are therefore strongly linked to typical summer weather conditions (high temperatures, sunny weather), giving rise to the so called "*summer smog*".

1.1.2 Particles

Particles, also known as particulate matter (PM) is everything in the air that is not a gas. These tiny, microscopic solid or liquid substances can originate from natural sources such as pollen, sea spray, forest fires and dust from soil or volcanic activity, as well as human made sources such as smoke from wood burning, emissions from construction, industry and vehicles, and wear from tyres and brakes.

. They can be divided into two different size categories:

- **$PM_{2.5}$** – These are fine particles smaller than 2.5 micrometres (approximately 20 times thinner than the width of a human hair), and which can penetrate deep into the lungs and even enter the bloodstream.

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[6] Ozone high up in the sky (stratospheric) is good because it protects us from the sun's harmful UV rays. But ozone near the ground (tropospheric) is bad because it pollutes the air and can make it hard to breathe.

[7] A secondary pollutant is a type of air pollutant that is not directly emitted into the atmosphere. Instead, it forms through chemical reactions between primary pollutants and other atmospheric components, often in the presence of sunlight.

- **PM_{10}** – These are slightly larger particles (up to 10 micrometres), which can still affect the respiratory system.

Urban areas are hubs of human activity, but they also concentrate many of the sources of air pollution that pose serious risks to public health and the environment. Typically, the most significant contributors to urban air pollution are:

- **Road traffic** (especially diesel vehicles) – is one of the major sources of NO_2.
- **Domestic heating** – including wood-burning stoves and open fires, which are large contributors to PM.
- **Industrial activities** – contributing to both gases and particle emissions.
- **Construction and demolition** – releasing dust and PM.
- **Chemical reactions in the atmosphere** – forming secondary pollutants like ozone

1.2 Air Pollution as a Public Health Crisis

Air pollution is no longer just an environmental concern - it is a pressing public health emergency.

According to a recent report[8] from the Royal College of Physicians' "*A Breath of Fresh Air*", air pollution is responsible for an estimated 30,000 deaths annually in the UK and contributes to a wide range of chronic and acute health conditions, including cardiovascular disease, respiratory illness, dementia, and mental health disorders.

The report reinforces what has become increasingly clear since the World Health Organisation released its updated air quality guidelines in September 2021:

There is no safe level of exposure to air pollution

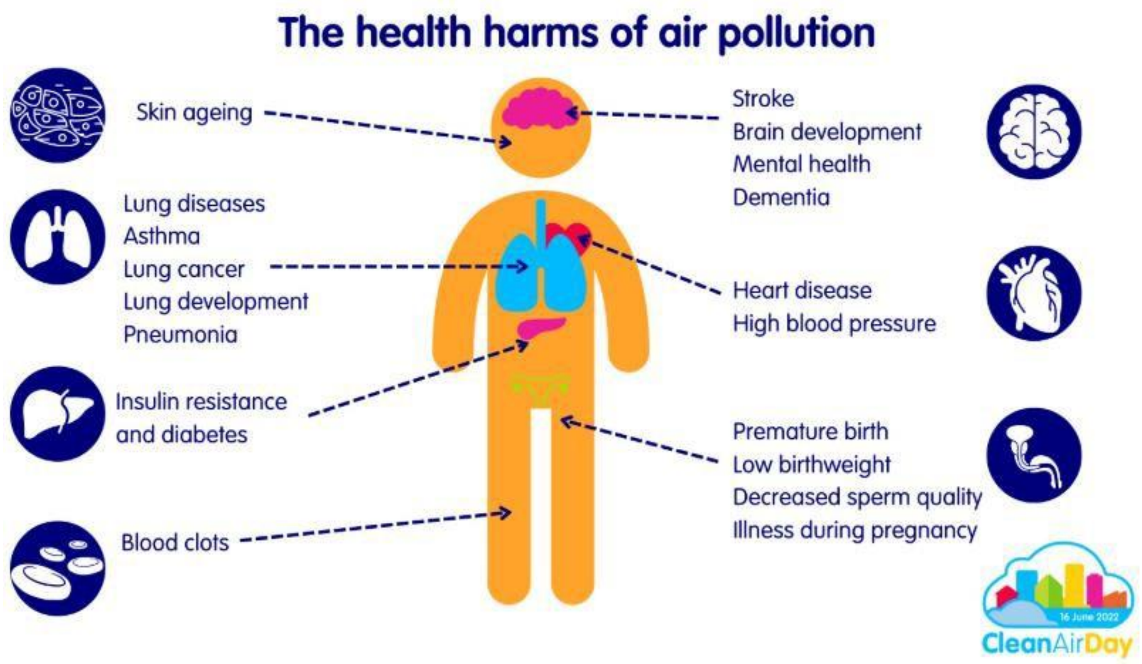
Even concentrations of nitrogen dioxide, particulate matter, and ozone well below current legal limits have been shown to cause harm. Clear evidence demonstrates that air pollution can negatively affect health across the entire life course - from prenatal development through to old age.

Figure 1 below shows how air pollution impacts nearly every organ in the human body. Fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and ozone (O_3) can penetrate deep into the respiratory system, triggering asthma, lung cancer, and reduced lung development. These pollutants also enter the bloodstream, contributing to heart disease, high blood pressure, and even blood clots.

[8] A breath of fresh air: responding to the health challenges of modern air pollution report, published on Clean Air Day (19th June 2025).

The brain is vulnerable too, with growing evidence linking air pollution to stroke, dementia, and mental health disorders. Exposure during pregnancy can lead to premature birth and low birthweight, while long-term exposure is associated with insulin resistance and type 2 diabetes. From skin aging to impaired reproductive health, the effects of polluted air are widespread and serious - making clean air essential for a healthy life.

Figure 1 - Mapping the Health Effects of Air Pollution Across the Body[9]



1.3 Air Pollution and the Climate Emergency

Air quality and the climate crisis are closely connected. Air pollutants and greenhouse gases often originate from the same sources (particularly the burning of fossil fuels in the transport and energy sectors), and so often share the same solutions.

As described above, key urban air pollution is focused on gases like NO_2 and O_3, and particles (PM_{10} and $PM_{2.5}$), which directly harm our health, especially our lungs and heart. The climate crisis is driven by greenhouse gases such as carbon dioxide (CO_2) and methane (CH_4), which trap heat and disrupt ecosystems. This leads to indirect health impacts through extreme weather and changing environmental conditions.

Some air pollutants also directly contribute to global warming. For instance, black carbon - a component of $PM_{2.5}$ produced by the incomplete combustion of coal, gas, wood, peat, and crop residues - accounts for up to 15%[10] of global warming.

[9] Image sourced from the Global Action Plan website (accessed on 1st September 2025)
[10] Science for Environment Policy, Air pollution and climate change (2010)

Similarly, methane and ground-level ozone are both harmful air pollutants and potent greenhouse gases, playing a significant role in climate change.

Both air pollution and climate change pose serious risks to public health. Air pollution causes immediate and direct harm, contributing to millions of premature deaths each year. In contrast, climate change affects health more indirectly - through extreme weather events, food and water insecurity, and the spread of infectious diseases.

1.3.1 Main advantages of joined-up action

A very important report from the Clean Air[11] fund highlights the key benefits of joined up action on air pollution and climate change. A short resume of the key points is highlighted below:

- ✓ **Improved Public Health**
  Reducing air pollution lowers the risk of respiratory and cardiovascular diseases, while tackling global warming reduces the threat of heat-related illnesses, infectious diseases, and extreme weather impacts. Both actions save lives and ease the burden on healthcare systems.
- ✓ **Faster Emissions Reductions**
  Many sources of air pollution (e.g. transport, energy, industry) also emit greenhouse gases. Tackling them together accelerates progress on climate goals.
- ✓ **Economic Savings**
  Integrated policies can reduce duplication, improve efficiency, and deliver better value for money through shared infrastructure and planning.
- ✓ **Support for Vulnerable Communities**
  Poorer populations often suffer most from both dirty air and climate impacts. Joint action can help address these inequalities.
- ✓ **Stronger Political and Public Support**
  Health benefits from cleaner air are immediate and visible, helping to build momentum and public backing for climate policies.
- ✓ **More Resilient Cities**
  Cleaner, greener urban environments are better prepared for climate shocks and offer improved quality of life.

1.4 Who Pays the Price? Air Pollution, Economics, and Inequality

Air pollution is not just an environmental issue - it is also a pressing matter of social and economic justice. The health and financial burdens it creates fall in many cases disproportionately on low-income households and marginalised communities, who

[11] Joined-up Action on Air Pollution and Climate Change (2021)

are more likely to live in areas with higher pollution levels[12] due to historical housing inequalities, limited political influence, and proximity to major roads or industrial sources.

These communities tend to experience elevated risks of respiratory and cardiovascular diseases, reduced life expectancy, and increased healthcare costs (pressures that deepen existing inequalities and perpetuate cycles of poverty). Vulnerable groups such as children, older adults, and individuals with pre-existing conditions like asthma, COPD, or obesity are also particularly at risk.

While this pattern is evident nationally (where deprived areas often coincide with higher pollution levels), Oxford presents a more complex picture. Many of the city's most deprived areas are located away from major traffic routes, such as housing estates, and therefore experience relatively lower pollution levels. However, high pollution persists in central areas heavily used by children and young people, including students. This highlights the importance of looking beyond averages to understand who is most affected and where.

The economic impacts of air pollution extend beyond individual health to broader societal costs, including lost productivity, increased public health spending, and reduced educational outcomes. Yet, these costs are not shared equally. Wealthier populations often have the means to avoid exposure and access better healthcare, while vulnerable groups are left to bear the brunt.

A strong UK-based reference for the estimated economic costs of air pollution comes from a Parliamentary Office of Science and Technology (POST) briefing[13]. It states that:

Between 2017 and 2025, the total estimated NHS and social care cost of air pollution in England will be at least £1.6 billion.

This figure reflects the direct burden on public health services due to air pollution-related illnesses, particularly from pollutants like particulate matter ($PM_{2.5}$) and nitrogen dioxide (NO_2), which are linked to respiratory and cardiovascular diseases.

1.5 Navigating global and local standards for Clean Air

Air quality standards form the backbone of efforts to protect public health and the environment, yet they vary significantly across jurisdictions. From the World Health Organisation's science-based guidelines to the legally binding thresholds set by the European Union, the United Kingdom, and local authorities like Oxford City Council, navigating this complex landscape is essential for understanding both the progress

[12] In 2023, people living in the 20% most deprived areas experienced 8% higher average $PM_{2.5}$ concentrations than those in the 20% least deprived (Royal College of Physicians' "*A Breath of Fresh Air*" report).

[13] The UK Parliament Post on Urban outdoor air quality (from January 2023) can be found here.

made and the challenges ahead. This section explores how these standards align or diverge, and what they mean for achieving truly clean air at every level.

Figure 2 - Timeline of annual mean standards for NO_2 and $PM_{2.5}$ and the institutions behind them

August 2006 - The World Health Organisation (WHO) publishes its air pollution guidelines, recommending adoption of annual mean guideline values of 40 µg/m^3 for NO_2 and 10 µg/m^3 for $PM_{2.5}$.

May 2008 - The European Union publishes Directive 2008/50/EC on ambient air quality and cleaner air for Europe, setting up an annual mean limit value of 40 µg/m^3 for NO_2 and 20 µg/m^3 for $PM_{2.5}$.

June 2010 - The UK transposed Directive 2008/50/EC into domestic law using powers granted under the European Communities Act 1972, through the Air Quality Standards Regulations 2010 - thereby adopting the same legal annual mean limits for NO_2 and $PM_{2.5}$ as set out in the European directive.

January 2021 - Already recognising that there is no safe level of air pollution, Oxford City Council published its Air Quality Action Plan 2021 - 2025 and was a pioneer in its clear commitment to achieving a local annual mean NO_2 target of 30 µg/m³ across all areas of relevant public exposure within the city.

September 2021 - In 2021, the WHO updated its Global Air Quality Guidelines, confirming that no level of air pollution is safe. The new recommendations significantly lowered thresholds for key pollutants. For NO_2, the annual mean guideline was reduced to 10 µg/m³, with interim targets at 40, 30, and 20 µg/m³. For $PM_{2.5}$, the annual mean was halved to 5 µg/m³, reflecting stronger evidence of health risks even at low exposure levels.

November 2021 - The UK's Environment Act 2021 established two legally binding targets for $PM_{2.5}$ in England: an annual mean concentration limit of 10 µg/m³ - reflecting the WHO's 2005 guideline- and a 35% reduction in population exposure, both to be achieved by 2040. Notably, the Act did not introduce any new legal targets for NO_2.

October 2024 - In October 2024, the European Union adopted Directive (EU) 2024/2881 on ambient air quality and cleaner air for Europe. This recast directive reflects the EU's commitment to aligning its standards more closely with the latest scientific evidence and the 2021 WHO Global Air Quality Guidelines. One of the most significant changes is the reduction of the annual mean legal limit value of NO_2 from 40 µg/m³ to 20 µg/m³, and of $PM_{2.5}$ from 20 to 10 µg/m³, all to be met by 2030.

The information derived from Figure 2 highlights three important key points:

- The legally defined air pollution limit values do not necessarily represent the safest thresholds in terms of human exposure and associated health risks.
- The local annual mean target adopted by Oxford City Council in January 2021 - six months prior to the World Health Organisation's release of its updated air quality guidelines - aligns precisely with the WHO's current Interim Target II.
- The UK Government is now lagging behind the European Union in terms of both air quality standards and legislative progress.

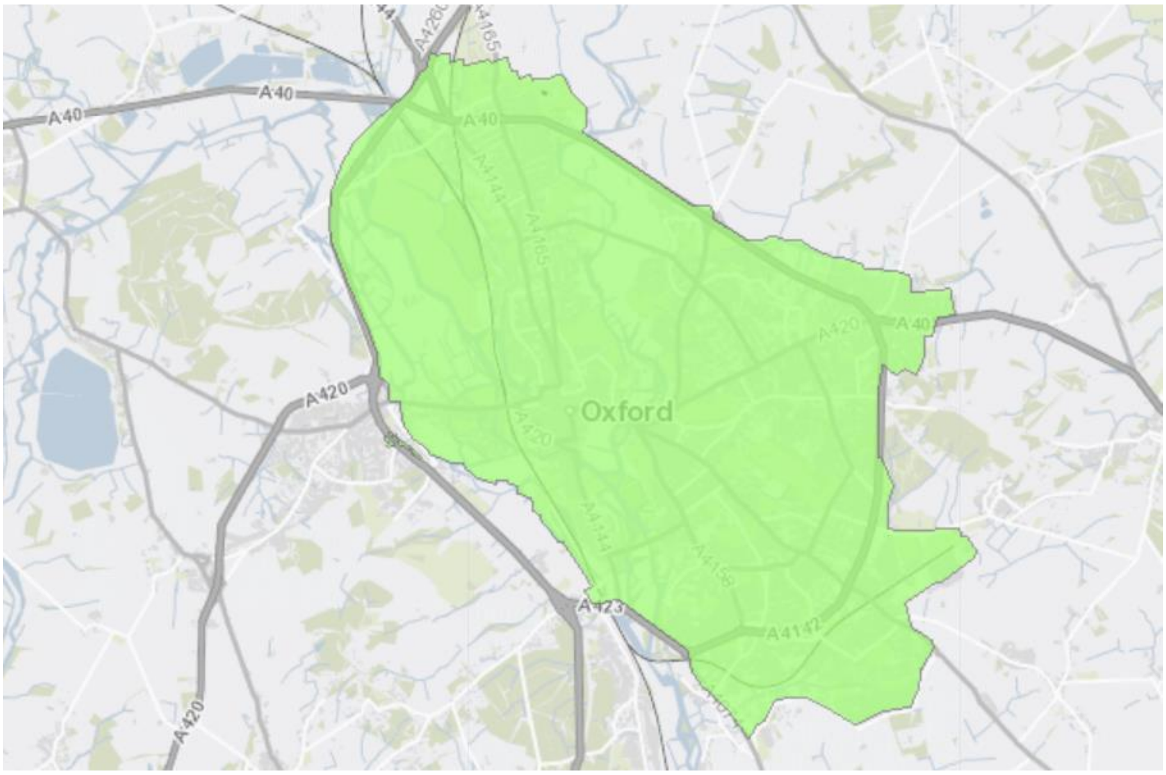
2. Oxford’s Air: Pollution Levels and Progress

Oxford is a historic city in Oxfordshire, England, situated approximately 56 miles (90 km) northwest of London. It has an estimated population of 165,200, with university students making up about 22% of its residents. Around 74.3% of the population is of working age (16 - 64 years)[14]. Oxford also has the second highest proportion of ethnic minority residents in Southeast England, and 35% of its population was born outside the United Kingdom - underscoring the city’s diversity and the global reputation of the University of Oxford.

The city’s rich heritage is reflected in its medieval street layout, narrow lanes, and historic architecture, which together create a distinctive and cherished urban environment. However, these same features pose significant challenges for modern transport and air quality management. Many roads in the city centre were never designed for motor vehicles and now struggle to accommodate current traffic volumes. With limited space for road expansion or major infrastructure upgrades, traffic often becomes concentrated in certain areas, leading to elevated levels of air pollution.

