

Draft Perth Air Quality Action Plan

Perth and Kinross Council

November 2024



Executive Summary

Perth City was designated an Air Quality Management Area (AQMA) in 2006 due to exceedances in National Air Quality Objectives. A subsequent Air Quality Action Plan (AQAP) was published in 2009. This document updates Perth and Kinross Council's Air Quality Action Plan for Perth City as part of our statutory duties required by the Local Air Quality Management framework. The aim of this plan is to outline measures Perth and Kinross Council (PKC) and Partners will take forward to improve air quality in the Perth Air Quality Management Area between 2023 and 2027.

Poor air quality has long been associated with both short- and long-term adverse effects on human health, leading to air pollution being classified as the single largest environmental health risk in the United Kingdom contributing to premature death and disease¹² (reference). There is extensive evidence which suggests long term exposure to even low-level air pollution can lead to increases in premature mortality, through the onset of respiratory and cardiovascular diseases (e.g. heart disease and stroke³). Air pollution particularly affects the most vulnerable in society: children and older people, and those with pre-existing heart and lung conditions.

Air pollution is also closely linked with climate change: many of the pollutants of concern in local air quality management are also greenhouse gases, and the main sources of air pollutants are often significant sources of CO₂ as well (e.g. combustion engines, energy production etc.). Improvements to air quality will therefore have many co-benefits for climate change mitigation, and PKC will work to maximise these benefits between these two areas.

Since the original Perth AQAP was published in 2009, there has been a consistent downward trend in levels of both NO₂ and PM₁₀ throughout Scotland, likely attributed to the increasing number of newer and cleaner vehicles across the country. This trend is replicated in Perth, further driven by various local air quality improvement measures delivered since 2009, with levels for NO₂, PM₁₀ and PM_{2.5} remaining below national objectives throughout the AQMA in recent years. However, the most recent air quality modelling of Perth still identifies pollutant hotspots with borderline objective exceedances in central areas such as Atholl Street and Main Street, Bridgend.

In addition, Perth will undergo significant change in the coming years with large developments in Perth West, Bertha Park and Scone as well as construction of the Cross Tay Link Road due to be completed during the operational period of this Action Plan. PKC must therefore ensure that the measures within this Action Plan keep air pollution levels from rising beyond National Objectives over the coming years as a result of the increased development of Perth.

This Action Plan contains a fresh suite of air quality improvement measures intended to reduce levels of air pollution within Perth. These measures have been shaped by data from air quality monitoring and modelling and have been developed through close consultation with both internal and external stakeholders across the Council and other relevant agencies. These measures have been divided into 7 broad topic areas covering all aspects of air pollution mitigation:

¹ Public Health England. Health matters: air pollution, 2018. Available at: <https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution>. [Cited 13 July 2022].

² World Health Organization. Ambient air pollution – a major threat to health and climate. Available at: <https://www.who.int/airpollution/ambient/en/> [Cited 13 January 2022].

³ International Agency for Research on Cancer. Air Pollution and Cancer. IARC Scientific Publication No. 161. Available at: <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Scientific-Publications/Air-Pollution-And-Cancer-2013>. [Cited 13 July 2022].

A. Strategic Measures
A.1 Improve Links with Regional Transport Strategy
A.2 Ensure Mobility Strategy created in line with CAFS2
A.3 Ensure Integration of Air Quality with Other Council Strategies and Policies
A.4 Planning and AQ
B. Relocate AQMA Traffic
B.1 Cross Tay Link Road
B.2 Incentivise parking out with City Centre hotspots
B.3 Encourage Low-Car Development
C. Traffic Measures
C.1 Continued improvement of UTMC system
C.2 Anti-Idling Scheme
C.3 Traffic Monitoring
D. Reduce Emissions from Sources
D.1 Encourage local fleet operators to pursue cleaner vehicles
D.2 Freight Improvements
D.3 Public transport improvements
D.4 Continue to evaluate the need for an LEZ in the AQMA
D.5 PKC Fleet Improvement
D.6 PKC Fleet Management
D.7 EV Charging Infrastructure
D.8 School Travel Plans
E. Reduce Demand for Traffic
E.1 Promotion and Development of car clubs
E.2 Park and Rides
F. Education and Community Measures
F.1 Promotion of active travel
F.2 Provision of travel information
F.3 Awareness raising and education
F.4 Encourage move to EV
F.5 Improve Council's provision of AQ information
G. Improve Local Air Quality Monitoring
G.1 Increase AQ Monitoring Network
G.2 Increased AQ Modelling
G.3 Scenario Modelling

In this AQAP we outline how we plan to effectively tackle air quality issues within our control. However, we recognise that there are a large number of air quality policy areas that are outside of our influence (such as vehicle emissions standards agreed in Europe), so we will continue to work with regional and central government on policies and issues beyond PKC's direct influence.

This Action Plan is set out as follows:

- **Section 1** gives a background of air quality in Perth, provides a brief overview of Perth and Kinross Council's air quality priorities (e.g. Health, Climate change etc.) and summarises action plan work so far.
- **Section 2** presents a summary of recent monitoring data and reviews of local air quality undertaken by Perth and Kinross Council.
- **Section 3** gives a summary of measures to be adopted by Perth and Kinross Council
- **Section 4** presents the range of options that were considered when aiming to improve local air quality within the designated AQMA
- **Section 5** provides a brief overview of the statutory duties placed on local authorities, and a summary of existing plans and strategies which may influence air quality in Perth.

Responsibilities and Commitment

This AQAP was prepared by PKC Regulatory Services, assisted by Sweco UK Ltd, with the support and agreement of the following officers and services:

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- Emily Stevenson – NHS Tayside
- Vincent McNally – Transport Scotland

This AQAP has been approved by:



Thomas Glen, Chief Executive

This AQAP will be subject to an annual review, appraisal of progress and reporting to the relevant Environmental Committees. Progress each year will be reported in the Annual Progress Reports (APRs) produced by PKC and submitted to the Scottish Government and a third independent part for assessment as part of our statutory Local Air Quality Management duties.

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1 Introduction

This report outlines the actions that Perth and Kinross Council (PKC) will deliver between 2024-2029 in order to reduce concentrations of air pollutants and exposure to air pollution; thereby positively impacting on the health and quality of life of residents and visitors to Perth. This Air Quality Action Plan (AQAP) is an update on the previous AQAP published for Perth in 2009.

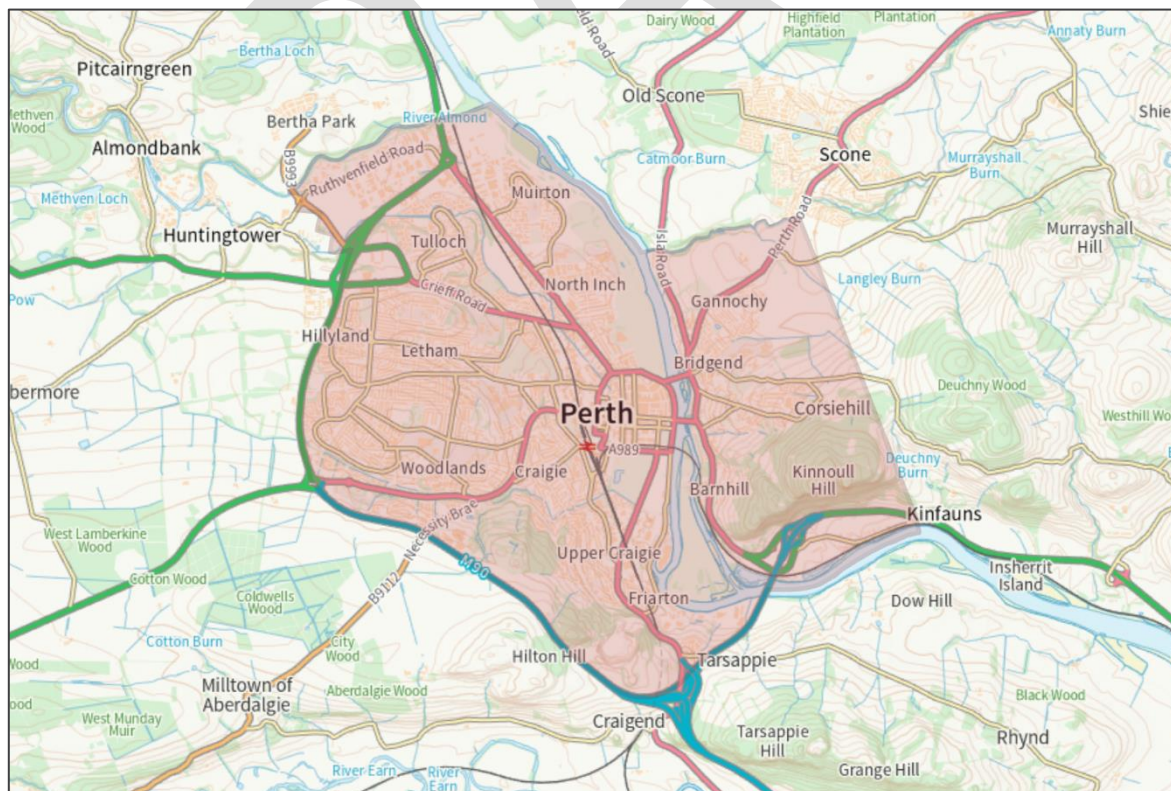
The AQAP has been developed in recognition of the legal requirement on all local authorities to work towards Air Quality Strategy (AQS) objectives under Part IV of the Environment Act 1995 (see [Table 2.1](#)) and relevant regulations made under that part and to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