Since 2010, the entire administrative area of Oxford has been designated as an Air Quality Management Area (AQMA) due to repeated exceedances of the UK’s legal nitrogen dioxide (NO_2) limits. Figure 3 below highlights the current extent of the city’s AQMA in light green.

Figure 3 - Boundary of Oxford's current city-wide AQMA for NO_2



[14] As of June 2023, according to the Office for National Statistics (ONS)

Despite the challenges outlined above, Oxford has made notable progress in reducing air pollution in recent years. This chapter explores how air quality levels have evolved over time and highlights the most impactful measures delivered through the city's previous Air Quality Action Plan. These actions have played a key role in helping to create cleaner, healthier air for everyone who lives, works, and breathes in Oxford.

2.1 What action has been taken over the last five years?

Oxford has taken ambitious and forward-thinking steps to improve air quality through its previous Air Quality Action Plan (2021-2025).

To the best of our knowledge, Oxford was the only local authority in the UK to have established its own local air quality target for nitrogen dioxide (NO_2) in January 2021: an ambitious annual mean concentration of 30 µg/m³ to be achieved citywide by 2025 at all locations where people are regularly exposed.

This target is significantly more stringent than the current national legal limit of 40 µg/m³, underscoring Oxford's proactive commitment – already evident in 2021 - to safeguarding public health and setting a leading example in air quality management.

To support this goal, the city has implemented 30 targeted air quality actions across four key priority areas: promoting cleaner vehicles, encouraging sustainable transport, reducing emissions from homes and businesses, and increasing public awareness.

Figures 4 and 5 below present a summary of some of the most impactful measures delivered under the 2021-2025 Air Quality Action Plan.

Figure 4 - Key accomplishments from Oxford's Air Quality Action Plan (2021-2025)

<u>City-wide Smoke Control Area</u>

We have introduced a city-wide Smoke Control Area, covering the entire administrative area of the city, which introduced some rules on how people burn solid fuels and use wood-burning stoves to try to reduce (human health damaging) $PM_{2.5}$ emissions in the city

<u>Energy Super Hub</u>

Oxford City Council and its partners have delivered the world’s largest hybrid battery system (50MW) at Redbridge Park & Ride, offering fast and ultra-rapid charging infrastructure for 42 vehicles at once and with potential for charging up to 400 vehicles in the future.

<u>Bus Electrification</u>

159 new electric buses have been delivered in Oxford, thanks to a successful bid that was put forward to DfT under the Zero Emission Bus Regional Areas (ZEBRA) scheme. This now means that 69% of the entire bus mileage of the city is made on electric buses

<u>Air Quality Website OXONAIR</u>

Delivery of a new Oxfordshire air quality website, which consolidates air quality information from various councils in Oxfordshire into one platform. The website features real-time air quality data, forecasts, and resources to help residents understand and address air pollution

<u>Oxford City Council’s Electric Fleet</u>

Oxford City Council initially set a target to electrify 25% of its fleet by 2023. As of April 2025, this goal has been exceeded, with 35% of the fleet - 118 out of 338 vehicles - now fully electric

<u>Zero Emission Zone Pilot</u>

This is an area where zero emission vehicles (such as fully electric motorcycles, cars and vans) can be used without incurring a charge but where all petrol and diesel vehicles, including hybrids, will incur a daily charge if they are driven in the zone, unless they have a 100 per cent discount or exemption

Figure 5 - Key accomplishments (II) from Oxford's Air Quality Action Plan (2021-2025)

<u>Low Traffic Neighbourhoods (LTNs)</u>

An LTN is an area where motorised traffic is prevented from taking shortcuts through a residential area, creating quieter and safer streets, leading also to air quality improvements. LTNs were delivered in Cowley and at East Oxford at St Marys, St Clements and Divinity Road.

<u>E-cargo bike trials</u>

The partnership between Oxford City Council and Velocity Cycle Couriers offered the possibility for city centre businesses to trial subsidised, zero-emission deliveries by e-cargo bike. The scheme is part of a broader effort to promote sustainable transport options.

<u>Eco-moorings</u>

Three eco-mooring bollards were installed at the visitors' moorings located at Aristotle Lane, which aim to provide visiting boaters with electrical power infrastructure as an alternative to diesel engines, generators, and wood burners for their daily heat and energy needs.

<u>Electric Charging for Taxis</u>

7 new charging points (a total of 14 new bays) have been installed in Oxford at the following locations: Keble Road, Blackbird Leys Leisure centre, Headington Car park and Old Greyfriars Street, to enable the electric vehicle transition of the Oxford Hackney and Private Hire trade.

<u>Oxford's EV Strategy</u>

Oxford City Council has developed a strategy which sets out clear targets for the city of Oxford to meet by 2026, 2030 and 2040, in terms of infrastructure deployment and EV uptake, which measure the city's fulfilment of its net zero ambitions.

<u>Do You Fuel Good? campaign</u>

We have delivered a city-wide awareness raising campaign, in partnership with local Friends of the Earth and the Canal & River Trust, specifically addressing wood burning and the use of inappropriate fuels and highlighting the negative health impacts caused by these.

2.2 Air Quality levels in Oxford

2.2.1 Tracing the evolution of Air Quality Management in Oxford

Since 1999, Oxford has undertaken a continuous process of reviewing and assessing air quality. At that time, NO_2 levels - both annual and hourly means - exceeded air quality objectives in areas primarily affected by traffic.

In 2003, Oxford City Council declared its first Air Quality Management Area (AQMA) for NO_2 in central Oxford, which was subsequently expanded in 2005. In response, the Council published its first Air Quality Action Plan in 2006, focusing on reducing emissions from buses - identified at the time as the primary source of pollution in the area.

While the 2006 AQAP led to notable progress, significant exceedances of national NO_2 objectives persisted, and additional pollution hotspots were identified. As a result, following further detailed air quality assessments, a city-wide AQMA was declared in September 2010. To address the broader scope of air quality challenges, the Council adopted a new AQAP in 2013, introducing a revised set of measures aimed at improving air quality across Oxford for the period 2013 - 2020.

The city's most recent AQAP was published in January 2021, introducing a new suite of ambitious measures to be implemented between 2021 and 2025. These measures reflected a continuous strong commitment from the City Council and its partners to improve air quality across the city. Notably, for the first time in an Oxford AQAP, the plan included the city’s commitment to achieve compliance with a local nitrogen dioxide (NO_2) target of 30 µg/m^3, a target significantly more stringent and ambitious than the current UK legal standard for this pollutant - 40 µg/m^3.

2.2.2 Oxford’s Air Quality Over Time

Figure 6 (below) presents long-term trends in NO_2 concentrations across Oxford from 2004 onward - just one year after the City Council declared its first Air Quality Management Area (AQMA) for this pollutant. The data, drawn from the three sites where automatic monitoring has been consistently maintained (including two stations within the national AURN network[15]), is plotted alongside three key benchmarks: the UK’s current legal limit for NO_2, the World Health Organisation’s recommended guideline, and Oxford’s own local target, as set out in the 2021–2025 Air Quality Action Plan.

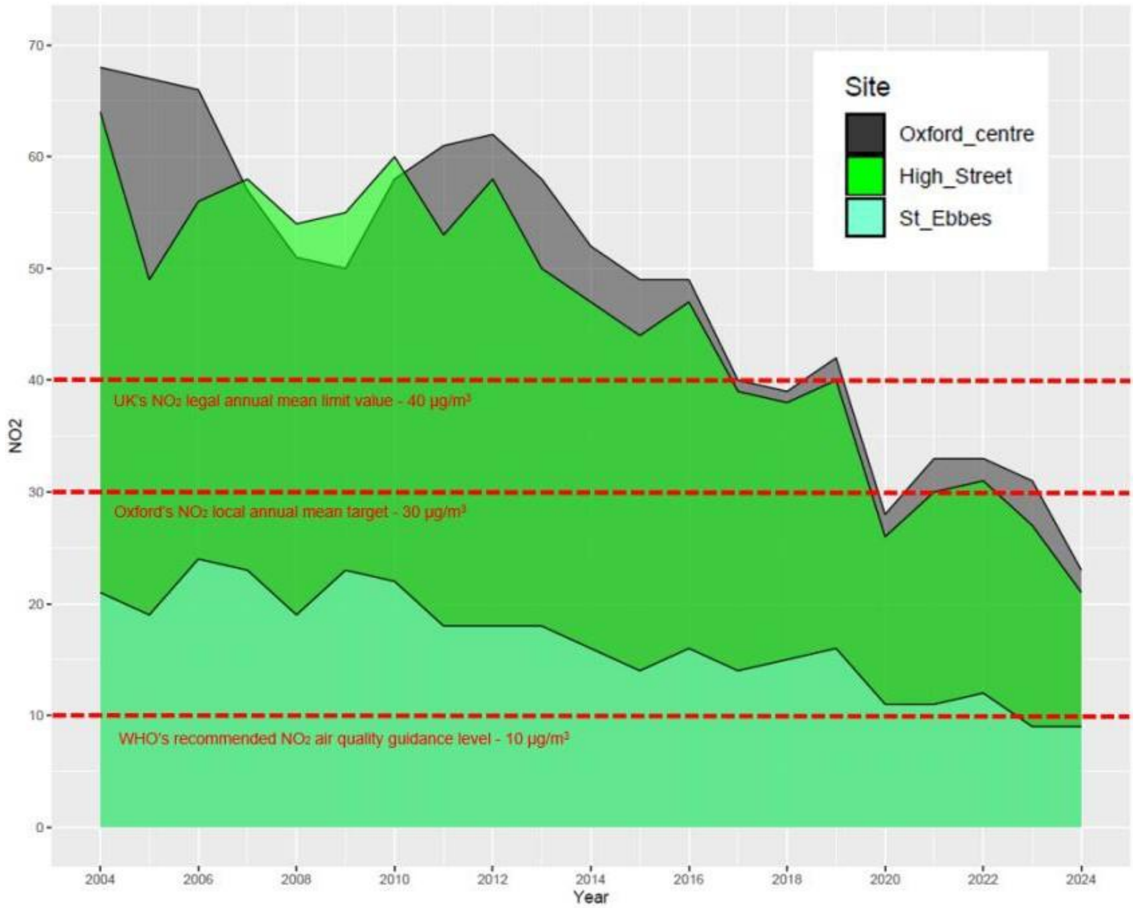
Over the past 20 years, concentrations at these key monitoring sites have declined by an average of 65%.

One particularly striking comparison underscores the scale of this improvement and of the substantial progress made in improving urban air quality in Oxford: in 2024, the annual mean NO_2 concentration at the roadside monitoring site on High Street -

[15] The AURN stands for the Automatic Urban and Rural Network. It is the UK’s national air quality monitoring network, managed by the Department for Environment, Food & Rural Affairs (Defra) in partnership with the Environment Agency. It is in place to provide high-quality, real-time data on air pollutants across the UK, supporting compliance with national air quality standards.

located in the very heart of Oxford city centre - was 21 µg/m³. Remarkably, this matches the level recorded at the urban background station at Oxford St Ebbes in 2004. Over the last two decades, NO_2 levels in one of the city's busiest traffic corridors have been reduced to levels once typical of quieter, less traffic-impacted areas.

Figure 6 – NO_2 annual mean historic trends of Oxford's automatic monitoring sites



Similarly, Figures 7 and 8 below illustrate the long-term trends in PM_{10} and $PM_{2.5}$ concentrations at Oxford's automatic monitoring sites where these pollutants have been historically measured - namely, Oxford High Street and Oxford St Ebbes.

Figure 7 reveals a clear and sustained downward trend in PM_{10} concentrations. Between 2011 and 2024, levels of this pollutant have declined by an average of 45%. Oxford now remains comfortably below both the UK's legal annual mean limit and the World Health Organisation's recommended guideline for PM_{10}, reflecting significant progress in reducing particulate pollution.

Figure 8 highlights a 40% reduction in urban background $PM_{2.5}$ concentrations at Oxford St Ebbes over the past decade. In recent years, Oxford has consistently remained within the UK's legal limits for $PM_{2.5}$ and is now just 2 µg/m³ away from meeting the World Health Organisation's recommended annual mean of 5 µg/m³ - widely regarded as the safest level of exposure for human health.

Figure 7 - PM_{10} annual mean historic trends of Oxford's automatic monitoring sites

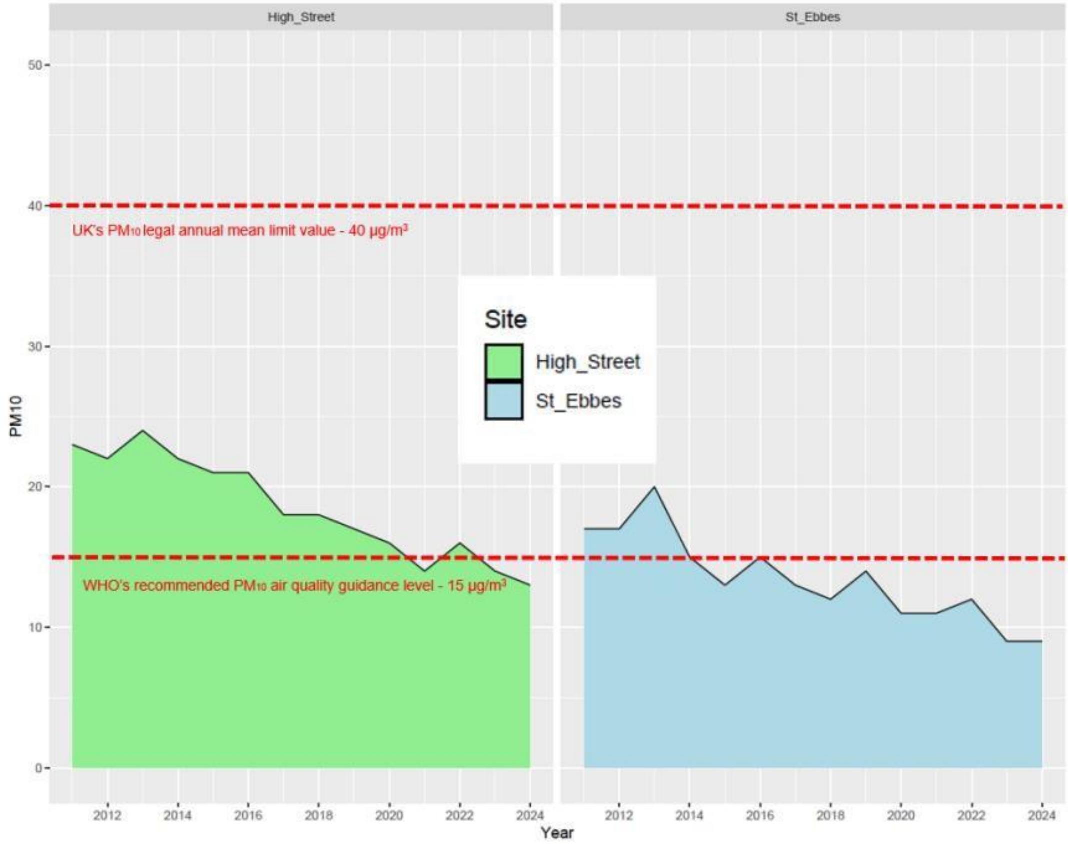
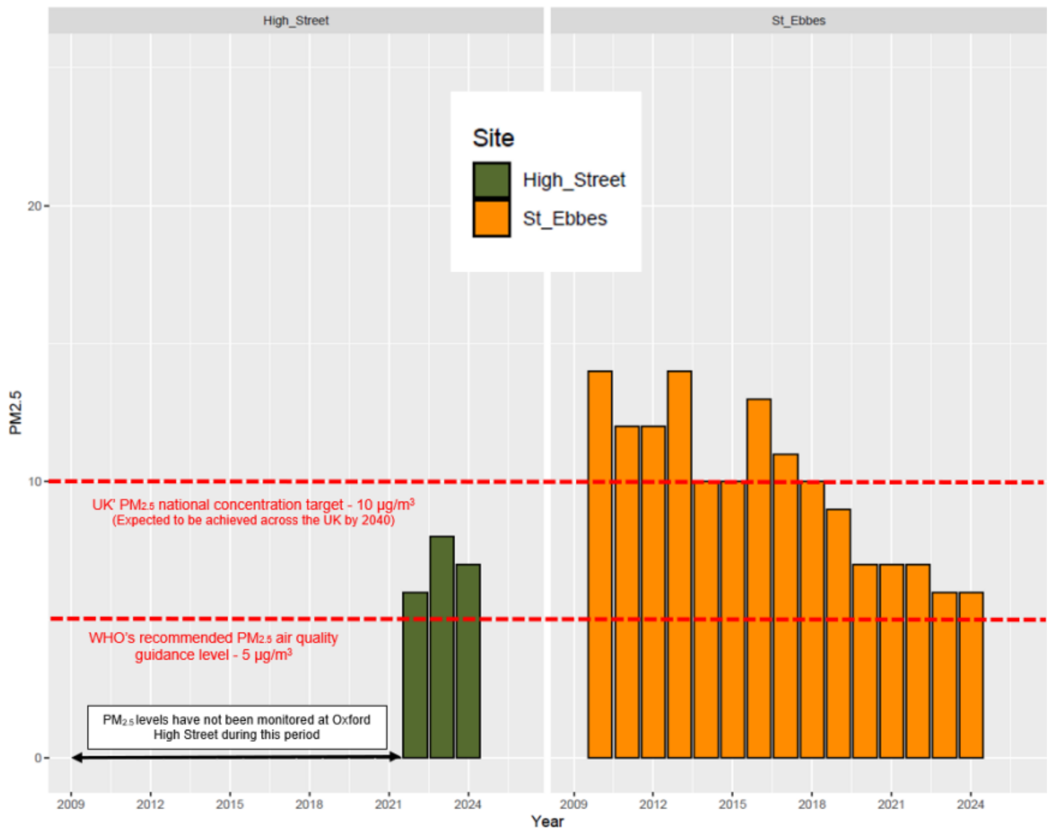


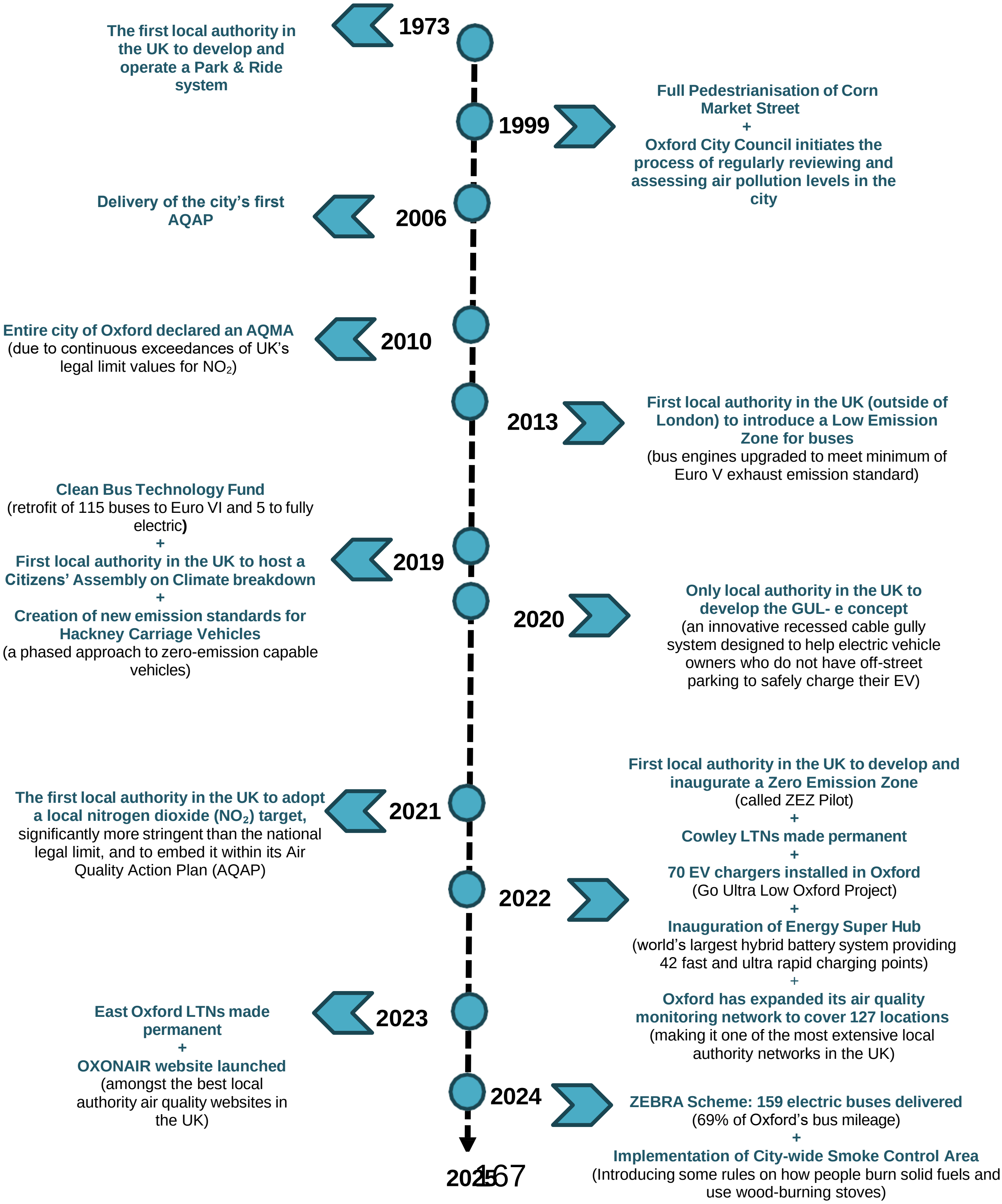
Figure 8 -$PM_{2.5}$ annual mean historic trends of Oxford's automatic monitoring sites



2.2.3 Timeline and milestones that made a difference

Figure 9 below presents a timeline of the most significant air quality measures implemented in Oxford over the years. It highlights Oxford's pioneering role and leadership in delivering innovative interventions to tackle air pollution. The timeline provides a clear overview of the key historic actions that have shaped the city's progress and offers valuable context for understanding how Oxford has reached its current position in its journey to cleaner air.

Figure 9 -Oxford's Clean Air Journey: A Timeline of Action



2.2.4 How far is Oxford from delivering on its local NO_2 target?

As outlined in earlier sections of this document, Oxford City Council published its Air Quality Action Plan (AQAP) in January 2021, setting at the time a strong and ambitious commitment to achieve a local annual mean nitrogen dioxide (NO_2) target of 30 µg/m³. This target is significantly more stringent than the UK's legal limit of 40 µg/m³ and applies to all locations across the city where people are regularly exposed to air pollution[16].

Table 1 below presents a comparison between air quality monitoring results from 2019[17] - the last full year before the COVID-19 pandemic - and 2024, the most recent year for which air quality data is available at the time of writing.

Table 1 - Oxford's current compliance status with NO_2 legal and local targets.

Metrics	2019	2024
Total amount of monitoring sites ≥ the UK's NO_2 legal annual mean (40 µg/m³)	13	**1**
% legal exceedances over totality of monitoring sites	18%	1%
Total amount of monitoring sites ≥ Oxford's NO_2 local annual mean target (30 µg/m³)	35	**4**[18]
% local target exceedances over totality of monitoring sites	47%	3%

It is evident that the measures implemented over the past five years have had a substantial impact in reducing NO_2 levels across Oxford. As shown in Table 1, these actions have enabled the city to achieve compliance with the UK's legal annual mean limit for NO_2, with the only exceedance occurring at Headington Hill - a location not considered relevant for public exposure.

More importantly, the data also demonstrates that Oxford City Council's commitment to meeting its more ambitious local target of 30 µg/m³ by the end of 2025 is within reach.

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[16] According to DEFRA's Local Air Quality Management (LAQM) Policy Guidance, "*relevant exposure*" refers to locations where the public is regularly present and potentially exposed to air pollution over the relevant averaging period. I.e., for annual mean objectives, this typically includes areas near residential properties, schools, care homes, and hospitals.

[17] Although the AQAP was published in January 2021, the year 2019 was used as the baseline for this comparison because 2020 and 2021 were significantly affected by the COVID-19 pandemic. During those years, lockdowns and traffic restrictions led to an artificial and temporary improvement in air quality. As a result, comparing data from those years with 2024 would not provide a realistic assessment of long-term trends and improvements.

[18] The monitoring locations include Headington Hill, two sites along the Oxford Ring Road, and St Clements – The Plain. However, the sites at Headington Hill and the Ring Road are not designed to assess direct human exposure to air pollution. Instead, they are intended to monitor potential air quality impacts from traffic displacement linked to future transport schemes being considered in Oxford. As such, these locations fall outside the scope of the city's 2025 local air quality target.

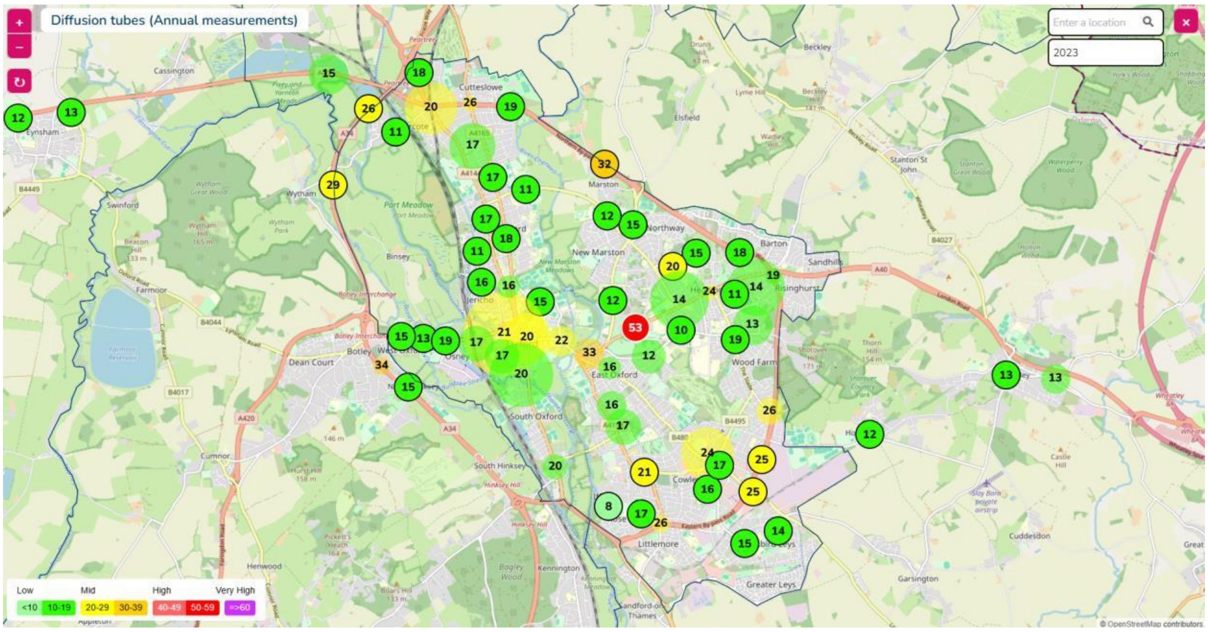
When considering only locations of relevant exposure, the city is just one site short of full compliance: St Clements – The Plain, which recorded an annual mean of 34 µg/m³ in 2024.

It is important to note that the full benefits of the bus fleet electrification will only be reflected in 2025, as electric buses were gradually introduced throughout 2024. With a full year of operation in 2025, further reductions in NO_2 levels are therefore expected - potentially bringing St Clements into compliance and marking full delivery of the city's local air quality target.

Air quality is monitored annually at 118 locations across the city using two complementary methods: automatic monitoring stations and passive diffusion tubes.

For detailed information on monitoring locations, the rationale behind their selection, the latest air quality data, and a wealth of additional resources, please visit the [OXONAIR](#) website.

Figure 10 – Oxford's NO_2 Monitoring Map: Locations and latest readings from OXONAIR.



3. Sources of Air Pollution in Oxford

The measures outlined in this Air Quality Action Plan are specifically designed to target the main sources of air pollution within the city of Oxford.

To support this targeted approach, Oxford City Council commissioned in October 2024 the air quality consultancy Ricardo Energy & Environment to carry out a comprehensive source apportionment study. The purpose of the study was to provide a detailed, most up to date understanding of the key sources of air pollution in Oxford, and it included the following components:

- **Emission sources by activity sector:** A refined analysis of the contribution of each activity sector to total emissions of nitrogen oxides (NO_x)[19], particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$), offering greater detail than previous studies.

- **Road emission sources by vehicle type:** An assessment of the road transport sector, quantifying the contribution of different vehicle types to total road transport emissions of NO_x, PM_{10}, and $PM_{2.5}$.

- **Understanding road-based sources of PM:** A further disaggregation of road transport emissions, identifying the relative contributions of tailpipe emissions, road surface abrasion, and brake and tyre wear to road transport emitted PM_{10} and $PM_{2.5}$ levels.

- **The Impact of residential heating on $PM_{2.5}$ emissions:** A breakdown of emissions from the domestic combustion sector, detailing the impact of various heating and fuel types on $PM_{2.5}$ emissions from residential sources in Oxford.

The full source apportionment study was conducted in accordance with the Local Air Quality Management Technical Guidance (LAQM TG22) and was published by Oxford City Council on 13 February 2025. It is available for public review on the Council's website.

[19] Nitrogen oxides (NOx) are a collective term used to refer to nitric oxide (NO) and nitrogen dioxide (NO_2). Both are produced from the reaction of nitrogen and oxygen gases in the air during combustion processes, especially at high temperatures. Total oxides of nitrogen (NOx) are used for the required reduction in vehicle emissions. This is routinely used for vehicle emissions standards instead of NO_2. Vehicles emit nitrogen dioxide (NO_2) and nitrogen oxide (NO) which make up the total NOx. The NO reacts with ozone in sunlight to create NO_2. The relationship between NOx emitted and ambient NO_2 is not linear hence required emission reductions tend to always be presented as NOx rather than NO_2.

3.1 Emission sources by activity sector

The contribution of each activity sector to the total emissions of NO_x, PM_{10} and $PM_{2.5}$ in Oxford is shown on Figure 11 below

Figure 11 – Share of total emissions of NO_x, PM_{10} and $PM_{2.5}$ by activity sector in Oxford

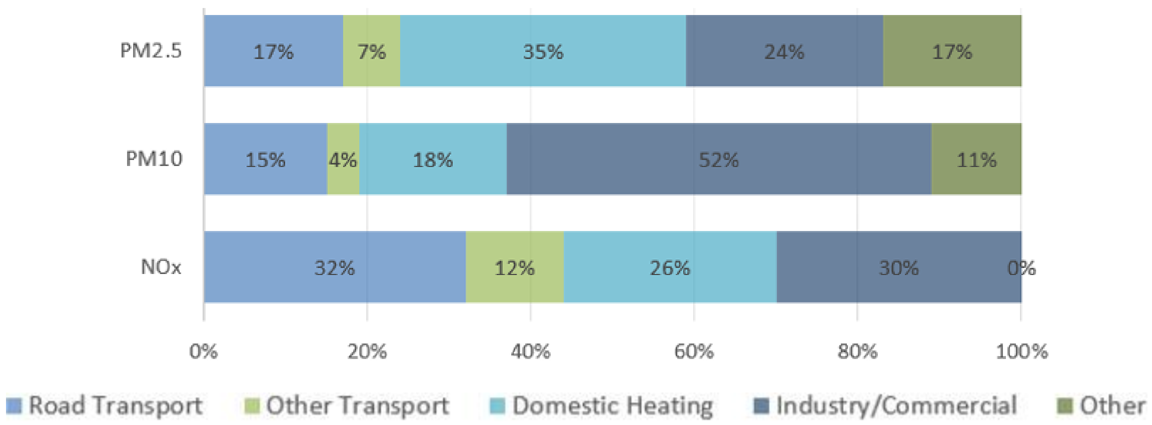


Figure 11 illustrates that for the first time, the transport sector (including both road and other transport modes) accounts for less than 50% of all NOx emissions (approximately 44% of total NO_x emissions) in the city. In contrast, its contribution is significantly lower for PM_{10} (19%) and $PM_{2.5}$ (24%).

Meanwhile, domestic heating emerges as the primary source of $PM_{2.5}$ emissions, contributing 35% to the total. For PM_{10}, the industry/commercial sector is the most significant contributor, responsible for 52% of the total emissions.

3.1.1 Breaking down the data by sector in more detail

Below is a more detailed breakdown of what is included or aggregated under some of the activity sectors referenced in Figure 11, specifically: "Other Transport," "Industry/Commercial," and "Others."

Other transport

NO_x (12%) – This total includes contributions rail transport (3.0%) and a combined contribution from military aircraft and inland waterways (8.9%).

$PM_{2.5}$ (7%) – This total includes contributions from rail transport (0.6%) and a combined contribution from military aircraft and inland waterways (6.8%).

PM_{10} (4%) – This total includes contributions from rail transport (0.3%) and a combined contribution from military aircraft and inland waterways (3.4%).

Industry/Commercial

NO_X (30%) – This total includes contributions from Industry combustion (3.4%), Point sources[20] (19.7%), and non-road mobile machinery[21] (7.1%).

$PM_{2.5}$ (24%) – This total includes contributions from Industry Combustion (1.9%), Production Processes (9.7%), Point Sources (9.0%), and Non-Road Mobile Machinery (3.0%).

PM_{10} (52%) – This total includes contributions from Industry Combustion (0.9%), Production Processes (44.7%), Point Sources (5.3%), and Non-Road Mobile Machinery (1.5%).

Other

NO_X (<1%) – This total includes residual contributions from Waste (0.1%) and Agriculture (0.2%).

$PM_{2.5}$ (17%) – This total includes residual contributions from Waste (8.2%), Agriculture (0.2%), Nature (4%) and Solvents (4.5%).

PM_{10} (11%) – This total includes residual contributions from Waste (4.4%), Agriculture (0.7%), Nature (2.1%) and Solvents (3.3%).