This Plan will be reviewed every five years at the latest and progress on improvement measures set out within this Plan will be reported on annually within Perth and Kinross Council's Annual Progress Report (APR) to the Scottish Government.

1.1 Background

PKC carried out a [Detailed Assessment](#) of Perth in 2005 to identify whether any exceedances of the annual mean Air Quality Strategy Objectives were likely within Perth City. This assessment found that exceedances of the nitrogen dioxide (NO₂) and particulate matter (PM₁₀) objectives were likely at a number of areas within Perth, primarily near the Atholl Street/Barrack Street junction. This assessment also concluded that an AQMA should be declared for Perth and that a [Further Assessment](#) be carried out to confirm the conclusions of the detailed assessment and to test the likely impact of action planning scenarios to inform the future Perth AQAP.

Figure 1.1: Perth Air Quality Management Area (AQMA)



The Perth AQMA was declared in 2006 for exceedances of the NO₂ and PM₁₀ Air Quality Strategy Objectives. The Perth AQMA boundary is presented in [Figure 1.1](#).

Though the areas of exceedance identified in the Detailed and Further Assessments were localised around Atholl Street/Barrack Street, PKC chose to declare the whole of the city of Perth as an AQMA. It was determined that having one consolidated AQMA, rather than multiple smaller AQMAs throughout the city would allow the creation of an AQAP which focused on reducing emissions across the city of Perth, rather than moving air quality issues from hotspots to other areas. As part of this AQAP and in the future, the AQMA boundary continues to be reviewed and may be expanded as a result of future developments in Perth West, Bertha Park etc.

Perth has changed greatly since the original declaration of the AQMA, with large residential developments at Bertha Park, Huntingtower and Glasgow Road further expanding the size of the city over the last 15 years. Further growth is expected over the coming years in Perth West, Scone, and with the completion of the Cross Tay Link Road, leading to potential large increases in road traffic throughout the city and a corresponding increase in vehicle emissions.

PKC therefore will continue to review the AQMA boundary throughout the ongoing development of Perth, with the possibility of its expansion likely to ensure compliance with air quality objectives throughout the region.

1.2 PKC Air Quality Priorities

As well as meeting the statutory requirements related to local air quality management, Perth and Kinross Council has a number of priorities behind the improvement of air quality in Perth. These aim to the benefit the quality of life of all its residents as well as improving and protecting the wider environment.

1.2.1 Public Health

Air pollution has been associated with a wide range of effects on the wider environment; however, it is the potential negative impacts of ambient air pollution on human health that is the primary focus of local air quality management. While low- and middle-income countries disproportionately suffer the greatest health burden of poor air quality, air pollution remains the single largest environmental health risk in the United Kingdom, contributing to premature death and disease.^{4 5} Poor air quality, due to gaseous and particulate pollution, is associated with both short- and long-term adverse effects on human health.

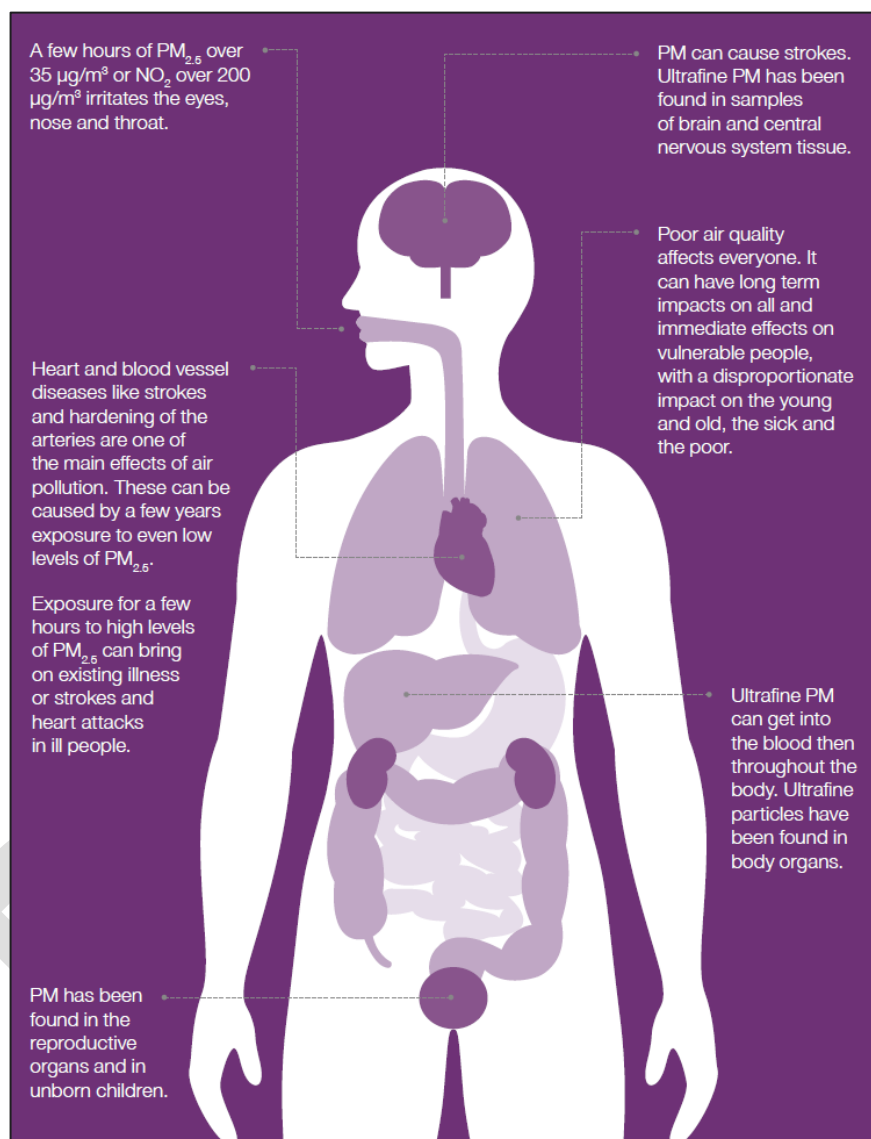
The size of polluting particles, concentration of pollutants and the duration of exposure are key determinants of potential adverse health effects. Particles larger than 10 µm are mainly deposited in the nose or throat, whereas particles smaller than 10 µm pose the greatest risk because they can be drawn deeper into the lung. The strongest evidence for effects on health is associated with fine particles (PM_{2.5}). However, epidemiological studies have also shown associations of outdoor Nitrogen Dioxide (NO₂) with adverse effects on health, including reduced life expectancy. While some of the

⁴ Public Health England. Health matters: air pollution, 2018. Available at: <https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution>. [Cited 13 July 2022].

⁵ World Health Organization. Ambient air pollution – a major threat to health and climate. Available at: <https://www.who.int/airpollution/ambient/en/> [Cited 13 January 2022].

health effects are caused by NO₂ itself, other pollutants emitted at the same time are also likely to be contributing.⁶

Figure 1.2: Effects of air pollutants on the human body⁷



As well as exposure related factors, the effects of air pollution on health also depend on an individual's vulnerability. Long term exposure to air pollution can affect everyone's health. However, some people are more vulnerable to the effects of air pollution because of their age (children and older people are at increased risk), existing medical conditions and/or health determining behaviours.

The levels of air pollution experienced on high pollution days in Scotland are usually not sufficient to cause acute problems in healthy individuals but can exacerbate symptoms in people who have pre-existing health conditions e.g., exacerbations of respiratory and cardiovascular conditions.

⁶ Committee on the medical effects of air pollutants. Statement on the evidence for the effects of nitrogen dioxide on health, 2015. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411756/COMEAP_The_evidence_for_the_effects_of_nitrogen_dioxide.pdf [Cited 13 July 2022].

⁷ DEFRA and Public Health England. Air Quality: A Briefing for Directors of Public Health. March 2017 https://www.local.gov.uk/sites/default/files/documents/6.3091_DEFRA_AirQualityGuide_9web_0.pdf

In addition to the acute health impacts of peak air pollution, there is an extensive body of evidence which associates lower-level long-term exposure to air pollution with increases in premature mortality and morbidity. Ambient air pollution has been associated with respiratory disease and cardiovascular disease (e.g. ischaemic heart disease and stroke).⁴ Outdoor air pollution, especially particulate matter, has also been classified by the International Agency for Research on Cancer (IARC) as carcinogenic to humans (a Group 1 carcinogen) and causing lung cancer.^{8 9} In addition, there is emerging evidence which links air pollution with dementia, low birth weight and Type 2 diabetes.⁴

While Scotland enjoys relatively good air quality in comparison to its own past and compared to other developed countries, air pollution remains a public health concern. This is due to a number of factors:

- Even in the UK where particulate matter concentrations in many cities do comply with guidelines, life expectancy can still be improved through improvements in air quality.¹⁰
- Small particulate pollution has health impacts even at very low concentrations. Indeed, no threshold has been identified below which no damage to health is observed. For this reason, the World Health Organization's air pollution guideline limits aim to achieve the lowest concentration of particulate matter possible.¹¹ There have been associated adverse health effects for NO₂ at and below the legal limits.¹²
- It is our most vulnerable populations who are most effected by air pollution. Areas of high deprivation are associated with poorer air quality. The health impacts of poor air quality compound pre-existing health inequalities.
- Air pollution and climate change are inextricably linked. The climate emergency is a significant risk to population health. Measures to combat air pollution which lead to a reduction in the combustion of fossil fuels will bring about additional health benefits by mitigating climate change.
- Measures to reduce air pollution can bring about health co-benefits (i.e. benefits in addition to the direct benefits from reducing air pollution). For example, there are considerable physical and mental health benefits from people walking and cycling rather than driving.

In the long-term, the available scientific evidence indicates that air pollution can have a significant effect on human health, although the effects will vary depending on where an individual lives (urban or rural) and the type of pollutant(s) to which they are exposed. Whilst the full extent of these impacts across the population is difficult to quantify, in the UK, poor air quality is considered to reduce the average life expectancy by several months (COMEAP, 2009).

⁸ International Agency for Research on Cancer. Air Pollution and Cancer. IARC Scientific Publication No. 161. Available at: <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Scientific-Publications/Air-Pollution-And-Cancer-2013>. [Cited 13 July 2022].

⁹ International Agency for Research on Cancer. Q and As on outdoor air pollution and cancer, 2018. Available at: https://www.iarc.fr/wp-content/uploads/2018/07/pr221_QA.pdf [Cited 13 July 2022].

¹⁰ Danjak D, Walton H, Smith JD. Birmingham City Health and Economic Impact Assessment study. Kings College London, 2019. <https://www.uk100.org/wp-content/uploads/2019/05/KCL-UK100-Birmingham-City-Health-and-Economic-Impact-2019.pdf>

¹¹ World Health Organization. Air Quality Guidelines – Global Update 2005. Available at: https://www.who.int/phe/health_topics/outdoorair/outdoorair_aqg/en/. [Cited 13 July 2022].

¹² DEFRA and Public Health England. Air Quality: A Briefing for Directors of Public Health. March 2017 https://www.local.gov.uk/sites/default/files/documents/6.3091_DEFRA_AirQualityGuide_9web_0.pdf

1.2.2 Climate Action Perth and Kinross

Climate change and air quality are inextricably linked; air pollution often originates from the same activities that contribute to climate change. The majority of both greenhouse gases and air pollutants are produced by vehicle engines, power generation and domestic heating, and as such multiple measures aimed at reducing air pollutants often also reduce CO₂ emissions, for example the adoption of low emission vehicles.

However, we are now also aware that some national policies to address air quality or climate change in the past have not interacted and at times been in conflict (see **Figure 1.3** below). As a result, we recognise that it is vital to establish policies which seek to improve both air quality and climate change through collaborative working with relevant stakeholders.

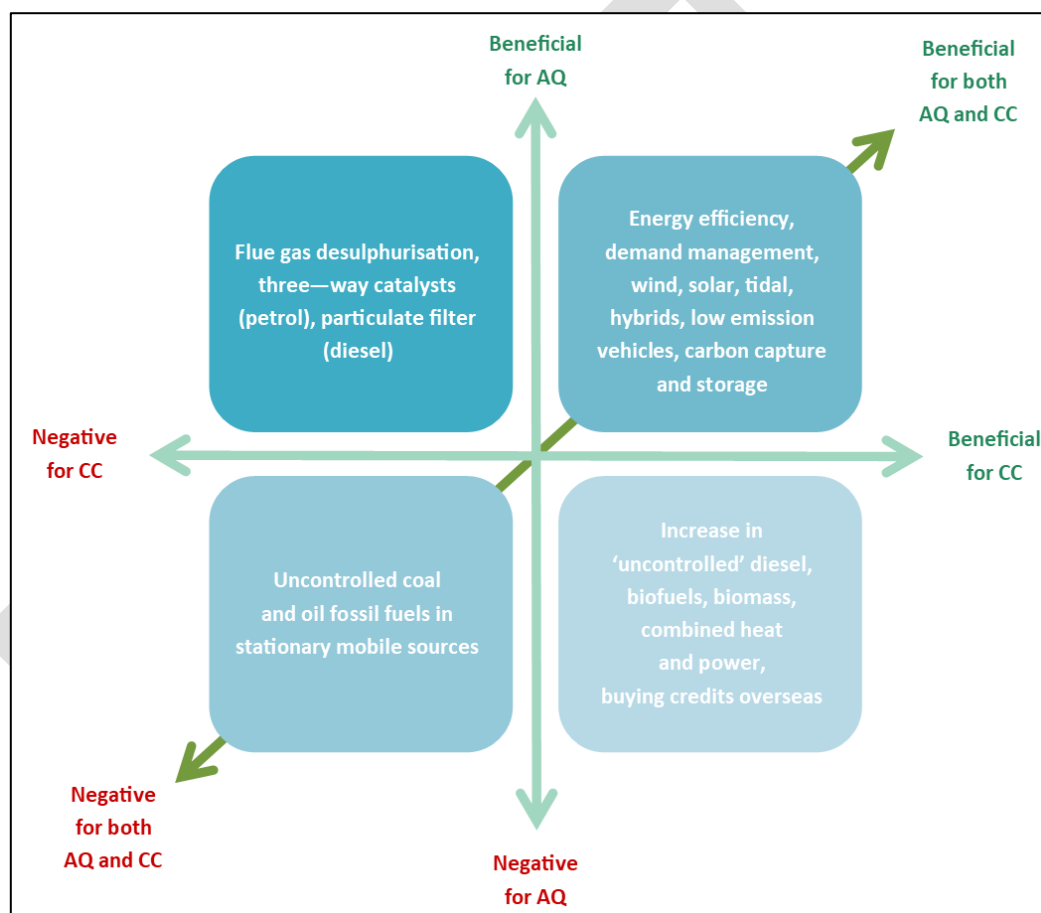


Figure 1.3: Air Quality and Climate Change Interactions¹³

Air quality was therefore one of the many considerations as part of Perth and Kinross Council's Climate Change Strategy and Action Plan¹⁴, which was unanimously approved by the Council in December 2021.

The Action Plan sets out PKC's vision in reaching net zero targets and achieving a climate resilient Perth and Kinross by outlining key short-term and long-term actions in relation to Energy and

¹³ Defra: Air Pollution: Action in a changing climate
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf

¹⁴ Perth and Kinross Climate Change Strategy and Action Plan. Available at: <https://www.pkclimateaction.co.uk/climate-change-strategy-and-action-plan>

Buildings, Transport, Climate Resilience, Waste and Circular Economy, Education and Engagement, Business and Industry, and Land Use.