3.1.2 A decade of change: Tracking the evolution of NO_x emissions by sector in the city

The findings from Oxford's recent source apportionment study offer valuable insights into how the contributions of different emission sectors have evolved over time. Table 2 presents a direct comparison of the last three NO_x source apportionment studies conducted in 2013, 2019, and 2025 to inform the city's various AQAPs.

Table 2 – Historic comparison of each sector's weight to total NO_x emissions in Oxford.

Activity Sectors	2013	2019	2025
Transport (all)	75%	68%	44%
Combustion (Domestic, Industry & Services)	25%	31%	56%
Others (Agriculture, Solvents, Nature, Waste)	<1%	<1%	<1%

[20] A point source refers to an emission source located at a specific, identifiable site with known grid references, allowing it to be directly mapped. Detailed emissions data for these industrial and commercial sources are provided by the National Atmospheric Emissions Inventory (NAEI).
In Oxford, notable point sources include the BMW Group plant, University of Oxford facilities, and the Churchill and John Radcliffe Hospitals.

[21] Non-Road Mobile Machinery (NRMM) refers to a broad category of mobile equipment and transportable industrial machinery powered by internal combustion engines. Examples include equipment such as diesel generators and/or construction/agricultural machinery.

The results of this comparison indicate that the transport sector's contribution to total NO_x emissions in Oxford has declined by 31% by weight since 2013. This significant reduction is largely attributed to fleets with successively cleaner engines, many of which were driven by recent local government initiatives - particularly those aimed at reducing emissions from buses.

The comparison in Table 2 also highlights that as NO_x emissions[22] from the transport sector continue to decline, the relative share of emissions from domestic, industrial, and services - related sources are becoming increasingly prominent. Combustion now plays the most significant role in the city's overall NOx emissions profile[23].

3.2 Road emission sources by vehicle type

Figure 12 below illustrates the contribution of each vehicle type to total road transport emissions of NOx, PM_{10}, and $PM_{2.5}$ in Oxford. As highlighted in the previous paragraph, road transport is responsible for approximately 32% of total NOx emissions, 15% of PM_{10}, and 17% of $PM_{2.5}$.

Figure 12– Share of total road emissions of NO_x, PM_{10} and $PM_{2.5}$ by vehicle type in Oxford

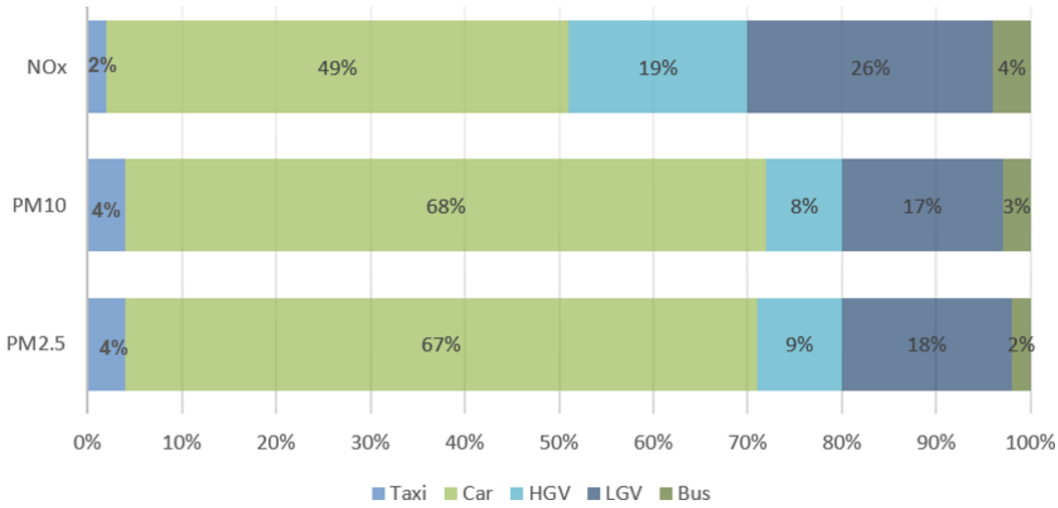


Figure 12 illustrates that cars are now by far the largest contributors to total NO_x Road transport emissions in the city, accounting for nearly half (49%) of this sector's total emissions. Heavy Goods Vehicles (HGVs) are the second-largest source at 26%, followed by Light Goods Vehicles (LGVs) at 19%. Buses contribute 4%, while

[22] A similar comparison was not possible for Particulate Matter (PM_{10} and $PM_{2.5}$), as the 2013 source apportionment study did not include Particulate Matter.

[23] On Table 2, the observed increase in the percentage contribution of certain sectors to overall NO_x emissions over time does not reflect a rise in emissions from those sectors. Instead, it is primarily a result of the relative redistribution of sectoral shares following a significant and sustained reduction in transport-related emissions in recent years. Monitoring data from Oxford shows a consistent decline in average NO_2 levels across the city, with a 50% reduction recorded between 2014 and 2024. This trend is corroborated by data from the National Atmospheric Emissions Inventory (NAEI), which indicates that NO_x emissions have been steadily decreasing across all major sectors since 2013.

taxis - including both Hackney carriages and Private Hire Vehicles - make up the remaining 2%.

Figure 12 also shows that the contribution of different vehicle types to total PM_{10} and $PM_{2.5}$ emissions from road transport shows a similar pattern. Cars are the dominant source, accounting for 68% of PM_{10} and 67% of $PM_{2.5}$ emissions. They are followed by Light Goods Vehicles (LGVs), which contribute 17% and 18% respectively. Heavy Goods Vehicles (HGVs) account for 8% of PM_{10} and 9% of $PM_{2.5}$ emissions. Taxis (including Hackney carriages and Private Hire Vehicles) contribute 4% to both pollutants, while buses are responsible for 3% of PM_{10} and 2% of $PM_{2.5}$ emissions.

3.2.1 A Changing Fleet: How vehicle types have shaped road emissions in Oxford over a decade

As urban vehicle fleets evolve, the nature of emissions from road transport is also changing. While advancements in engine technology, the growing adoption of electric vehicles and targeted local authority interventions have overall led to important reductions in tailpipe emissions in the city in the past 12 years.

Table 3 - Different vehicle types and their historic weight to NO_x Emissions in Oxford

Vehicle types	2013	2019	2025
Taxis (Hackneys and Private Hire)	3%	<1%	2%
Cars	15%	37%	49%
Light Goods Vehicles (LGVs)	6%	16%	26%
Heavy Goods Vehicles (HGVs)	12%	15%	19%
Buses	64%	32%	4%

The results presented in Table 3 show that, since 2013, the contribution of buses to total road NO_x emissions in Oxford has decreased by 60%. This substantial reduction demonstrates the effectiveness of several key measures implemented over the past decade:

- ✓ The introduction of a Low Emission Zone (LEZ) for buses in 2014 in Oxford.
- ✓ Securing grant funding in 2019 through the Clean Bus Technology Fund, which enabled the upgrade of 115 city bus engines from Euro V to the significantly cleaner Euro VI standard.
- ✓ The full electrification of 69% of the city’s bus fleet (159 buses) in 2024, supported by the Zero Emission Bus Regional Areas (ZEBRA) scheme.

As the contribution of buses to total road NO_x emissions has significantly declined, the relative share of other vehicle types has become more prominent[24].

For example, the contribution of cars to total road NO_x emissions has increased significantly - from 15% in 2013 to 49% in 2025, representing a 34-percentage point rise. This shift is partly due to updated emissions data for cars following the Volkswagen emissions scandal, with post-2019 figures beginning to reflect more accurate real-world driving emissions. However, the primary factor behind this

[24] See footnote 22 for explanation regarding percentage shifts due to declining transport emissions.

change is the substantial reduction in emissions from the bus fleet, which has shifted the focus toward cars now emerging as the dominant source of NO_x emissions on Oxford’s roads.

While air pollution has markedly improved in recent years, it remains crucial to sustain and accelerate this progress. Ensuring that all residents and visitors can enjoy cleaner, healthier air requires ongoing commitment. To that end, the city must continue modernising its transport infrastructure and championing sustainable mobility. Maintaining this positive trajectory is essential for further enhancing air quality and safeguarding public health.

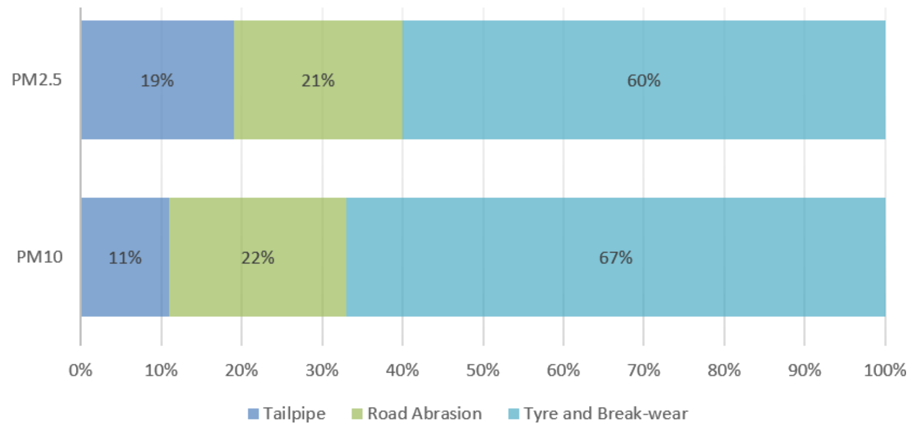
3.3 Understanding road-based sources of Particulate Pollution

As previously shown in paragraph 3.1, road transport is not the largest contributor to total particulate matter (PM) emissions in the city - accounting only for 17% of $PM_{2.5}$ and 15% of PM_{10} emissions.

However, it's important to note that these figures do not solely reflect tailpipe emissions. A significant portion of PM emissions from road transport also arises from non-exhaust sources such as road surface abrasion, brake wear, and tyre wear.

Figure 13 below provides a more detailed breakdown of the contribution of all these emission sources for PM in Oxford.

Figure 13 - Breakdown of particulate matter emissions from road transport in Oxford



As the vehicle fleet continues to modernise, older models are gradually being replaced by newer, cleaner, and more efficient engines. Many of these, particularly diesel vehicles, are now equipped with diesel particulate filters (DPFs), which significantly reduce tailpipe particulate emissions. In parallel, the adoption of electric vehicles (EVs) is steadily increasing.

While EVs produce no tailpipe emissions, their typically greater weight compared to internal combustion engine vehicles can lead to increased road surface abrasion and tyre wear. Consequently, the relative contribution of these non-exhaust sources to total particulate matter (PM) emissions from road transport is becoming more pronounced.

Figure 13 highlights this shift, showing that brake and tyre wear are now the dominant sources of PM emissions from road transport in Oxford - accounting for 60% of $PM_{2.5}$ and 67% of PM_{10} emissions. Road surface abrasion follows as the second - largest contributor, responsible for 21% of $PM_{2.5}$ and 22% of PM_{10} emissions. Traditional tailpipe emissions now represent the smallest share, contributing just 19% to $PM_{2.5}$ and 11% to PM_{10}.

3.4 The Impact of residential heating on $PM_{2.5}$ emissions

Air pollution is not solely driven by emissions from the transport sector. Residential heating also plays a significant role in urban air quality degradation, particularly through the release of fine particulate matter ($PM_{2.5}$).

These microscopic particles are primarily generated by the combustion of solid fuels. In Oxford, as in many other urban and rural areas in the UK, domestic heating becomes a dominant source of $PM_{2.5}$ during the colder months. This seasonal increase in emissions intensifies air quality challenges for this pollutant.

As highlighted in Section 3.1, domestic heating accounts for approximately 35% of the city's total $PM_{2.5}$ emissions, making it the single largest source. Figure 14 below offers a more detailed breakdown, illustrating the various origins and types of contributors within this sector. This granular view is essential for identifying targeted mitigation strategies and informing policy decisions.

Figure 14 - Breakdown of $PM_{2.5}$ Emissions from Residential Heating Sources

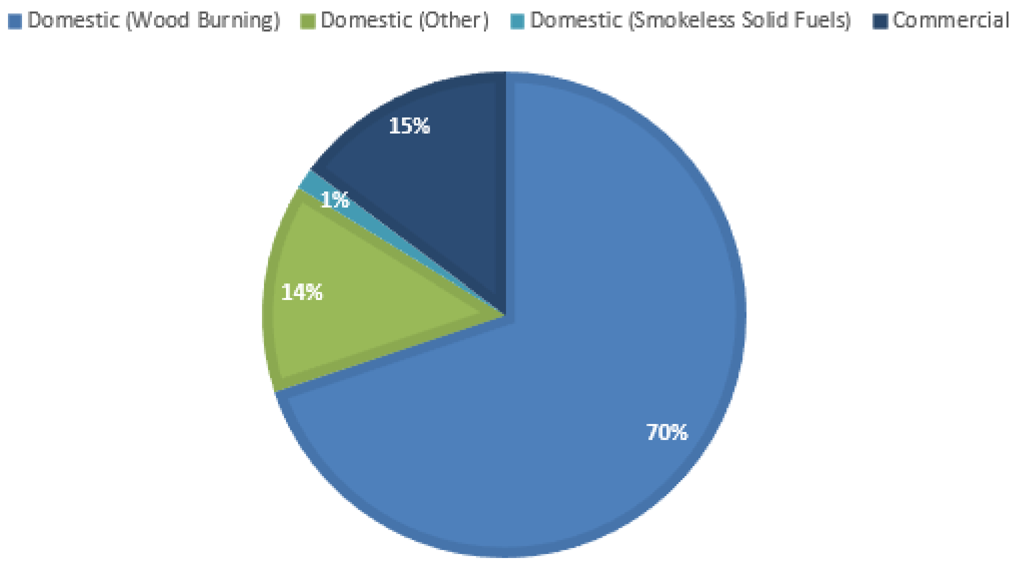


Figure 14 clearly illustrates that within the residential heating sector, wood burning is by far the largest contributor to local $PM_{2.5}$ emissions in Oxford. It accounts for approximately 70% of $PM_{2.5}$ emissions from this sector, which translates to 24.6% of the city's total $PM_{2.5}$ emissions across all sources.

The figure also highlights the very positive impact of using smokeless fuels, which contribute only a residual 1% to $PM_{2.5}$ emissions from residential heating, especially when compared to the significantly higher emissions from wood burning.

The category "Domestic (Other)" includes fuels such as natural gas, LPG, biogas, oil, and coal. However, coal use is now virtually negligible due to recent national regulatory restrictions and the widespread availability of gas and electricity infrastructure in urban areas like Oxford.

4. Vision and aims of this AQAP

This chapter outlines the overarching vision and strategic aims that guide the development and implementation of this Air Quality Action Plan.

The purpose of this Air Quality Action Plan (AQAP) is to outline a series of targeted actions aimed at reducing air pollution across various activity sectors within the city. This plan responds to:

- ✓ **the declaration of an Oxford city-wide Air Quality Management Area** (AQMA) in 2010, due to exceedances of the annual mean objective for NO_2.

- ✓ **the World Health Organisation's updated air quality guidelines** published in 2021, which recommend significantly stricter limits for several key pollutants, and which reflect growing scientific consensus that there is no safe level of exposure to air pollution.

- ✓ **the findings from Oxford's latest Source Apportionment Study -** outlined in Chapter 3 of this plan – and which offer the most up-to-date insights into the city's pollution sources and their respective contributions to overall air quality levels

Our Action Plan sets out defined clear objectives and priorities which provide the foundation for targeted actions that address key sources of air pollution and are a testament of the city's long-term commitment to protecting public health and enhancing environmental sustainability.

4.1 Oxford's Commitment to Clean Air

Oxford has long demonstrated leadership in addressing air pollution, with its previous Air Quality Action Plan delivering measurable improvements in local air quality. As a result:

- **The city achieved compliance** with the UK's legal annual mean limit for nitrogen dioxide (NO_2) of 40 µg/m³.

- **The city is on track** to meet, by the end of 2025, the World Health Organisation's Interim Target II for NO_2 (30 µg/m³), which also serves as Oxford's 2021 local annual mean target.

However, despite these commendable achievements, the journey toward truly clean air is far from over. As shown in Figure 15, the UK's legal limit values for key pollutants remain significantly less stringent than the WHO's updated air quality guidelines. Even Oxford's more ambitious local target of 30 µg/m³ for NO_2 falls short of what is considered a safe level of exposure.

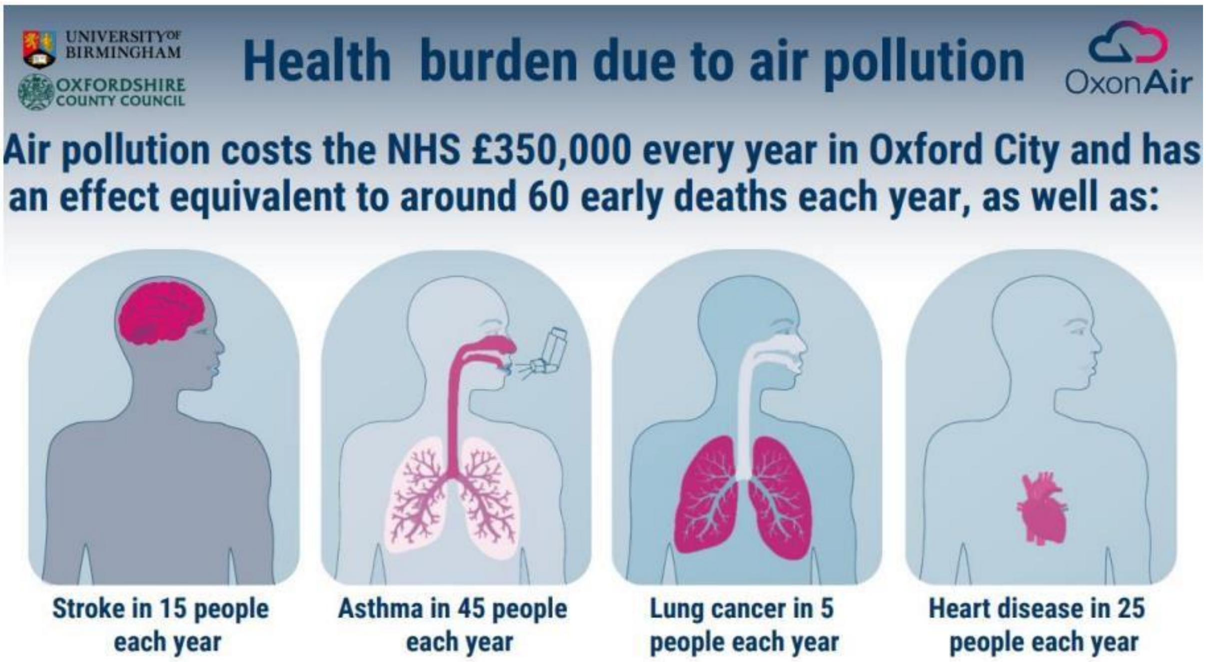
The WHO guidelines, grounded in the latest scientific evidence, make it clear that there is no safe threshold for exposure to air pollution. Consequently, although air pollution levels in Oxford have declined in recent years, they continue to pose a serious risk to public health - a reality clearly illustrated in Figure 16.

Figure 15 - Legal Air Quality Objectives (UK) and WHO Air Quality Guidelines

Pollutant	Averaging time	UK Air Quality Objective (µg/m³)	Interim WHO targets (µg/m³)				WHO Air Quality Guideline (µg/m³)
			I	II	III	IV	
NO_2	Hourly mean	200 a)	-	-	-	-	200
	Daily mean	-	120	50	-	-	25
	Annual mean	**40**	40	30	20	-	**10**
$PM_{2.5}$	Daily mean	-	75	50	37.5	25	15 c)
	Annual mean	**10**	35	25	15	10	**5**
PM_{10}	Daily mean	50 b)	150	100	75	50	45 c)
	Annual mean	**40**	70	50	30	20	**15**

a) Not to be exceeded more than 18 times a year**, b)** Not to be exceeded more than 35 times per year**, c)** 99th percentile (i.e.3-4 exceedance days per year).

Figure 16 - How dirty air continues to affect Oxford's Health[25]



This stark reality underscores the need for continued and intensified action. Oxford's commitment will therefore continue to evolve beyond compliance, following the path already initiated in the previous action plan, which is to reduce pollution to the lowest achievable levels (in alignment with WHO's recommendations).

[25] In 2025, Oxfordshire County Council acquired the Air Quality Life Course Assessment Tool (AQLAT) from the University of Birmingham. This initiative - jointly funded by the five district councils and the county council - integrates county-wide air quality modelling with the AQLAT tool to provide detailed estimates of the health and economic benefits of reducing air pollution, down to the ward level. Figure 16 presents results from the beta version of the tool, which uses modelled air pollution data from Defra's background maps. The outputs indicate the annual health burden attributable to air pollution in Oxford.

Our vision for this Air Quality Action Plan is therefore to:

Deliver Cleaner Air for everyone who lives in, works in, or visits the city of Oxford

This vision is anchored in three important premises:

- ✓ **Air pollution affects everyone** throughout the different life stages and can harm all organs of the body.
- ✓ **There is no safe level of exposure to air pollution** - even low, long-term exposure can impact future health.
- ✓ **Air pollution contributes to health inequalities**, disproportionately affecting vulnerable groups.

The core aims that we have set up in this action plan to help us deliver it are:

- ✓ **Alignment with the World Health Organisation Air Quality Guidelines**. These guidelines will serve as the city's reference standard and long-term target. This AQAP commits to pursuing WHO's Interim Target III for NO_2.
- ✓ **To raise public awareness of the health impacts of air pollution**, empowering residents with information and encouraging behavioural change.
- ✓ **To influence change and lead by example through local action and policy,** demonstrating the Council's commitment to cleaner air and healthier communities

4.2 Oxford's Local Target

Now that Oxford has achieved compliance with the UK's legal annual mean limit for nitrogen dioxide (NO_2) of 40 µg/m³ - and is firmly on track to meet the WHO's Interim Target II (30 µg/m³) by the end of 2025 - the city reaffirms its commitment, under this Air Quality Action Plan, to continue the journey it began in January 2021: closing the gap between current air pollution levels in the city and the WHO's recommended thresholds for safer exposure.

In line with this ambition, **this AQAP sets a new local target**: to pursue an annual mean NO_2 concentration of 20 µg/m³ across all areas of relevant public exposure in Oxford by the end of 2030.

The overarching objective of this AQAP for the entire Oxford city area is therefore to:

Pursue a local annual mean NO_2 target of 20 µg/m³ by 2030 **"20 by 30"**

In doing so, the city will continue to safeguard public health and serve as a model of ambition and leadership for communities across the UK and beyond.

4.2.1 Rationale for Oxford's New Local NO_2 Target of 20 µg/m³

Oxford's proposed new air quality target for NO_2 is in full conformity with the following established standards:

- **The World Health Organisation's Interim Target III for NO_2**, published in September 2021, which sets a recommended annual mean concentration limit of 20 µg/m³.

- **The European Union's revised legal annual mean limit for NO_2**, as defined in the Ambient Air Quality Directive (EU) 2024/2881, effective from December 2024, which also sets the NO_2 limit at 20 µg/m³ and is to be achieved across the EU by 2030.

By setting an ambitious target, the city not only strengthens its commitment to cleaner air but also positions itself to attract further investment in innovative solutions - particularly in areas where Oxford has demonstrated leadership and success.

The City Council aims to leverage this momentum to secure substantial funding that will accelerate efforts to improve air quality, protect public health, and reduce premature deaths. At the same time, these actions will contribute to addressing the climate crisis and support local businesses, job creation, and inclusive economic growth.

As with the analysis conducted in January 2021 - when Oxford first established its historic local annual mean NO_2 target - the decision to adopt the new, more ambitious target of 20 µg/m³ has been guided by a comprehensive, evidence-led approach.

This decision is supported by a comprehensive review of the following evidence:

- ✓ **Historical air quality monitoring data** collected across the city from 2002 to 2024.
- ✓ **DEFRA's roadside projection factors**, providing future pollutant concentration trends.
- ✓ **Expected air quality improvements** associated with the full range of measures proposed in this Action Plan - particularly those substantiated by robust air quality modelling.

A comparative analysis of these sources concluded that a target NO_2 value of 20 µg/m³ is both ambitious and at the edge of achievability within the specified timeframe.

Setting clear and realistic targets is essential for building trust and inspiring confidence among citizens and partners. When people understand the goals and their potential role in achieving them, they are more likely to engage in our shared efforts.

Under the Local Air Quality Management (LAQM) regime, Oxford City Council is required to review and assess air quality within its jurisdiction on an annual basis. As in previous years, the Council will continue to rely on its established air quality monitoring programme to track progress toward the new local NO_2 target. Compliance will be assessed throughout the 2026–2030 period, with findings reported annually through the city's Air Quality Annual Status Report, published each June.

4.3 Required reduction in emissions

Air quality measurements from 2024 indicate that the most significant pollution hotspots in Oxford are located at St Clements, St Aldates/High Street (representing Oxford city centre), and Cutteslowe Roundabout.

Appendix A provides detailed information on these three locations. Table 4 below presents the required[26] reductions in road NOx emissions at each of these historic NO_2 hotspots to meet the WHO's Interim Target III of 20 µg/m³, which also serves as Oxford's new local annual mean NO_2 objective.

Table 4 - Road NOx reductions required to achieve compliance with Oxford's proposed NO_2 annual mean target at Oxford's main air pollution hotspots (µg/m³).

Diffusion Tube Code	DT55	DT39 and DT56	DT26
Location	St Clements-The Plain[27]	St Aldates/High Street[28]	Cutteslowe Roundabout[29]
NO_2 measured in 2024	34	25	26
NO_2 background [30]	9	9	9
Roadside NO_x from NO_2 calculator (A)	63.2	37.0	39.7
Roadside NO_x to achieve compliance with new local target of 20 µg/m³ (B)	23.9	23.9	23.9
Roadside NO_x required reduction to achieve compliance with new local target (A-B)	39.3	13.1	15.8
Roadside NO_x required reduction for new local target (A-B) %	62%	21%	25%

[26] The required emission reductions have been calculated in accordance with Chapter 7 of DEFRA's statutory Technical Guidance (LAQM.TG22), ensuring consistency with nationally recognised methodologies.
[27] This location remains Oxford's most significant NO_2 hotspot and was the only site with relevant public exposure to report an annual mean concentration exceeding the city's local target of 30 µg/m³ in 2024.
[28] Both sites are located within Oxford City Centre, in areas equipped with automatic monitoring stations. As such, they are considered representative of air quality levels across the central urban area. Other monitoring locations reporting similar annual mean concentrations in 2024 (using diffusion tubes) include Worcester Street, George Street, and Long Wall Street.
[29] This site is situated in a more peripheral area of Oxford, away from the city centre and close to the ring road. As such, it is representative of air quality levels typically observed in these outer urban zones. A comparable annual mean NO_2 concentration in 2024 was recorded at the Oxford Road/Newman Road junction monitoring site.
[30] The NO_2 background levels used in these calculations are measured values obtained from Oxford's AURN Urban Background site of Oxford St Ebbes for the year 2024.

Table 4 highlights St Clements as the location with the highest risk of non-compliance with Oxford's NO_2 target, requiring a substantial roadside NOx reduction of 62%.

Nonetheless, the city anticipates further improvements in air quality throughout 2025 and remains confident that full implementation of the measures outlined in this Air Quality Action Plan will enable compliance with the proposed target by 2030.

For context, in 2021, the majority of Oxford's key NO_2 hotspots required roadside NOx reductions exceeding 54% to meet the previous local city target of 30 µg/m^3.

This highlights not only the scale of progress already achieved, but also the feasibility of achieving similar reductions again - provided the right air quality measures are put in place.

5. Oxford's air quality priorities for 2026-2030

This Air Quality Action Plan (AQAP) sets out a framework to continue existing efforts in reducing nitrogen dioxide (NO_2) emissions - and, indirectly, fine particulate matter ($PM_{2.5}$) - across the city. Now that we have achieved full compliance with the UK legal limit values for NO_2, the plan outlines new actions aimed at going beyond compliance to pursue the council's ambitious local target of 20 µg/m³ annual mean for NO_2.

Our source apportionment analysis highlights the significant contribution of both the transport sector and domestic heating to overall NO_x emissions in the city. Notably, domestic heating also plays a major role in influencing local $PM_{2.5}$ levels.

The analysis further reveals a shift in the sources of road transport-related NO_x emissions. With the recent electrification of most of Oxford's bus fleet, the relative contribution from buses has decreased substantially. Smaller vehicles - particularly private cars and light goods vehicles (LGVs) - now represent a larger share of these emissions.

5.1 Strategic Air Quality Interventions Planned for Oxford

In March 2025, a Citizens' Assembly on Travel and Transport[31] made up of 40 randomly selected Oxfordshire residents overwhelmingly voted in favour of bold changes to the city's transport system - including making Oxford's city centre car-free.

Over the course of six weeks and 11 sessions, participants learned from transport experts, community groups, and local stakeholders. Their discussions led to strong support for a range of transformative ideas:

- ✓ 88% supported a car-free city centre, with designated roads for buses, cyclists, emergency vehicles, taxis, and Blue Badge holders.
- ✓ 97% backed improved Park & Ride services
- ✓ 91% supported better local medical facilities to reduce car travel to hospitals
- ✓ 88% endorsed 15-minute neighbourhoods, where key services are within walking distance
- ✓ 88% supported using existing roads for dedicated bus and cycle lanes, rather than building new ones.

The Assembly was facilitated by Mutual Gain and commissioned by Oxfordshire County Council, following cross-party support, and reflects a

growing public appetite for cleaner, more accessible, and people-friendly streets

[31] The full Citizens' Assembly report—detailing the discussions, key outcomes, and conclusions reached by participants - is available for download/consultation here

This new Air Quality Action Plan (AQAP) has been developed in response to this growing demand from our residents for cleaner air and healthier communities.

Vehicle Emissions Reduction

Three major transport initiatives which aim to reduce private car usage, congestion and emissions, are currently being advanced by the Local Transport Authority. More detailed information on each of these transport schemes is outlined below:

- **Traffic Filters** are specific points on roads where private cars are restricted from passing through at certain times, unless they have a permit. Other vehicles - such as buses, taxis, vans, mopeds, motorbikes, HGVs, and emergency services - can always pass through freely. Six traffic filters are planned across key routes in Oxford. They are designed to reduce through-traffic in the city centre, giving priority to buses, cyclists, and pedestrians, and helping to create safer, more accessible streets.

- **The Workplace Parking Levy** is a local policy tool that charges employers for the number of parking spaces they provide for their staff. The goal of this measure is to reduce car use, encourage sustainable travel, and generate funding for public transport and active travel infrastructure improvements.

- **The expansion of Oxford's Zero Emission Zone (ZEZ)** should significantly reduce air pollution and accelerate the transition to cleaner, more sustainable transport. Building on the successful launch of the ZEZ Pilot in February 2022, the expansion will significantly widen the area covered - targeting more of the city centre and, eventually, other parts of Oxford. The primary aim of the ZEZ is to restrict access for the most polluting vehicles, encouraging a shift to zero-emission alternatives and improving air quality in the areas most affected by traffic-related emissions.

Rail Improvements

In parallel with these initiatives, Oxford City Council and its partners are seeking to reinstate a rail line for passenger services between Oxford and Cowley, the Cowley Branch Rail Line, by 2030. This multi-million-pound project is expected to introduce two new rail stations: **Oxford Littlemore**, serving Littlemore and The Oxford Science Park, and **Oxford Cowley**, serving the communities of Blackbird Leys and ARC Oxford.

By connecting key residential and employment areas to the city centre in under 10 minutes, the line is expected to support over one million passenger journeys annually. This shift from car to rail will help ease congestion on some major city routes, particularly during peak hours, and reduce the number of commuters driving into the city centre.

These transport schemes are designed to enhance connectivity and reduce congestion (by removing unnecessary traffic from our streets and creating more space for active travel). They are expected to serve as the primary drivers of reductions in road transport - related air pollution across Oxford during the lifetime of this Action Plan (2026–2030).

Buildings and Energy Systems

The Zero Carbon Oxfordshire Partnership will also play a pivotal role in driving Oxford's air pollution reductions over the next five years. By bringing together key stakeholders from across the public, private, and academic sectors, ZCOP fosters collaboration and coordinated action to accelerate decarbonisation of the city's buildings and energy systems (one of the city's biggest contributors to air pollution), through initiatives like the electrification of heating, promotion of renewable energy, and support for low-carbon technologies in the industrial and commercial sectors.

5.2 Priorities and actions

The following pages provide a detailed breakdown of the measures, interventions, and key priorities developed in response to Oxford's source apportionment findings.

These actions will be delivered in partnership with various stakeholders, including Oxfordshire County Council, which, as the local transport authority, plays a central role in implementing transport-related initiatives to support modal shift.

Priority A – Promoting Active Travel and reducing the need to drive

Promoting active travel and reducing reliance on private vehicles is especially important in a historic city like Oxford. With its medieval layout, narrow streets, and a city centre largely unsuited to modern car traffic, Oxford faces significant congestion and associated air quality challenges. Most of the central areas were never designed with motor vehicles in mind, making them ideal for walking, cycling, and other forms of sustainable transport.

Reducing the overall number of cars operating in Oxford's city centre is a key priority of this Action Plan. Fewer cars mean lower levels of air pollution, but the benefits extend well beyond cleaner air. A reduction in car traffic also leads to fewer road accidents, improved safety for all road users and pedestrians, lower noise levels, and a more pleasant and accessible urban environment.

Reclaiming space from cars allows for a more vibrant public realm. These changes not only enhance the quality of life for residents and visitors but also bring direct health benefits through increased physical activity and reduced exposure to harmful pollutants.

Core actions expected to be delivered under this key priority area include:

- Introduction of trial Traffic Filters
- Introduction of Workplace Parking Levy
- Expand and improve Oxford's footways and cycleways[a)]
- Encouraging Low Car Developments and the provision of car club parking[b)]
- Enhancement of urban rail infrastructure in Oxford[c)]
- Delivery of Oxfordshire Railway Strategy and Supporting Measures
- Delivery of the Bus Service Improvement Plan[d)]

Footnotes:

a) With the aims to increase cycling in the city by 50% by 2031.
b) This measure is anticipated to be implemented through Oxford's emerging Local Plan 2042, with formal public consultation, formal examination and public hearings taking place in throughout 2025 and 2026, and final adoption expected by spring 2027.
c) Focusing on the delivery of infrastructure improvements in Oxford's central station and the reopening of Cowley branch line to passengers.
d) Looking at a wide range of improvements such as faster and more reliable services, simplified fares and integrated ticketing, improved passenger experience, support for new and enhanced routes.