A web-based version of the Strategy and Action Plan is available on the [Perth and Kinross Climate Action website](#) which was launched in early 2022, in order to act as a central hub for climate-related information across Perth and Kinross. The website features 'Take Action' pages in relation to each area where changes need to be made, as well as key resources such as funding, events and climate-related news.

To work towards the delivery of Perth and Kinross Council's Strategy and Action Plan, a Climate Change Working Group (CCWG) was set up. The CCWG consists of representatives from relevant teams which allows for co-ordinated sharing of best practice across Council services, and is divided into thematic subgroups (e.g. Energy and Buildings, Transport etc.).

Though air quality is a recurring theme across all subgroups, air quality related issues fall within the remit of the Transport subgroup, where it is a standing item on the agenda.

1.3 Previous Action Plan Progress

This action plan replaces the previous action plan which was created in 2009. A wide range of actions were delivered through the past action plan, full details can be viewed in PKC's air quality [Annual Progress Reports](#). Some key examples of delivered actions include:

- Cross Tay Link Road – Construction is now well underway, with the A9 realignment complete, A94 to River Tay link road significantly progressed ([Figure 1.4](#)) and the first section of the Tay Crossing pier also complete. The CTRLR is expected to redirect a significant proportion of traffic away from central Perth, which is predicted to have a positive impact on reducing pollution in our worst hotspots in Atholl Street and Bridgend.
- Air quality was a key consideration in both Local Development Plan 1 and 2, and [PKC Supplementary Air Quality Planning Guidance](#) was created and implemented in 2020, with a significant number of planning applications having been assessed for air quality in recent years – This has ensured air quality is embedded within the planning process and will prevent developments which will have a negative effect on Perth's local air quality.
- Air quality was integrated within both the Local Transport and Regional Transport Strategies – Similar to the Local Development Plan, this has ensured air quality is one of the key considerations during any transport planning exercises
- TACTRAN-wide Freight Quality Partnership was created to improve freight movements across Perth and Kinross – Freight movements can often produce a significant quantity of air pollutants due to the size and weight of the vehicles involved. The Freight Quality Partnership presents a forum where PKC can work directly with these freight companies to reduce the impact they have on local air quality.
- Stratos UTM Common Database was installed in Perth to improve traffic management in City centre – Atholl Street and Bridgend are the worst hotspots for pollution in Perth and Kinross. Stratos allows for better management of congestion in these areas, with one such example being the 2014 adjustments to traffic signal timings in Atholl St which resulted in a significant reduction in NO₂ levels ([Figure 1.5](#)).
- PKC Fleet Vehicles are now only replaced with Euro 6 or EV/Hybrid alternatives, vehicle MPG now monitored through mileage recording at every fuelling event and all council vehicles are now

installed with tracking/telematic systems to improve fleet usage. This will significantly reduce the Council's own contribution to air quality issues in Perth.

- Public Transport Improvements – Electric charging hub installed at Broxden Park and Ride, real time passenger information boards installed in bus shelters throughout Perth City and surrounding areas, continual improvement to bus services in Perth and Kinross including new electric buses for Service 1 and 2 in Perth City. Investment in public transport infrastructure is the first step in encouraging modal shift from car use to more sustainable and cleaner travel
- TACTRAN Connect travel information database and journey planner created in 2010 and modernised in 2014. This tool makes it easier to plan a journey through Perth using the available public transport in the city, rather than using a personal vehicle.
- Perth On The Go delivers cycle/walking route maps and bus timetables to local residents, alongside ongoing school initiatives such as the Ibike Project and Bikeability. Ensuring information on sustainable travel routes/methods is readily available to Perth and Kinross residents is vital to encourage modal shift to walking, cycling and public transport.
- PKC has taken part in Clean Air Day for many years, carrying out air quality educational events for both schools and the wider public across Perth and Kinross, alongside social media messaging about Perth's air quality and encouraging the move to active and sustainable travel



Figure 1.4: Cross Tay Link Road from Tay Crossing to A94 - Dec 2023



Figure 1.5: Change in NO₂ Levels Following Signal Changes at Atholl Street

2 Air Quality in Perth

Throughout the majority of Perth and Kinross air quality is considered to be very good, however there are a number of hotspot areas where this is not the case which has led to the declaration of Air Quality Management Areas (AQMAs) in Crieff High Street and Perth City. In most cases, these hotspot areas are caused by high sided buildings on both sides of a road prone to congestion, creating a “street canyon” where traffic emissions cannot disperse properly. This is the case in Atholl Street and Main Street Bridgend, Perth’s main hotspots.

PKC’s Environmental Health team is responsible for identifying, monitoring and improving areas of poor air quality within our Local Authority boundary. The methods by which we achieve this are explained in this section.

2.1 Monitoring

Under Section 82 of the Environment Act 1996, all local authorities are required to regularly review and assess the air quality within their area against the National Objectives set out in the Air Quality (Scotland) Regulations (2000 and Amended Regulations 2002 and 2016).

PKC have a statutory duty through the LAQM process to report annually to the Scottish Government on monitoring undertaken within Perth and Kinross. All reports and assessments, including the existing AQAP for Perth, are available at <https://www.pkc.gov.uk/article/15307/Air-quality-reports>.

Table 2.1: Scottish Air Quality Objectives

Pollutant	Air Quality Objectives ($\mu\text{g}/\text{m}^3$)	Measured as	Date to be achieved by
Nitrogen Dioxide	40	Annual Mean	31.12.2005
	200	One hour mean, not to be exceeded more than 18 times per year (equivalent to the 99.79th percentile of hourly means)	31.12.2005
Particulate Matter (PM_{10})	18	Annual Mean	31.12.2010
	50	24 hour mean, not to be exceeded more than 7 times a year (equivalent to the 98.08th percentile of 24-hour means)	
Particulate Matter ($\text{PM}_{2.5}$)	10	Annual Mean	31.12.2020

The above three objective pollutants are of main concern to Scottish Government due to their potential to impact public health:

- Nitrogen Dioxide (NO_2) – NO_2 originates from car and other vehicle exhausts from both petrol and diesel engines. NO_2 can irritate the lungs and enhance the opportunity of falling ill to respiratory infections such as the flu.

- Particulate Matter of a diameter less than 2.5 microns (PM_{2.5}) – PM_{2.5} sources include petrol and diesel exhaust fumes. These fine particles can be carried deep into the respiratory system where they may cause inflammation (particularly in those with cardiovascular and respiratory issues).
- Particulate Matter of a diameter less than 10 microns (PM₁₀) – PM₁₀ originates from petrol and diesel exhaust fumes but can also originate from natural sources such as tire and brake dust, soil, biological particles, pollen and sea salt. Much like PM_{2.5}, fine particles can penetrate the respiratory system and cause inflammation. Both PM₁₀ and PM_{2.5} are potentially carcinogenic.

In order to identify potential breaches of the above National Objectives, PKC maintains a comprehensive air quality monitoring network across the whole of Perth and Kinross. There are two types of air quality monitoring equipment distributed throughout the region as part of our network: Real Time Monitors and Nitrogen Dioxide Diffusion Tubes.



Figure 2.1: Real Time Monitor in Bridgend, Perth (Left), Nitrogen Diffusion Tube (Right)

Real Time Monitors (RTMs) are a series of highly sensitive analysers housed in a secure cabinet which measure ambient concentrations of Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀ and PM_{2.5}) in real time, 24 Hours a day. These measurements are then available live on the [Scottish Air Quality Website](#). While RTMs are the most accurate means of assessing air quality available to PKC, their high cost, large size and need for specialist maintenance/calibration means only a small number can be placed throughout the region, concentrating on the areas with the highest pollution concentrations.

There are currently three Real Time Monitoring sites in Perth: Atholl Street, Bridgend, and Glasgow Road. These monitors are provided and maintained by an external consultant.

Table 2.2: Perth Real Time Monitoring Stations

Site Name	Site Type	Pollutants Monitored
Atholl Street	Roadside	NO ₂ , PM ₁₀ , PM _{2.5}
Bridgend, Perth	Roadside	NO ₂ , PM ₁₀ , PM _{2.5}
Glasgow Road, Perth	Roadside	NO ₂ , PM ₁₀ , PM _{2.5}

To supplement the data collected by the four Real time monitors, PKC has deployed a network of over 80 Nitrogen Dioxide Diffusion tubes throughout Perth and Kinross. These small tubes are mounted at a height of around 2 meters on lampposts, downpipes etc close to the roadside to measure monthly average NO₂ concentrations at their location.