Priority B – Accelerating the Transition to Low and Zero Emission Transport

Accelerating the shift to low and zero-emission transport is essential for improving air quality, reducing greenhouse gas emissions, and creating healthier urban environments.

While the overarching goal remains to reduce the overall number of vehicles on Oxford's streets - particularly in the historic city centre - it is also recognised that not all car journeys can be eliminated. For those vehicles that must remain, it is vital that they are as clean as possible in terms of emissions.

This priority area focuses on delivering air quality measures that align with the County's plans for expanding the city's current Zero Emission Zone (ZEZ) to a much wider city centre area. The actions developed under this priority area are expected to play a significant role in further reducing transport-related emissions across Oxford.

According to the city's latest source apportionment, the transport sector is still responsible for 44% of total NOx emissions in Oxford.

<u>Core actions expected to be delivered under this key priority area include:</u>

- All new and renewal Hackney Carriage vehicle applications to meet the City Council's most up-to-date low emission standard
- Delivery of Zero Emission Zone expansion
- Increase the amount of EV infrastructure in the city[a)]
- Deliver Bus emission requirements under the Bus Enhancement Partnership Plan and Scheme[b)]
- Continue transitioning City operated fleets toward zero and low-emission vehicles
- Investigate strategic options for implementing freight consolidation hubs
- Promote the integration of sustainable logistics into Oxford's business ecosystem

Footnotes:

a) In particular the delivery of a 300+ charging network (secured via the government's Local EV Infrastructure (LEVI) Fund) that provides access to easy to use, reliable and affordable EV charging to the estimated 46% of households in the city who don't have access to private off-street parking.
b) The plan includes the commitment to continue to accelerate the transition to zero-emission buses, particularly in areas affected by the Zero Emission Zone (ZEZ), the expectation that operators will have to prioritise the deployment of zero-emission buses on routes that pass through the ZEZ and other air quality hotspots, and supports the phased replacement of older diesel buses with battery-electric or hydrogen fuel cell vehicles, in line with national targets and funding availability.

Priority C – Reducing Emissions from Domestic Heating, Industry, and Services

The latest source apportionment results show a notable shift in Oxford's air pollution profile: as transport-related emissions decline, the contribution of emissions from domestic heating, industry, and services becomes more prominent. Domestic heating alone now accounts for 26% of total NO_x emissions and 35% of total $PM_{2.5}$ emissions in Oxford.

To address this, most measures under this priority area will focus on reducing combustion emissions by improving energy efficiency. This includes replacing combustion systems for zero emission ones and renewables, shifting to low emission appliances, exploring the implementation of heat networks. These actions will help reduce both NO_x and PM emissions, supporting Oxford's commitment to cleaner air and a net zero carbon future.

Core actions expected to be delivered under this key priority area include:

- Prevent installation of all fossil fuel burning heating systems in all new development
- Support the development of district heat networks across the city[a)]
- Examine the feasibility of introducing a Non-Road Mobile Machinery Emissions Policy[b)]
- Deliver actions for housing for a net zero carbon future as part of the city council's Housing, Homelessness and Rough Sleeping Strategy[c)]
- Deliver Oxford City Council's target of getting 95% of its housing stock to an Energy Performance Certificate (EPC) C or above
- Review strategies for improving air quality for boating communities around Oxford's inland waterways
- Update Oxford City Council's Air Quality Planning Guidance[d)]
- Facilitate electrification of industrial processes within the ZCOP Industrial cluster[e)]

Footnotes:

a) A district heating network is a way of providing heat to multiple buildings from a central source. Instead of each building having its own heating system, hot water or steam is produced at a central location and then piped through underground insulated pipes to homes, offices, and other buildings. This system is usually more efficient and environmentally friendly, especially when it uses renewable energy.
b) Non-Road Mobile Machinery (NRMM) refers to machines and equipment that are not used on public roads but are powered by engines (usually diesel) and are commonly found on construction sites. Examples include excavators, bulldozers, cranes, generators, and loaders. These machines can produce significant air pollution, especially NO_x and PM.
c) This measure touches on all the work that is already being developed by the city council and which relates with: building new low-emission homes, retrofitting existing homes with emission free heating systems (like heat pumps), supporting private landlords and homeowners encouraging and enabling energy efficiency improvements, developing zero-carbon housing policies, promoting renewable energy, and tackling fuel poverty.
d) So that what the city requires from developments is more aligned with the city's ambitious health-based standards. Updating the guidance ensures that planning policy is consistent with these commitments, particularly when the city decided to commit to a lower NO_2 threshold than the national legal limit.
e) Helping industries in the Zero Carbon Oxford Partnership (ZCOP) industrial cluster switch from fossil fuels (like gas or diesel) to electricity to power their operations.

Priority D – Facilitating behaviour change by enhancing public awareness and collaborative partnerships

This area constitutes a cornerstone of effective air quality management.

While the direct impact of most of the measures under this area on pollution levels are inherently difficult to quantify - given their focus on influencing individual and collective behaviours, which are often subjective and variable - this area remains critically important.

Raising awareness, empowering communities, and fostering cooperation across sectors can drive long-term cultural shifts toward cleaner, healthier choices.

By enhancing public awareness, we begin to understand that everyone has a role to play - each of us is part of the solution. Our everyday choices, no matter how small, can directly influence the quality of the air we all share.

For Oxford, continued investment in this area is essential to support and amplify the effectiveness of technical and regulatory interventions, ensuring a more sustainable and engaged path toward cleaner air.

Core actions expected to be delivered under this key priority area include:

- Make use of the city's electronic road signage to regularly share air quality messages with the public.
- Strengthen links with NHS and local health services, with the eventual goal of embedding air quality awareness into patient engagement and care pathways.
- Collaborate with communities and businesses to explore green infrastructure solutions that reduce exposure to air pollution and support climate adaptation.
- Collaborate with District and County Councils to deliver a coordinated and consistent approach in raising awareness of air pollution and its health effects.
- Enhance the content, usability, and visibility of the OXONAIR[a)] website to better inform and engage residents on local air quality issues
- Support initiatives that strengthen the evidence base on air quality and public health in Oxford.
- Explore opportunities to develop an Air Quality Literacy Programme in collaboration with the County Council and neighbouring Districts.
- Support school-wide initiatives that emphasize the importance of clean air.

Footnotes:

a) OXONAIR is Oxfordshire's central platform for air quality information, designed to help residents, policymakers, and organisations understand and improve the air they breathe. It provides real-time and forecasted air pollution data, interactive maps, educational resources, and practical advice on reducing exposure and emissions. It was delivered through a collaborative effort involving Oxfordshire County Council, Oxford City Council, and all the Oxfordshire district councils, using DEFRA's Air Quality Grant funding.

5.3 Policy Integration

This action plan is a key component of the city's broader environmental and public health agenda, aligning closely with local transport, climate, and planning strategies.

Developed in response to the city's air quality statutory requirements under the Local Air Quality Management (LAQM) framework, this plan is designed to complement and reinforce the complete list of existing policies that are presented on table 5 below.

Table 5 - Complete list of all the local policies and strategies that are relevant to Oxford's AQAP.

Policy Document	Ownership	Launch Date	Covering Period	Air Quality Relevance
Air Quality Strategy	Oxfordshire County Council	Jun 23	2023 2030	Sets out a strategic framework to accelerate improvements in air quality across the county.
Local Transport and Connectivity Plan	Oxfordshire County Council	Jul 23	2022 2050	Serves as the county's statutory transport strategy. It plays a vital role in improving air quality by aiming to reduce car dependency, promote active and public transport, and deliver a net-zero transport system by 2040.
Central Oxfordshire Travel Plan	Oxfordshire County Council	Sep 23	2023 2032	Promotes a shift towards sustainable transport modes, reducing reliance on private vehicles, and supporting the delivery of infrastructure that lowers transport-related emissions
Carbon Management Plan	Oxfordshire County Council	Jun 23	2022 2030	Outlines the council's roadmap to become carbon neutral by 2030, focusing on reducing emissions from its own operations, including buildings, street lighting, fleet, and staff travel.
Oxford Local Cycling and Walking Infrastructure Plan	Oxfordshire County Council	Mar 20	2020 2030	Outlines how to significantly improve walking and cycling infrastructure across Oxford. It aims to increase cycling by 50% by 2031.
Health and Wellbeing Strategy	Oxfordshire County Council	Dec 23	2024 2030	Sets out a unified vision to improve health outcomes across the county by focusing on prevention, reducing health inequalities, and fostering closer collaboration between health services, local government, and community organisations. It adopts a life-course approach - *"Start Well, Live Well, Age Well"* - and recognises the importance of wider determinants of health such as housing, employment, climate resilience, and clean air.
Active Travel Strategy	Oxfordshire County Council	Jul 22	2022 2032	Aims at promoting walking, cycling, and wheeling as alternatives to car use, helping reduce vehicle emissions and improve public health.

Oxfordshire Bus Service Improvement Plan (BSIP) and Enhanced Partnership (EP)	Oxfordshire County Council + Local Bus Operators	Oct 21	2021 2030	Support air quality by encouraging a shift from private cars to cleaner, more efficient bus travel. They promote low- and zero-emission buses, reduce congestion through bus priority measures, and improve service reliability - helping to cut transport-related emissions and improve urban air quality.
Oxford Local Plan[32]	Oxford City Council	Jun 20	2016 2036	Plays a key role in improving air quality by guiding sustainable development, prioritising low-emission transport, and ensuring that land use planning supports climate and public health objectives.
Oxford Urban Forest Strategy	Oxford City Council	Sep 21	2021 2050	Long-term master plan that aims to protect, manage, and expand Oxford's urban tree canopy. It recognises the role of trees in filtering airborne pollutants, reducing emissions, and mitigating the urban heat island effect, all of which contribute to healthier air and improved public wellbeing.
Green Spaces Strategy	Oxford City Council	Jul 13	2013 2027	Sets out how the city's parks and open spaces will be preserved, enhanced, and made more accessible, and recognises green spaces as the "lungs of the city", playing a vital role in filtering pollutants, supporting biodiversity, and encouraging active travel such as walking and cycling.
Air Quality Planning Guidance	Oxford City Council	Mar 19	2019 onwards	Provides a comprehensive framework to ensure that air quality is considered at every stage of the development process - from design and construction to operation.
Our Council Strategy	Oxford City Council	Jul 24	2024 2028	Outlines the council's priorities for the next four years. It embeds environmental sustainability into all council operations, prioritising clean transport, green infrastructure, and climate action as part of its commitment to a fairer, greener, and healthier city.
Electric Vehicle Strategy	Oxford City Council	Jul 22	2022 2040	Aimed at accelerating the shift to zero-emission transport through equitable, accessible, and future-ready EV charging infrastructure, directly reducing road traffic emissions across the city.
Zero Carbon Oxford Action Plan	Oxford City Council + Partners	Jul 21	2018 2040	Developed by the Zero Carbon Oxford Partnership (ZCOP)[33] this plan is Oxford's roadmap to becoming a net-zero carbon city by 2040, outlining practical steps across key sectors (like transport, buildings, and energy) to drastically cut emissions. The plan

[32] A new plan (Oxford Local Plan 2042) is currently in preparation, with formal consultations taking place in 2025, and it will eventually replace the existing plan to guide development through to 2042. This new plan is expected to strengthen Oxford's air quality commitments further.

[33] In March 2025, the Zero Carbon Oxford Partnership (ZCOP) expanded its scope to cover the entire county of Oxfordshire, reflecting a growing commitment to collaborative climate action across the region. The expanded partnership now includes Oxford City Council, Oxfordshire County Council, Cherwell District Council, West Oxfordshire District Council, Enterprise Oxfordshire (formerly the Oxfordshire Local Enterprise Partnership), Abingdon and Witney College, and Oxfordshire Greentech. Together, these organisations will work towards achieving net-zero carbon emissions across Oxfordshire by 2050, while also pursuing their own local or organisational decarbonisation goals. This collective effort is expected to significantly reduce carbon emissions and improve air quality throughout the county.

				sets five-year targets, encourages collaboration among major city stakeholders, and focuses on clean energy, sustainable travel, and greener buildings.
Climate Emergency Declaration	Oxford City Council	Jan 19	Not applicable	Reinforces the city's commitment to improving air quality by accelerating the transition to zero-emission transport, reducing fossil fuel use, and embedding clean air objectives into climate, planning, and transport policies.
Housing, Homelessness and Rough Sleeping Strategy	Oxford City Council	Apr 23	2023 2028	Promoting low-carbon housing development, improving energy efficiency, and reducing rough sleeping - actions that contribute to healthier living environments and lower emissions.
Carbon Management Plan	Oxford City Council		2021 2030	Supports air quality by phasing out fossil fuels in council operations, transitioning to zero-emission vehicles, and improving energy efficiency in buildings - actions that reduce both carbon and air pollutant emissions, contributing to healthier local environments.
Pathways to a Zero Carbon Oxfordshire	All 6 Oxfordshire local authorities + Other Stakeholders	Jun 21	2020 2050	Promotes transport electrification, building retrofit, and behavioural change to reduce fossil fuel use and emissions. These actions help lower nitrogen dioxide and particulate pollution, contributing to healthier indoor and outdoor environments across the county.

By aligning this plan with all these strategic documents, the AQAP ensures a coordinated approach to reducing emissions, promoting sustainable mobility, and improving public health outcomes across the city.

This integration enables more effective delivery of measures, maximises co-benefits, and supports long-term environmental resilience

5.4 AQAP Proposed Measures

Table 6 presents the full list of AQAP measures aligned with the four key areas of intervention identified on sub-chapter 5.2 above. It includes:

- A detailed list of actions that form part of the plan.[34]
- The individuals and departments or organisations responsible for delivering each action.
- Where possible, the detailed anticipated benefits in terms of pollutant emission and/or concentration reductions.
- The expected implementation timescales.

While analysing the information presented in Table 6, it is important to highlight five key aspects:

a) **Funding status of measures**
Not all measures listed in Table 6 currently have secured funding. However, Oxford City Council, in collaboration with its delivery partners, remains committed to securing the necessary resources to implement the plan. Given the strong track record of both the City and County Councils in attracting external funding - such as DEFRA's Air Quality Grant, Innovate UK programmes, OLEV schemes, and the LEVI fund - we are confident in our ability to deliver the actions outlined.

b) **Interdependencies between measures**
Several measures are interlinked and dependent on the successful implementation of others. For example, the delivery of additional cycle lanes and expanded footpaths - key to prioritising active travel - will only be feasible once measures such as the traffic filters, the Zero Emission Zone (ZEZ) expansion, and (to some extent) the Workplace Parking Levy (WPL) are in place. These dependencies should be carefully considered when interpreting the feasibility and sequencing of the proposed actions.

c) **Assumptions behind impact estimates**
The estimated impacts on air quality and other indicators are a mandatory requirement under DEFRA's guidance for Air Quality Action Plans. These estimates have been developed using the best available data at the time of writing and are based on a number of assumptions. However, many of the proposed schemes are still subject to public consultation and may evolve in terms of scope or geographic coverage. Any such changes will directly affect the projected air quality outcomes. Therefore, these estimates should be viewed as indicative and subject to refinement as the measures progress.

[34] This Air Quality Action Plan sets out 30 actions, presented without prioritisation. Each measure is considered equally important, and it is only through the full and coordinated implementation of all actions that the anticipated reductions in air pollution levels across Oxford can be achieved.

d) Formal decision and associated uncertainties

While these transport schemes are being actively developed, it's important to note that many of them will still be subject to public consultation and formal decision making by local authority. This process ensures transparency and democratic oversight, but it also means that the schemes may evolve significantly in scope and design. In some cases, proposals could be substantially altered or even withdrawn altogether. As such, there remains an inherent level of uncertainty until final decisions are made, which needs to be accounted for.

e) Local Government Reorganisation

Air quality improvements in Oxfordshire are currently delivered within a two-tier governance framework, with Oxfordshire County Council serving as the Local Transport Authority and Oxford City Council as the Lead for the city's statutory duties on Air Quality. This division of responsibilities has enabled collaborative progress on several key measures. However, this structure may be subject to significant change as part of the central government's broader ambition[35] to simplify local government arrangements across England. Final decisions on the proposed reorganisation are expected in late 2026, with new councils[36] likely to be established by 2028.

While the proposed reorganisation presents opportunities for more cohesive and locally responsive governance, it also introduces a degree of uncertainty that may affect the ownership, pace and consistency of air quality improvements in Oxford during the coverage period of this AQAP.

Example: Existing initiatives and measures may need to be re-evaluated or re-approved under new governance structures, potentially altering their scope or design. Finally, the redistribution of responsibilities and budgets could also impact the prioritisation and funding of some of the air quality measures contained in this document.

[35] Link to Central Government's English Devolution White Paper here

[36] Three reorganisation proposals are currently under consideration:

a) Three unitary councils, including a proposed Greater Oxford Council covering Oxford and its Green Belt.
b) Two unitary councils, combining Oxford City with surrounding districts.
c) A single unitary council covering the entire Oxfordshire County Council area.