While less accurate than RTM measurements, diffusion tube data helps build up a detailed map of pollution hotspots throughout the region. Their low cost and ease of installation allows for quick deployment and relocation to areas most in need of monitoring. A number of diffusion tubes are put in place on each RTM to compare readings and to allow for bias adjustment of tube data during the Annual Progress Report.

2.2 Modelling

To further improve our knowledge of air quality within Perth, PKC commissioned Sweco UK Ltd. to create a detailed dispersion model in 2021. An updated transport model undertaken for the baseline year of 2019 was used in the creation of the dispersion model to provide insight into the traffic movements within Perth and Kinross, and to further inform how to improve air quality in the area.

Air quality dispersion modelling considers all the data from PKC's air quality monitoring network, traffic data from traffic models, meteorology and topography to estimate pollutant concentrations across a whole region. This enables insight into the air quality of areas not currently monitored by PKC, and allow better determination of the most effective improvement measures to implement. Further details on the modelling process and outputs can be found in [Appendix E](#).

Below is a map of the Perth AQMA showing the Nitrogen Dioxide contours determined by the dispersion model. As shown in darker red, the main hotspots within the city centre are located in Atholl Street and Bridgend. Though there are also high concentrations surrounding the M90, A9 and Inveralmond roundabout, the areas of primary concern to local authorities are those areas of high concentration in close proximity to sensitive receptors (e.g. residential properties and areas of high footfall). Both the M90 and the A9 are also managed by Transport Scotland and are therefore out with PKC's control.

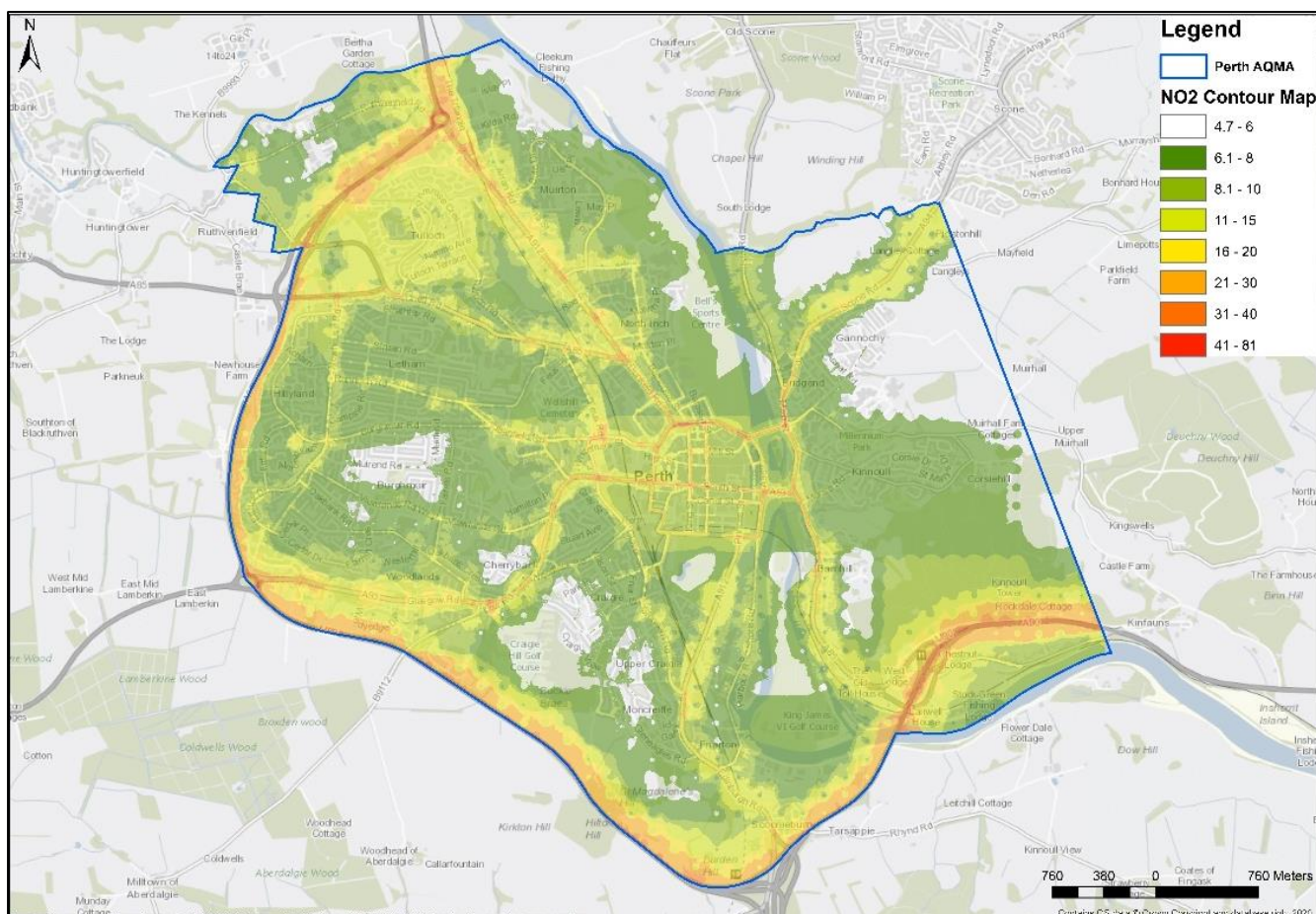


Figure 2.2: Dispersion Model NO₂ Contours for Perth AQMA

2.3 Trends in Pollution Levels

Perth and Kinross Council has been monitoring air quality for over 19 years. During this time, we have seen an overall general downward trend in recent years in levels of both NO₂ and PM₁₀. This downward trend was observed across automatic and diffusion tube monitoring sites and is being seen on a national basis, most likely due to a combination of PKC's air quality improvement measures delivered so far and an increasing number of newer and therefore cleaner vehicles within the vehicle fleet. Further monitoring is required to establish if this is a continual trend that could eventually lead to compliance with the objectives.

A period of 3-5 years of compliance is required before PKC would be in a position to consider amending/revoking the AQMA. As a result, the delivery of an action plan is still required. Monitoring undertaken during 2020 to early 2022 are also subject to much uncertainty and do not represent typical ambient air quality concentrations due to Covid-19 lockdown measures, meaning a trend cannot be established using data from that period.

Nitrogen Dioxide

The annual mean concentration of Nitrogen Dioxide (NO₂) within the Perth AQMA has been gradually decreasing over the last 10 years, with 2019 being the first year without an exceedance of the National Objective of 40 ug/m³ in Perth since 2018. During 2020 and early 2021 traffic levels were influenced by Covid-19 lockdowns and NO₂ levels dropped significantly, once again leading to no exceedances for these two years. However as this data does not reflect a typical year, the years 2020 and 2021 must be discounted from any trends.

Once again there were no exceedances of the NO₂ National Objectives during 2022, with overall levels remaining below those of pre-Covid 2019. These continued lower levels may be attributed to the continued homeworking/flexible working of many who formerly commuted to Perth pre-Covid, however it will be a number of years before a new clear downward trend in NO₂ concentrations can be established.

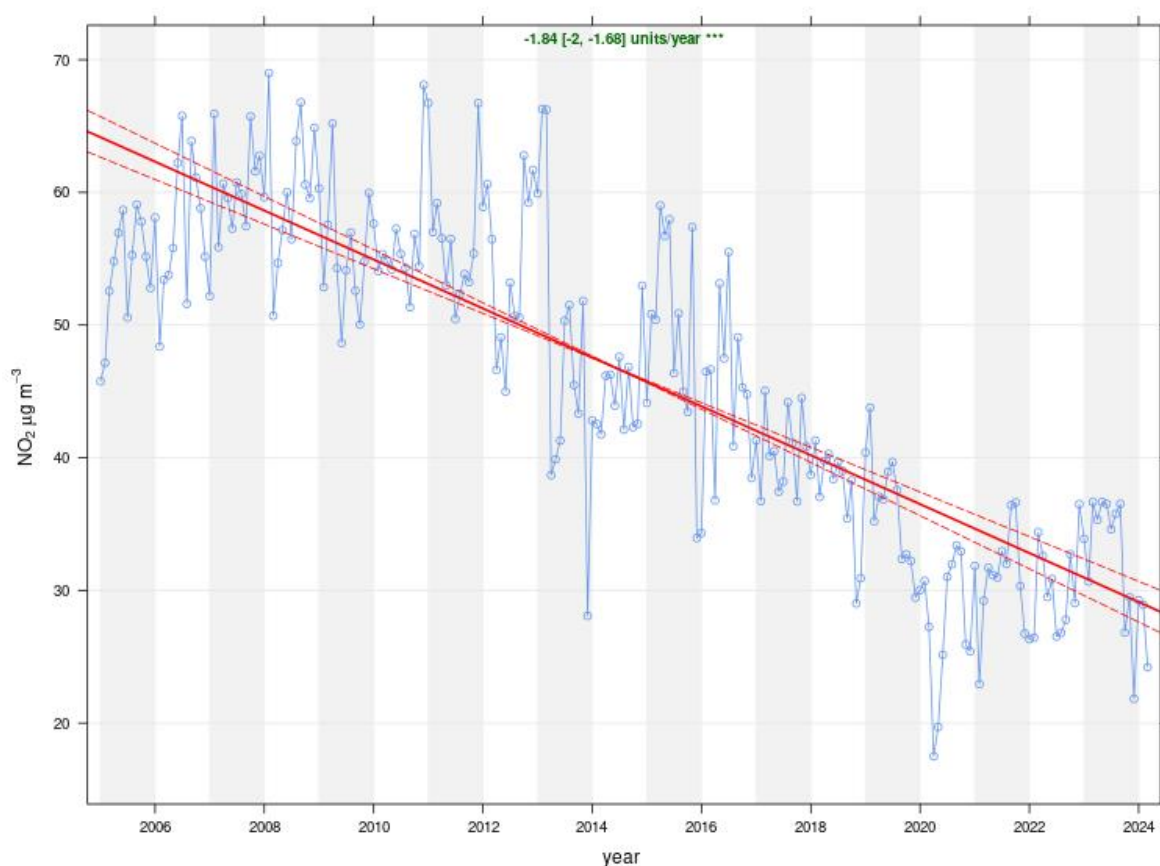


Figure 2.3: NO₂ Concentrations at Atholl Street Perth from 1/01/2005 to 25/03/2024 (De-seasonalised)

Particulate Matter

PM₁₀ annual mean concentrations have also followed the same trend as NO₂, with levels gradually decreasing up to 2019 and the years 2020 and 2021 discounted due to the influence of Covid-19 lockdown measures. There has not been an exceedance of the National Objective for PM₁₀ of 18 ug/m³ since 2016, however there has been some uncertainty surrounding the sensors used to monitor PM₁₀ possibly underreporting concentrations.

In March 2023 following the [Scottish Government Research Study to Investigate Particulate Matter Monitoring Techniques](#), Scottish Government recommended that all PM₁₀ and PM_{2.5} data recorded on Fidas 200 analysers from 2022 onwards would require a correction to be applied due to this underreporting. This correction led to 2022 having the first exceedances of the PM₁₀ daily mean objective since 2013, though this has been attributed to the ongoing building works directly behind the Atholl Street Real Time Monitor. The true trend in PM₁₀ levels will not be identifiable until these works conclude in 2024 and representative monitoring data can be gathered once more.

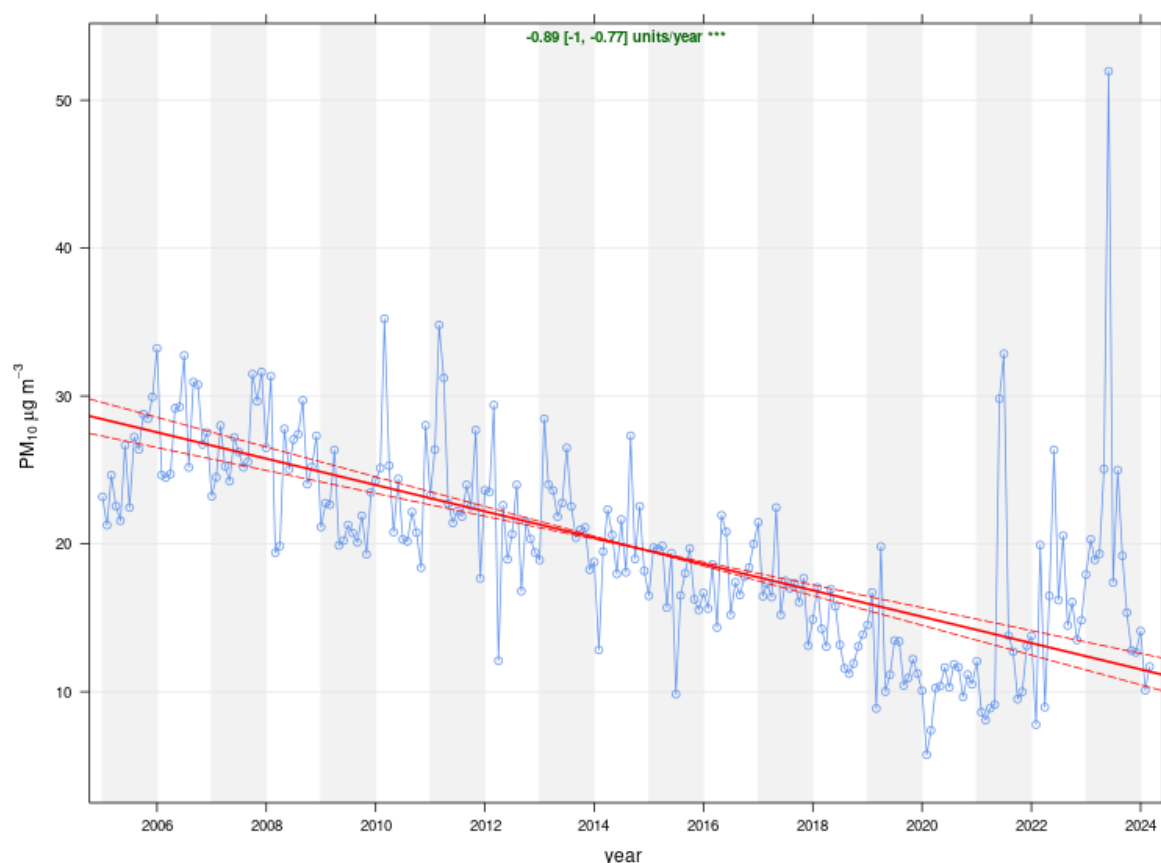


Figure 2.4: PM₁₀ Concentrations at Atholl Street Perth from 1/01/2005 to 25/03/2024 (De-seasonalised)

PKC began monitoring PM_{2.5} in late 2017 and therefore there is not sufficient data to establish a significant trend in concentrations as can be observed for NO₂ and PM₁₀. Concentrations have remained fairly steady since monitoring began, and there have been no PM_{2.5} objective exceedances so far.

2.4 Main Sources of Pollution

As part of the air quality dispersion modelling carried out by Sweco, the pollutant contributions from various vehicle types were calculated in a source apportionment assessment.

The aim of this assessment was to help the Action Plan target the most prevalent sources of pollutants through tailored improvement measures.

The source apportionment analysis showed the highest contributor of NO_x, PM₁₀ and PM_{2.5} emissions on each road based on the traffic model for the most part was cars and followed by buses/coaches, as shown in [Figure 2.5](#).

A more detailed breakdown of the source apportionment analysis was undertaken within the Perth city centre area to identify the different vehicles contributing to NO_x emissions. This analysis showed that whilst cars were the highest vehicle contributor to emissions out with the city centre area, buses/coaches are also contributing a significant proportion of NO_x emissions particularly on South Street, Mill Street, South Methven Street and York Place (**Figure 2.6**)