Table 6 - Complete list of measures included in AQAP 2026-2030

Key Priority Area	Measure	Ownership	KPIs	Estimated Air Pollution Reduction	Timescale for Implementation	Other Co-benefits	Cost[37]
A) Promoting Active Travel and reducing the need to drive	Introduction of Trial Traffic Filters	Oxfordshire County Council	Traffic Counts, Number of people travelling by bus, NO_2 levels measured in affected areas	Ricardo EE's AQ modelling report shows an 8% average reduction of NO_2 levels across the city, and of 1% of PM_{10} and $PM_{2.5}$	Start of trial August 2026 (subject to reopening of Botley Road)	Reductions of Traffic, Noise Pollution, Increased road safety	££££££
	Introduction of Workplace Parking Levy	Oxfordshire County Council	Number of businesses enrolled, WPL revenue generated, % reduction in total vehicle kilometres travelled	Nottingham's AQ monitoring results show that NO_2 concentrations in key areas affected by WPL declined by 13 - 20% over the first 5 years of the WPL, though this also reflects broader transport and fleet changes	Late 2027 (subject to consultation and DfT approval)	According to Transport Action Network, The WPL in Nottingham also led to 33% fall in carbon emissions and more than 40% of journeys into the city centre being made by public transport.	££££££
	Expand and Improve Oxford's Footways and cycleways	Oxfordshire County Council + Oxford City Council	Cycle and Walking counts, km of improved/new footpaths/cycleways completed	NO_2 reductions of 10-20% in certain key corridors are realistic. London Cycle Superhighways Study shows that roadside NO_2 concentrations dropped by up to 20% where roads were redesigned to include segregated cycle lanes and reduce motor traffic exposure.	2026-2030 (annually)	County-wide goal to reach 1 million cycle trips per week by 2031, up from 600,000 per week currently. The Goal is to increase cycling in Oxford by 50% by 2031	£££££££
	Enhancement of urban rail infrastructure	Oxford City Council + Oxfordshire County Council + Network Rail + DfT	Annual Rail passenger numbers, % modal shift from car to rail, annual vehicle-km reductions, NO_2 concentrations measured in affected areas	Based on the forecasted passenger numbers and modal shift assumptions from the Cowley Branch Line Full Business Case, the estimated annual air quality benefits from the project are: 27.5 million km of car travel avoided per year, NOx savings of 11 tonnes/year and of 386 kg/year for $PM_{2.5}$	2030	3,630 tonnes of CO_2 per year saved (based on 27.5 million car km avoided annually and at an average car emission factor of 132 g CO2/km (Dft 2023)	£££££££
	Encouraging Low Car Developments and the provision of car club parking[38]	Oxford City Council	Number of major developments per year with low, free or with net decrease (in case of a redevelopment) car parking provision; number of major	A Scottish Government commissioned review found out that: a) car free housing developments and off site non-adjacent parking are associated with reduced car kms travelled, lower car ownership and	2026-2030 (via Local Plan and planning system, every year)	Expected reduction in traffic volumes of 10-20% in areas with low car parking - Studies of Low Traffic Neighbourhoods (LTNs) and School Streets report these level of traffic reductions	££££

[37] Legend: £ <10k; ££ 10k-50k; £££ 50k-100k; ££££ 100k-500k; £££££ 500k-1 million; ££££££ 1million – 10 million; £££££££ > 10 million.

[38] This measure is anticipated to be implemented through Oxford's emerging Local Plan 2042, with formal public consultation, formal examination and public hearings taking place in throughout 2025 and 2026, and final adoption expected by spring 2027.

			developments per year that provide parking for car clubs	positive modal shift (towards walking, cycling and public transport). b) Car-free developments had car use levels less than half of city-wide averages While this study focused on car use, the implications for NO_2 are clear: reduced vehicle kilometres directly correlate with lower NO_2 emissions, especially in urban areas.		ex: London City Hall -school streets impacts study 2021	
	Delivery of Oxfordshire Railway Strategy and Supporting Measures	Oxfordshire County Council + Railway operators	% of Electrification progress, % of train punctuality and service reliability, % of modal shift from road to rail	According to the city's latest source apportionment study, railways contribute to up to 3% of total NOx emissions and to 0.6% of total PM2.5 emissions in the city	Strategy expected to be launched in 2026 with supporting measures delivered throughout 2026-2030	Rail as a place shaper, Improving connectivity, decarbonisation of the railway	££££££
	Delivery of the Bus Service Improvement Plan	Oxfordshire County Council + Bus Operators	Average bus journey time on key corridors, bus punctuality improvement, total bus ridership, passenger satisfaction score	Between 3.6 and 7.3 tonnes of NOx saved per year (18.2 to 36.5 tonnes in 5 years) (Assumptions: 5-10% modal shift car to bus, 100,000 daily car trips, average trip length 5Km, average NOx emissions of 0.4g/km[39] per car)	2026-2030 (annually)	Several studies seem to indicate that multiple interventions such as integrated ticketing, service reliability, and pricing can lead to a 5-10% modal shift from car to bus in urban areas	£££££
	All new and renewal Hackney Carriage Vehicle applications to meet the City Council's most up-to-date low emission standard	Oxford City Council	Total amount of annual applications made that meet the low emission criteria	According to the city's latest source apportionment study, Hackneys contribute to up to 2% of total NOx emissions and to 0.6% of total PM2.5 emissions in the city	2026-2030 (annually)	Reduced Noise Pollution, Less Carbon emissions	££££

[39] The fleet-weighted NOx emission factor for UK urban roads (excluding London) is provided by the Emission Factor Toolkit (EFT v12.0). For the year 2025, typical NOx emission factors by vehicle type are as follows: Petrol cars: approximately 0.02–0.05 g/km; Diesel cars: approximately 0.2–0.4 g/km. To ensure a conservative approach in our calculations, we have opted to use the upper bound of these ranges, specifically the emission factor for diesel cars, which represents the highest value among the most common vehicle types.

B) Accelerating the Transition to Low and Zero Emission Transport	Delivery of Zero Emission Zone expansion	Oxfordshire County Council	% of zero-emission vehicles and ICE entering the ZEZ, traffic volume changes, average vehicle speed (as proxy for congestion)	Data from ZEZ Pilot[40] evaluation report: Overall vehicle movements in the ZEZ Pilot have reduced by 28%, reduction of NO_2 in the affected streets between 12-18%, followed by a 29% increase in cycle movements	2027-2030 (likely to be delivered in 2027 - subject to consultation)	Reduced noise pollution, Less carbon emissions, more active travel, more attractive public spaces,	££££££
	Increase the amount of EV infrastructure in the city	Oxford City Council	Number of EV charging points installed in the city, % of cars registered in Oxford being EV	Key target in Oxford's EV strategy: 50% of all cars in Oxford to be electric by 2030 Estimated total NOx Annual savings: 128.6 tonnes/year (Assumptions: Total amount of registered cars in Oxford:52,753, average UK annual car mileage 12186km, NOx emission factor of 0.4 g/km	2026-2030 (annually)	Reduced Noise Pollution and Green House Gas emissions	££££££
	Deliver Bus emission requirements under the Bus Enhancement Partnership Plan and Scheme	Oxfordshire County Council + Bus Operators	% of city buses that are electric or of higher emissions standard	According to the city's latest source apportionment study, buses in Oxford now contribute to 4% of total road transport NOx emissions in the city – a significant reduction from 32% in 2020	By the end of 2030	Reduced Noise Pollution, Less Carbon Emissions	££££££
	Continue transitioning City operated fleets toward zero and low-emission vehicles	Oxford City Council	% of ODS Fleet being EV	Oxford Direct Services added 159 vehicles to its fleet between 2021 and 2025, - 35% of the total fleet is now EV The estimated total NOx emissions savings from the electrification of the ODS fleet between 2021 and mid-2025 is approximately 6.7 tonnes. Based on current trends and assuming a similar pace of fleet transition, we anticipate that NOx savings over the subsequent period (2026–2030) could be of a comparable magnitude.	2026-2030 (via procurement, every year)	Reduced Noise Pollution, Less Carbon Emissions	£££££££

40 The full modelling results for the potential expansion of the Zero Emission Zone (ZEZ) are currently under development and are not yet available for review. However, the results from the ZEZ Pilot implemented in Oxford city centre are included here and provide valuable insight into the potential positive impacts of a wider ZEZ rollout. The full modelling results are expected to be shared as part of the public consultation on the ZEZ expansion in early 2026.

				(Assumptions: 40 miles/day of average usage per vehicle, a NOx emission factor of 0.4 g/km)			
	Investigate strategic options for implementing smart hubs for last mile delivery	Oxfordshire County Council + Oxford City Council	Number of participating businesses, Number of deliveries made by cargo bike Total distance travelled by cargo bikes (km) Vehicle kilometres avoided (km) Average delivery time per trip, Operational cost per delivery	The Brixton last mile logistics trial project aimed to identify the possibilities and opportunities for last mile logistics hubs in urban centres Operating between April 2022 and June 2023, the project offered Brixton businesses to trial free cargo bike deliveries from two last mile consolidation hubs Using a NOx emission factor of 0.7g/km and the 277km of motor vehicle travel avoided, we calculate total NOx emission savings of this trial at 0.19 kg of NOx Scaling it up to 30 or more businesses in Oxford City Centre would result in a much higher NOx emission saving	2026-2030 (annually)	Overall, there were 8 Brixton businesses participating in the trial, 194 trips made by cargo bike as part of the trial, between April 2022 and February 2023, with 277 vehicle-km saved. The trial generated 109 kg of CO2 savings, the equivalent to 2 football-pitch sized forest fires, heating 12 homes for one day, or the amount of CO2 that 136 people exhale in one day	£
	Promote the integration of sustainable logistics into Oxford's business ecosystem	Oxford City Council	Number of deliveries made by cargo bike, distance covered by cargo bike, number of participating businesses	Oxford City Council's 12-month cargo bike trial in partnership with Velocity replaced approximately 6,259.8 car and van miles with cargo bike deliveries. Based on a NO_x emission factor of 0.7 g/km, this equates to an estimated saving of 7.1 kilograms of nitrogen oxides (NO_x). This previous trial highlights the significant potential of cargo bike logistics to reduce air pollution. If scaled over the next five years - and with increased participation from local businesses - the environmental benefits could be even greater	2026-2030 (annually)	Oxford City Council's 12-month cargo bike trial in partnership with Velocity engaged 25 city centre businesses, facilitated between 148 and 431 deliveries per month, and resulted in an estimated 1.65 tonnes of CO_2 savings Reduced Noise Pollution, Less Carbon Emissions, Improved road safety, less congestion, enhanced walkability and liveability	££
	Prevent installation of all fossil fuel burning heating systems in all new development	Oxford City Council	% of new major planning applications approved with fossil-fuel-free heating systems	Estimated NOx reduction per year: 365 kg (1.5 tonnes cumulative impact over 4 years) Assumptions: 567 new dwellings built per year in Oxford, each home would use 11,500 kWh/year for space and water heating if fitted with gas boiler,	2027-2030 (via Local Plan and planning system, every year)	If 2268 new houses (four times 567) are to be installed with a zero-carbon heating system, the estimated annual carbon savings would be approximately 5,321 tonnes of CO_2	££££££

C) Reducing Emissions from Domestic Heating, Industry, and Services				emission factor for new gas boilers used of 56 mg NOx per KWh		Emission factor used: 204 grams of CO_2 per kWh	
	Update Oxford City Council's Air Quality Planning Guidance	Oxford City Council	Number of planning applications referencing the updated guidance, Number of Air Quality Assessments improved or rejected due to non-compliance with the guidance	It is not possible to quantify the reduction in NO_2 levels resulting specifically from the update of this guidance. However, this document supports and complements the NO_x reduction measures outlined above, as it is closely integrated with the planning system.	2027	Reduction in $PM_{2.5}$ and other pollutants due to better design and mitigation	£
	Support the development of district heat networks across the city[41]	Oxford City Council + Partners	% of pipework and energy centre infrastructure completed, % of target buildings or households connected, NOx emissions saved mg/kWh (or total tonnes/year compared to conventional systems	Internal estimates (made for a hypothetical district heat network in the city centre) would equate to approximately 84,000,000 kWh of natural gas removed per year from the grid in Oxford City Centre, the equivalent to 8.4 tonnes NOx of emissions saved per year	2026-2030 (as and when, via planning system, every year)	annual carbon savings would be approximately of 17,136 tonnes CO2 Emission factor used: 204 grams of CO_2 per kWh	££££££
	Examine the feasibility of introducing a Non-Road Mobile Machinery Emissions Policy	Oxford City Council	% of compliant machinery	According to the city's latest source apportionment study, NRMM is responsible for 7.1% of Oxford's total NOx emissions and to 3.1% of total PM2.5 emissions. A study by King's College found that Stage IV generator engines emit approx. 78% less NOx than older Stage III-A engines.	2026-2030 (exact timeline not yet defined)	Reduced Noise Pollution, Less Carbon Emissions	£££
	Deliver Oxford City Council's target of getting 95% of its housing stock to an Energy Performance Certificate (EPC) C or above	Oxford City Council	Number of Homes upgraded to EPC C or above	This target applies to approximately 2,515 (worst case scenario) out of 7,626 council homes. If Oxford City Council upgrades 95% of its 2515 council homes to EPC C by 2030, and each home reduces gas use by 20%, the estimated NO_x emission savings would be: 549.5 kg NOx per year	By 2030	Reduced fuel poverty, Enhanced housing quality, Increases Community resilience, Less Carbon Emissions, better indoor air quality, improved energy efficiency	££££££

[41] Support of District Heat network will only be made in the cases where there is a valid argument for increased sustainability and emissions reduction.

				Assumptions: Average gas use: [11,500 kWh/year per home](), NO_x emission factor: [100 mg/kWh]() (old boilers), and 20% gas reduction per upgraded home			
	Deliver actions for housing for a net zero carbon future as part of the city council's Housing, Homelessness and Rough Sleeping Strategy	Oxford City Council	Number of homes retrofitted with energy efficiency measures; Number of new all-electric homes completed	Based on the commitments outlined in Oxford City Council's Housing, Homelessness and Rough Sleeping Strategy Action Plan (accounting for 600 homes to receive energy efficiency upgrades, and 31 homes switch from gas to ASHP), the estimated annual NO_x emission savings from housing decarbonisation actions are of 174 kg NOx per year (522 kg NOx over the 3-year period) Assumptions used: Gas use per home [11,500 kWh/year](), a gas reduction of 20% as a result of energy efficiency upgrades, and a NOx emission factor for boilers of [100 mg NOx/kWh]() (equivalent to an old boiler)	2026-2028	Reduced fuel poverty, Enhanced housing quality, Increases Community resilience, Less Carbon Emissions, better indoor air quality, improved energy efficiency	££££££££
	Review strategies for improving air quality for boating communities around Oxford's inland waterways	Oxford City Council	Number of boats using cleaner fuel, number of boats retrofitted, % of boaters aware of air quality impacts, Number of smoke nuisance complaints	According to the city's latest source apportionment [study](), inland Waterways (together with military aircraft) are responsible for most of 8.9% of Oxford's total NOx emissions and to 6.8% of total $PM_{2.5}$ emissions Inland waterways emissions contemplate emissions from: Motorboats / workboats (e.g. canal boats, dredgers, service boats, tourist boats, river boats)	2026-2030 (annually)	Reduced Water and Noise Pollution, Less Carbon Emissions, Improved biodiversity	£££
	Facilitate electrification of industrial processes within the ZCOP Industrial cluster	Oxford City Council + Oxfordshire County Council + ZCOP Partners	% of industrial processes electrified, number of industrial sites transitioned to electric technologies, reduction in fossil fuel consumption	According to the city's latest source apportionment [study](), Industry combustion accounts for 3.4% and 1.9% of total NOx and $PM_{2.5}$ emissions in the city	2026-2030 (annually)	[Currently]() 17% of the city's carbon emissions are related with industry and 66% of the city's industrial processes run on gas	££££££
	Make use of the city's electronic road signage network to regularly share air quality	Oxfordshire County Council	Number of messages displayed	Unable to estimate reduction in NO2 levels. A [study]() in Kent found that carefully crafted road signs reduced vehicle idling by 27.2% on average, suggesting	2026 - 2030	Reduction in CO2 emissions from anticipated behavioural change due to increased awareness, particularly from road transport.	£