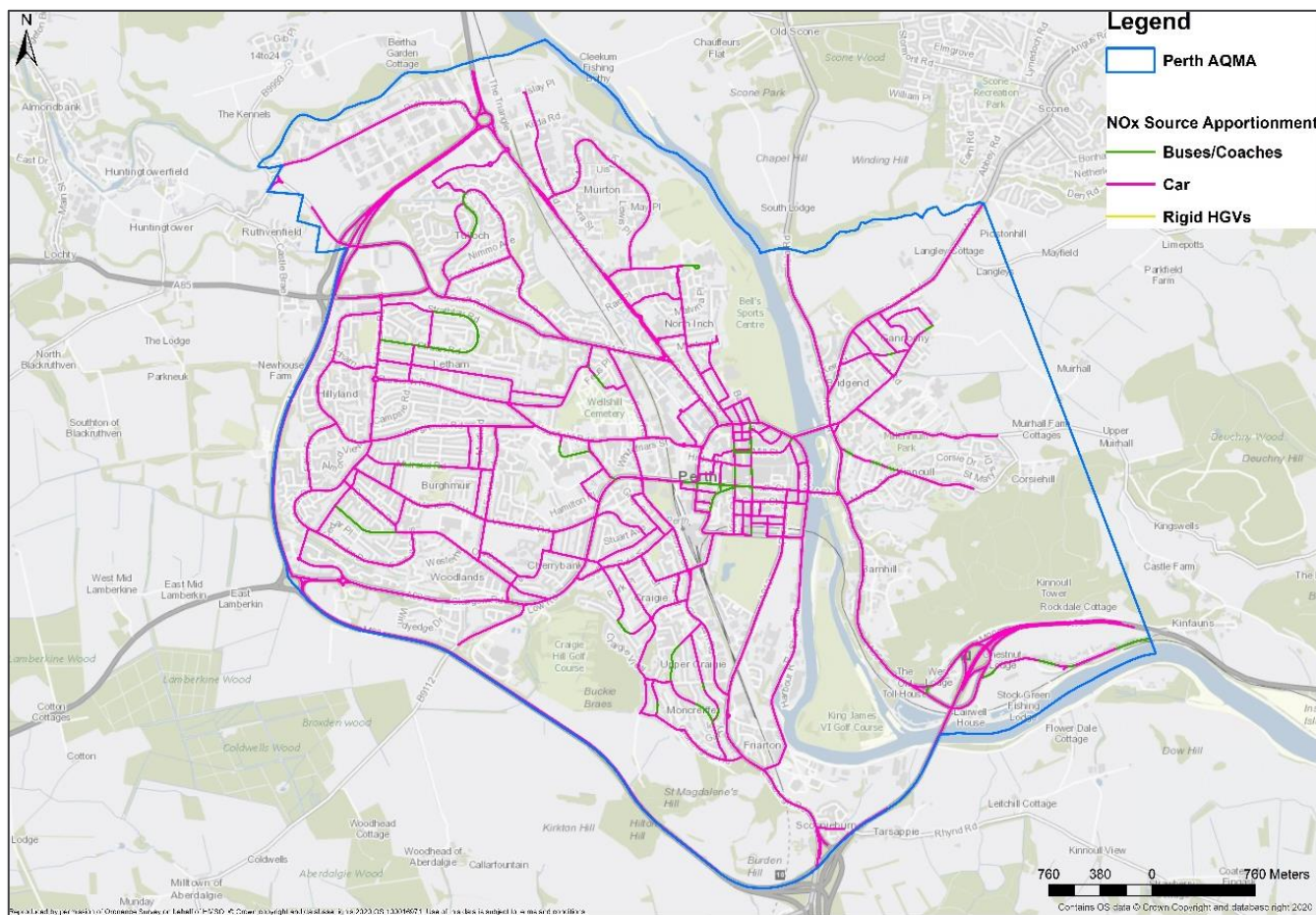


Figure 2.5: NO_x Perth Source Apportionment Analysis

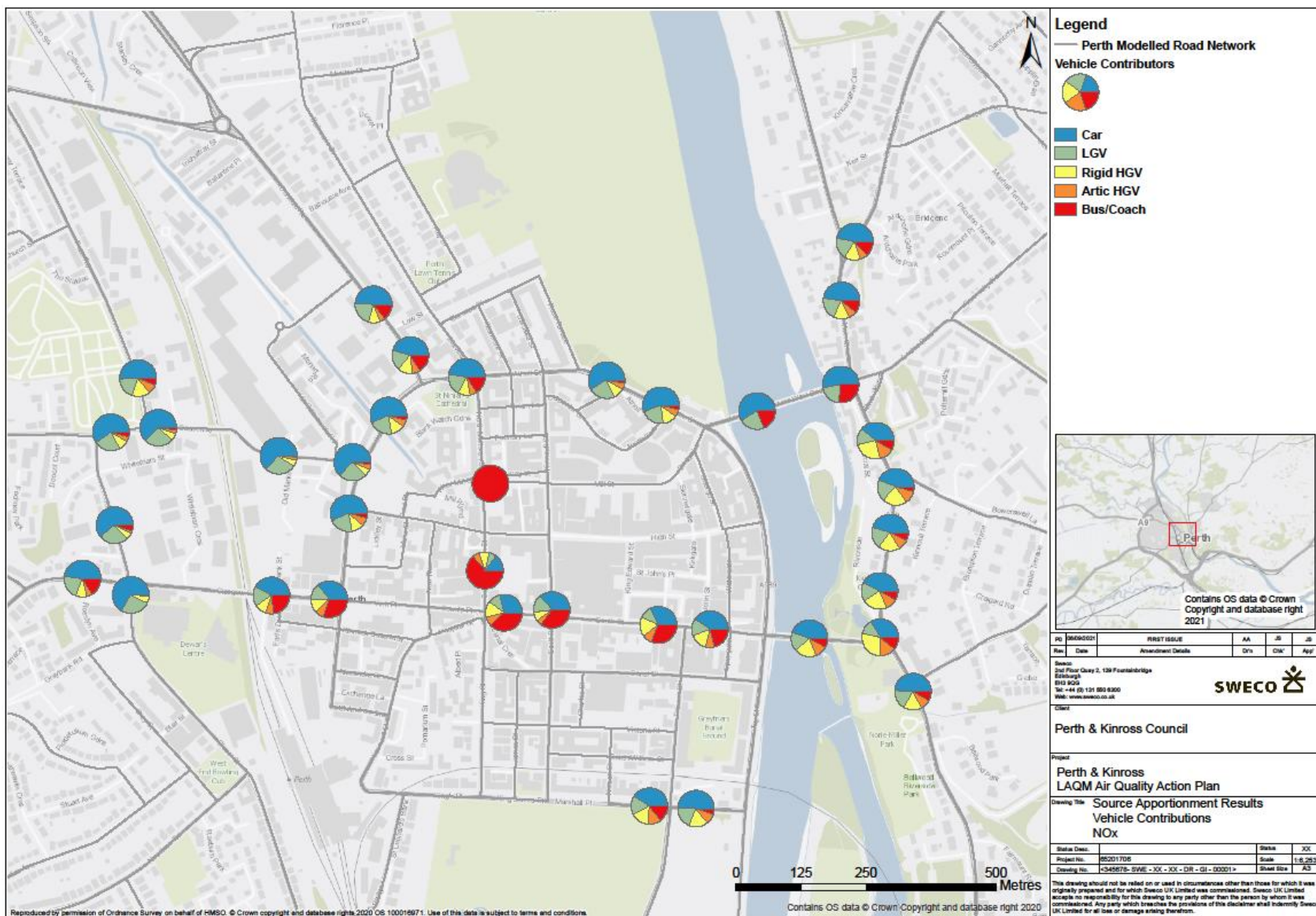


Figure 2.6: Source Apportionment – Perth City Centre Link Analysis

3 Improvement Measures

Once the key pollution hotspots were identified through monitoring and modelling, and the main sources of pollution were attributed through source apportionment, a steering group made up of representatives from various relevant services at PKC was convened to determine a range of improvement measures to reduce air pollution within the Perth AQMA.

This process consisted of a gradual refinement of a full range of potential options, to ensure the focus was centred on measures that directly address the principal problem (road traffic emissions), as well as prioritising the measures most feasible and cost-effective. Further information on this refinement process can be found in Section 4.

This section outlines the draft list of improvement measures following internal consultation and prior to public consultation.

A. Strategic Measures

It is important that AQAPs support and consider existing or forthcoming plans and strategies. Therefore, some integration of the AQAP with the local transport strategy, the development plan and other relevant Council strategies is considered essential and represents a strategic and integrated approach to local air quality management. The adoption of these measures will help to improve air quality across Perth and Kinross. These strategic actions are outlined in the measures 1 to 4 below.

A.1 Improve Links with Regional Transport Strategy

The Regional Transport Strategy contains a section on air quality, and the AQAP will link to this by working with both TACTRAN and other partners such as Transport Scotland to tackle transport issues that contribute to poor air quality. The Perth AQMA covers the whole of Perth City and includes key strategic routes on the national transport network such as the A9, A85 and M90, giving a regional and national dimension to the Perth AQAP. PKC is involved in the review of the Regional Transport Strategy currently being undertaken by TACTRAN, to be adopted late 2024. The new RTS would cover 2024-2034.