D) Facilitating behaviour change by enhancing public awareness and collaborative partnerships[42]	messages with the public.			strong potential for behaviour change through targeted messaging.			
	Strengthen links with the NHS and local health services, with the eventual goal of embedding air quality awareness into patient engagement and care pathways	Oxford City Council + Oxfordshire County Council + DCs +NHS	Number of health organisations engaged, number of health services incorporating air quality related patient engagement	Unable to estimate reduction in NO2 levels. Research published by University Hospitals Birmingham NHS Foundation Trust highlights the potential for health professionals to act as trusted messengers, particularly in respiratory care, and recommends embedding air quality messaging into patient pathways & staff training. In 2023/2024 Oxford Health saw 1,542,172 attended contacts delivered by Oxford Health staff, with an estimated 84,000 people in Oxford – a significant number of residents to engage with.	2026 – 2030	Reduction in CO_2 emissions through behaviour change (e.g. active travel, cleaner heating choice, improved cardiovascular and respiratory health, greater public trust in air quality messaging via healthcare professionals.	£
	Collaborate with communities and businesses to explore green infrastructure solutions that reduce exposure to air pollution and support climate adaptation	Oxford City Council + Oxfordshire County Council	Number of organisations engaged, number of green infrastructure projects delivered, reduction in pollution from monitoring at those sites	NO2 reductions: 12% in project areas A study in the Netherlands attributes up to a 12% reduction in NO_2 pollution concentrations from green infrastructure areas with nature-based solutions.	2026 – 2030	The same study shows a maximum of 6% decrease in temperature. Other studies show how green infrastructure can support flood mitigation, biodiversity, mental and physical wellbeing, carbon sequestration.	££££
	Collaborate with District and County Councils to deliver a coordinated and consistent approach in raising awareness of	Oxford City Council + County + Districts	Number of joint campaigns delivered (social media, workshops, community projects).	Unable to estimate reduction in NO_2 levels. A Royal College of Physicians report emphasises the need for consistent, coordinated messaging on air quality in order to influence behaviour change.	2026 – 2030	Increased public trust through unified messaging, greater participation in local clean air initiatives, behaviour change leading to reduced carbon emissions (e.g. through active travel, reduced idling, cleaner heating choices)	£

[42] All the measures outlined under this key priority area are considered *'soft measures'*, focusing primarily on raising awareness and fostering public engagement. As such, these actions are expected to be implemented on an ongoing basis throughout the duration of this action plan. Given their intangible nature, it is also generally not possible to directly quantify their impact on air pollution reduction. However, some of these measures include references to relevant scientific studies and related projects that highlight the value of such initiatives. Some available behavioural change indicators also offer insight into their potential to contribute indirectly to improved air quality outcomes.

	air pollution and its health effects						
	Explore opportunities to develop an Air Quality Literacy Programme in collaboration with County Council and neighbouring Districts	Oxfordshire County Council + City Council + Districts	Delivery of Air Quality Literacy programme, and once delivered, number of enrolments	The Air Quality Literacy Programme will aim to emulate the successful Climate Literacy programme to raise air quality across Oxfordshire. A study across five Nordic countries concluded that individuals with high climate concern had 1.5-2 tonnes lower carbon footprints than those with low concern. Similarly, increasing air quality awareness is expected to drive lower-emission behaviours and reduce exposure.	2026 - 2030	Behaviour changes leading to reduced pollution and carbon emissions, greater public support for air quality policies and initiatives, improved individual and community health outcomes through informed decision-making.	£
	Enhance the content, usability and visibility of the OXONAIR website to better inform and engage residents on local air quality issues	Oxford City Council + County + Districts	Number of visits to OXONAIR website	Unable to estimate reduction in NO_2 levels. Research shows that personalising and making air quality data accessible empowers individuals to take action, both to reduce their exposure and to adopt cleaner behaviours. Improved usability ensures broader reach and engagement.	2026 – 2030	Behaviour changes leading to reduced carbon emissions (e.g. less car use, cleaner heating choices), greater public trust in local and county air quality policies, increased digital engagement with environmental data and tools.	£
	Support initiatives that strengthen the evidence base on air quality and public health in Oxford	Oxford City Council	Number of studies or reports supported	Unable to estimate reduction in NO2 levels. Strengthening the evidence base with trusted, robust research enables the development of effective, targeted policies and supports behavioural change by providing credible information to the public and stakeholders.	2026 – 2030	Improved health outcomes by using targeted interventions based on evidence, more effective local policies, greater community awareness.	£
	Support school-wide initiatives that emphasize the importance of clean air	Oxford City Council + Oxfordshire County Council	Number of schools engaged; number of initiatives supported	A DEFRA report highlights the importance of education in raising public awareness, especially among young people. Schools serve as a powerful platform to reach both students and parents. A study from Barcelona found that traffic pollution negatively affects children's working memory, underlining the urgency of reducing exposure in school environments.	2026 – 2030	Behaviour changes around schools (e.g. anti-idling, school streets, active travel), reduced exposure to air pollution for children and staff, improved learning outcomes and health, increased family and community engagement in clean air initiatives	£

6. Development and Implementation of Oxford’s AQAP

6.1 Establishment of the AQAP Steering Group

A Local Authority Officer Steering Group was established in January 2025 to lead the development of this Air Quality Action Plan (AQAP).

The group convened three times between February and July to review the findings of Oxford’s source apportionment study, agree on a new local annual mean air quality target, and identify the key areas for intervention within the plan.

Following these group meetings, a series of one-to-one discussions were then held with individual steering group members, as well as with other relevant officers from internal teams at both City and County, whose work intersects with air quality.

These meetings were essential to negotiate and finalise some of the specific measures to be included in the AQAP. A final steering group interaction took place in late July to review the complete set of proposed measures and gather final comments and suggestions.

The AQAP steering group included representatives from:

- ✓ Oxford City Council Environmental Quality Team
- ✓ Oxford City Council Carbon Reduction Team
- ✓ Oxford City Council Planning Policy Team
- ✓ Oxfordshire County Council Central Locality Team
- ✓ Oxfordshire County Council Transport Policy and Strategy Team
- ✓ Oxfordshire County Council Healthy Place Shaping team

Other local authority teams have also been consulted during this period. Members of:

- ✓ Oxfordshire County Council Innovation Team
- ✓ Oxford City Council Regeneration and Economic Development Team
- ✓ Oxford City Council Business Regulation Team
- ✓ Oxford Direct Services

6.2 Consultation Process and Community Involvement

The **Environment Act 1995**, as amended by the **Environment Act 2021**, provides the statutory basis for consultation and engagement in the preparation or revision of a local authority’s Air Quality Action Plan (AQAP).

6.2.1 Joint Air Quality Workshop

On 29 April 2025, Oxford City Council and Oxfordshire County Council jointly hosted an Air Quality Engagement Workshop at the Oxford Westgate Library, from 10:30 to 14:30.

The event brought together a total of 25 residents and representatives from Community Action Groups (CAGs) to share their views on air quality in Oxford, explore current challenges, and engage in meaningful group discussions around potential solutions.

This workshop marked the first phase of public engagement to inform the development of this draft Air Quality Action Plan. The session included a series of presentations to provide context on the city's air quality status and the work undertaken so far. Participants also took part in interactive activities, including hands-on demonstrations with air quality sensors and an introduction to the new OXONAIR website, designed to improve public access to local air quality data.

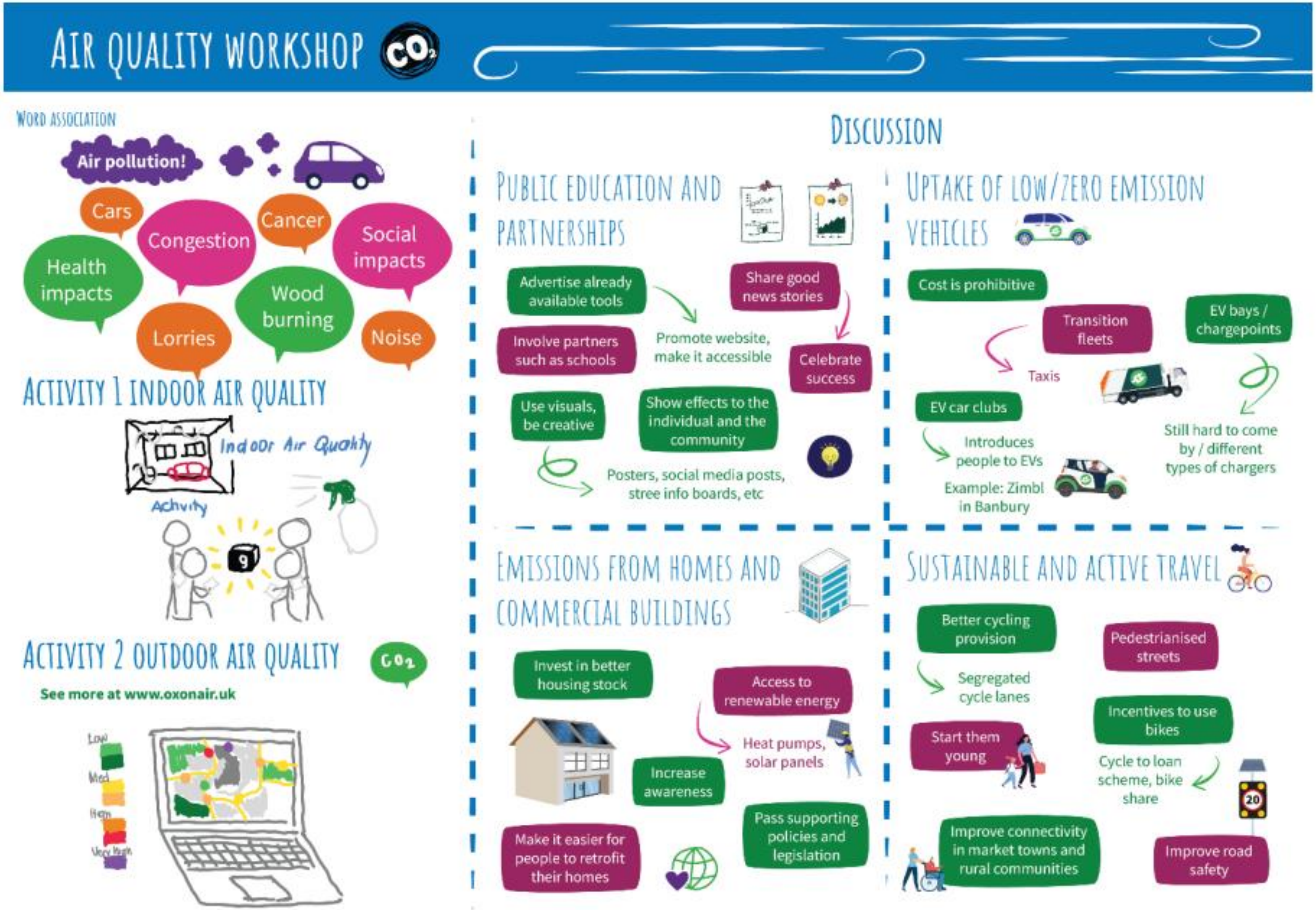
Figure 17 below provides a clear and engaging summary of the workshop activities and discussions, which focused on four key areas: Public Education and Partnerships, Uptake of Low/Zero Emission Vehicles, Emissions from Homes and Commercial Buildings, and Sustainable and Active Travel.

6.2.2 Public Consultation

In accordance with the legal framework outlined above and the relevant policy guidance (LAQM.PG22), Oxford City Council is required to carry out a full public consultation on this draft Air Quality Action Plan.

This section of the AQAP will be updated upon completion of the consultation process and analysis of the feedback received, ensuring that the final plan reflects, as far as practicable, the views and priorities of local residents and stakeholders.

Figure 17 - Infographic showing the insights of the collaborative Air Quality workshop



7. Appendix

7.1 Oxford's air pollution hotspots

This section of the AQAP provides further detail on Oxford's three historic air quality hotspots. Figures 18-20 present the contour maps that were generated from both modelled and measured air quality data for the year 2022[43]. Shaded areas represent modelled NO_2 concentrations, while the data points correspond to diffusion tube monitoring results. Both modelled and monitored data was used to inform Oxford's most recent Source Apportionment Study.

7.1.1 St Clements

St Clements has historically recorded the highest NO_2 concentrations in Oxford. Located within the commercial centre of the city and under the jurisdiction of Oxford City Council, this road link plays a critical role in the local transport network. It serves as a key city centre corridor, connecting East and West Oxford via The Plain Roundabout. St Clements Street is also the most direct route linking the eastern parts of the city with the central area.

Figure 18 – Baseline model results and measured NO_2 in 2022 at St Clements/ The Plain

[43] During the development of Oxford's latest Source Apportionment Study, which informed this AQAP, it was decided to use 2022 as the baseline year for air quality modelling to assess the transport sector's contribution to emissions. This decision was based on the fact that 2022 was the most recent full year in which traffic conditions in Oxford reflected a *'business as usual'* scenario. In contrast, 2023 monitoring data was significantly affected by atypical traffic patterns resulting from the closure of Botley Road near Oxford Station - a disruption that is still ongoing, with the road not expected to reopen until August 2026.

Traffic frequently builds up along St Clements heading toward The Plain Roundabout, with queues often extending beyond 125 metres. The road serves as a key corridor for local bus services, with several bus stops located along the route. It also accommodates 24-hour coach services to London and major airports, with stops in both eastbound and westbound directions. In addition, a significant number of delivery and service vehicles use this road, as it provides a primary access route to the city centre from the east. The area hosts a high concentration of businesses that rely on daily deliveries, further contributing to traffic volumes and emissions.

The relatively poor air quality at this location is primarily due to the narrow street layout and frequent obstructions to traffic flow. The street's configuration creates a canyon effect, which traps pollutants and limits their dispersion.

Nitrogen dioxide levels at St Clements decreased by 36% between 2019 and 2024.

In 2019 - the last full year before the pandemic - the annual mean concentration was 53 µg/m³, compared to 34 µg/m³ in 2024. As a key corridor for local bus services, this substantial improvement is largely attributed to some bus lane adjustments which were introduced to improve bus flow and reduce congestion, and to the recent electrification of Oxford's bus fleet.

7.1.2 Oxford City Centre Area - St Aldates and High Street

High Street and St Aldates areas are a vibrant city centre thoroughfare lined with shops on both sides. It features pavements along its entire length, supporting high volumes of pedestrian activity, and is frequently used by cyclists. Several bus stops are located along these streets.

High Street is also subject to a bus gate that restricts access to most vehicle types between 07:30 AM and 6:30 PM. Only local buses, licensed taxis and private hire vehicles (excluding private rentals), and exempt emergency vehicles are permitted during these hours.

However, although vehicles are prohibited from passing through the bus gate, access is still permitted for deliveries, servicing, and other access-related purposes - provided the route is not used as a through road.

Eastbound bus access to High Street is via St Aldates and Queen Street, while westbound services enter from The Plain Roundabout. The presence of intensively used bus stops, combined with frequent stopping by delivery and service vehicles, contributes to congestion throughout the day, affecting traffic flow in both directions.

Nitrogen dioxide levels on High Street and St Aldates decreased by an average of 46% between 2019 and 2024.

In 2019, the average annual mean NO_2 concentration across these two monitoring sites was 41 µg/m³, compared to 22 µg/m³ in 2024.

Like St Clements, this area serves as a key corridor for local bus services. The substantial improvement in air quality is largely attributed to the recent electrification of Oxford's bus fleet, alongside broader behavioural and operational changes following the pandemic - such as increased remote working, reduced commuting demand, and the growth of electric vehicle usage, accelerated by the introduction of the Zero Emission Zone Pilot in the city centre, and which also contributed (together with cargo bikes) to a rise in sustainable delivery methods in this area of the city centre.

Figure 19 - Baseline model results and measured NO_2 in 2022 on the High Street and St Aldates city centre areas

7.1.3 Cutteslowe Roundabout

Of Oxford's three historic NO_2 air pollution hotspots, this is the only one located outside the city centre. This distinction is important, as areas beyond the city centre typically experience much lower footfall due to the absence of shops and services. Consequently, human exposure to air pollution in these locations tends to be less frequent and of shorter duration compared to central areas.

The Cutteslowe and Wolvercote roundabouts are situated on the northern boundary of the city. These junctions serve as major gateways, providing direct links to the city centre via Banbury Road, as well as to the A40 - connecting eastward to Cheltenham and Swindon, and westward toward the John Radcliffe Hospital. They also offer direct access to the A34, linking Oxford to Bicester in the north and Abingdon in the south. This strategic positioning makes the area one of the city's busiest traffic arteries.

Nitrogen dioxide levels at Cutteslowe roundabout decreased by an average of 34% between 2019 and 2024.

In 2019, the average annual mean NO_2 concentration across the two monitoring sites at the roundabout was 38 µg/m³, compared to 25 µg/m³ in 2024.

The significant reduction in NO_2 levels at this location can be attributed to several key factors. While the electrification of local bus services has contributed, its impact here is likely smaller compared to city centre routes, as many buses operating in this area remain hybrid or Euro VI standard.

Cutteslowe Roundabout, located on the outskirts of Oxford, is heavily influenced by commuter traffic to and from the city and London due to its proximity to the ring road. Therefore, the primary driver of air quality improvements is likely the long-term shift in commuting patterns - particularly the rise in remote working and the sustained reduction in peak-hour traffic. These behavioural changes, accelerated by the COVID-19 pandemic, appear to have had a lasting effect.

Figure 20 - Baseline model results and measured NO_2 in 2022 near Cutteslowe Roundabout

In addition, broader trends have undoubtedly contributed to improvements across all three hotspots in recent years, including:

- The introduction of stricter vehicle emissions standards (e.g. Euro 6)
- The gradual phasing out of older, more polluting diesel vehicles
- The increasing uptake of electric and hybrid vehicles

Figure 21 - Historic diffusion tube trends of annual mean NO_2 in Oxford city centre.