Measure	Title
A.1	Improve links with regional transport strategy
Definition	Key Intervention
Ensure that AQ and Climate change are considered in Transport Planning for Perth at a regional strategy level. Such considerations would include: <ul style="list-style-type: none">a. Promoting measures to reduce traffic within Perth City (reducing trips/promoting alternatives)b. Promoting measures to promote ULEV in and around Perth	Ensure that AQ and Climate change are considered with regards to Transport Planning for Perth at a regional strategy level.
Responsible authority and other partners	Powers to be used
TACTRAN/PKC Transport Planning/Environmental Health (EH)	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – All Areas	

A.2 Ensure Mobility Strategy created in line with CAFS2

Perth and Kinross Council's upcoming Mobility Strategy, commonly known as a Local Transport Strategy, will set out the Council's vision for managing and developing the transport network over a minimum of 10 years. The Mobility Strategy will consider all modes of transport, for the movement of goods and people, across Perth and Kinross's rural and urban settings, to help achieve national targets and local objectives. The Mobility Strategy will respond to the climate change agenda and changes in how people travel following the Covid-19 pandemic.

The strategy will also consider emerging technologies, digital services, housing, inclusion, poverty, health, climate adaption, economic growth, air quality and place making.

As a major council strategy for the future of transport, it is vital that air quality be one of the key considerations within this document. The aims and actions of the Cleaner Air for Scotland 2 Strategy should therefore be incorporated within the new Mobility Strategy to ensure PKC compliance.

Measure	Title
A.2	Ensure Mobility Strategy created in line with CAFS2
Definition	Key Intervention
Ensure that air quality and CAFS2 objectives are integrated into the delivery of the future Perth and Kinross Mobility Strategy.	Air quality to be a key consideration within future mobility strategy and subsequent transport planning
Responsible authority and other partners	Powers to be used
PKC Transport and Development	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – All Areas	

A.3 Ensure Integration of Air Quality with Other Council Strategies and Policies

PKC will ensure air quality is considered within various council strategies and policies to minimise any negative impacts they may cause. Air quality planning policies and guidance will make sure any impacts and appropriate mitigation measures are considered at the design stage of all proposed developments. Procurement guidance will influence future PKC tender exercises, in particular the uptake of more fuel efficient and lower emission vehicles by PKC and public transport services. Future changes to the traffic network within Perth will consider possible air quality effects and aim to reduce air pollution wherever possible.

Measure	Title
A.3	Ensure integration of air quality with other council strategies and policies
Definition	Key Intervention
a. Joint-working between Council Services to consider air quality implications of existing/ future Council strategies/ policies,	Encourage opportunities for improving local air quality and minimising negative impacts from existing and future PKC strategies and policies.
b. Ensure air quality impacts and mitigation measures are considered at the design stage for all proposed developments across the Local Development Plan area	
c. Ensure air quality is formally considered in future tender processes, particularly for new PKC vehicles	

Measure	Title
	and public transport decisions (i.e. for school subsidised public services, school buses and taxis)
Responsible authority and other partners	Powers to be used
PKC	Statutory: Town and Country Planning (Scotland) Act 1997 as amended by the Planning etc. (Scotland) Act 2006
Related Climate Change Action Plan Focus Area	
Governance – Governance and Accountability, Business and Performance Management, Sustainable Procurement	

A.4 Planning and Air Quality

The Environmental Health Team, as internal consultees for development management, will continue to request and assess all planning applications in Perth and Kinross which may result in an increase in air pollution, both directly from the development (wood-burning stoves, biomass boilers etc.) and from the increase in traffic caused by the new development.

Green Travel Plans are requested for new large developments under existing planning arrangements, however there is little that can be done to ensure these plans are put in place after planning permission is granted. Enforcement and general delivery of future green travel plans for developments will therefore be reviewed to ensure compliance by developers. This could include requesting regular/annual monitoring reports on the GTP from developers to ensure compliance

PKC produced a new statutory AQ Supplementary Guidance document which was adopted in March 2020 and is linked with the Local Development Plan. Having been in place for several years, the performance, use and content of this guidance will now be reviewed to improve use by developers. Further air quality policy updates could also be made when the Local Development Plan is updated in 2027.

Measure	Title
A.4	Planning and Air Quality
Definition	Key Intervention
<ul style="list-style-type: none"> a. Continue to consider air quality in planning decisions b. Review/Increase enforcement and monitoring of new development green travel plans. c. Improve use of existing AQ Supplementary Guidance d. Ensure provision of EV chargers and active travel infrastructure in developments wherever feasible (e.g. safe cycle storage) 	Ensure air quality improvement is prioritised throughout the planning process at PKC and review existing planning policies and guidance related to AQ to optimise performance
Responsible authority and other partners	Powers to be used
PKC Development Management/EH	Statutory: Town and Country Planning (Scotland) Act 1997 as amended by the Planning etc. (Scotland) Act 2006
Related Climate Change Action Plan Focus Area	
Transport – Accelerate the EV Transition, Increase Active Transport Across Perth and Kinross, Improve Public Transport Provision Business and Industry – Measuring Performance	

B. Relocate AQMA Traffic

B.1 Cross Tay Link Road

The Cross Tay Link Road across the River Tay from A9 to A93 North of Scone is the largest infrastructure project ever undertaken by Perth and Kinross Council. The new link road will allow west-east journeys to the north of Perth to bypass the city centre, helping to improve traffic flow, reduce congestion and improve journey times. Air quality modelling for the project predicted that there would be a beneficial effect on NO₂, PM₁₀ and PM_{2.5} concentrations in the majority of locations assessed, with areas like Atholl Street and Bridgend seeing the largest improvements in air quality.

The project also includes significant active and sustainable travel infrastructure, including cycle routes, bus priority measures, EV chargers and a new Park and Choose site on the west side of the Tay. As a result this development provides the opportunity for a shift towards greener modes of transport, leading to potential further improvements in air quality in Perth. Furthermore, the resultant reduction in traffic flows through the centre of Perth will allow for the delivery of the planned active travel improvements in Phase 4 of the Perth Transport Futures Project, continuing the drive for active travel in and around Perth.

Measure	Title	
B.1	Cross Tay Link Road	
Definition		Key Intervention
Provide new crossing connecting A9 to A94, leading to potential AQ benefits for Perth City Centre		Divert through traffic around the city and reduce the volume of traffic within the city, directly reducing main source of air pollution in hotspots of Atholl St and Bridgend
Responsible authority and other partners		Powers to be used
PKC Traffic and Network/Transport Planning, Transport Scotland		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Reducing Vehicles in Town Centres, Increase Active Transport Across Perth and Kinross. Improve Public Transport Provision		

B.2 Incentivise Parking out with City Centre Hotspots

Perth and Kinross Council, in consultation with relevant stakeholders, will review and improve the existing parking options outside Perth City Centre to reduce vehicle trips within the city centre with the aim of alleviating the impacts of congestion. PKC will further investigate options to incentivise parking out with the city centre such as improving walking and cycling infrastructure from outer car parks like South Inch, as well as reviewing parking charges within the city. Reducing car journeys through the city centre will help to reduce vehicle emissions in our worst hotspots, while also helping to encourage active travel.

Measure	Title	
B.2	Incentivise parking out with City Centre hotspots	
Definition	Key Intervention	
Investigate options to encourage parking outside Perth City Centre such as improving walking and	Encourage parking away from the city centre to reduce traffic and	

cycling routes from outer car parks like South Inch, reviewing parking charges within Perth etc.	congestion in hotspot areas, while encouraging active travel
Responsible authority and other partners	Powers to be used
PKC Parking	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Reducing Vehicles in Town Centres	

B.3 Encourage Low-Car Development

The quantity of car parking spaces required as part of new developments (both residential and non-residential) is a matter assessed by the Development Management team at Perth and Kinross. Over provision of car parking can result in a reduction in use of alternative and more sustainable travel methods by promoting car use, which further increases congestion and vehicle emissions.

Low-Car Development counters these problems by reducing the land used for roads and parking, encouraging less car use/ownership and a more active travel friendly road environment. To further encourage the move to more active and sustainable travel methods in Perth and Kinross, PKC will investigate the definition of an area/areas around Perth City where less car parking spaces are required per development.

Measure	Title
B.3	Encourage Low-Car Development
Definition	Key Intervention
Define central area within LDP where maximum parking standards are reduced for new developments (both residential and non-residential) to encourage the move to active and sustainable travel	Restrict continued provision of car parking in future developments to encourage alternative forms of transport
Responsible authority and other partners	Powers to be used
PKC Development Management	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Reducing Vehicles in Town Centres	

C. Traffic Measures

C.1 Continued Improvement of UTMC System

The Urban Traffic Management and Control system (UTMC) is continually updated to optimise traffic flow through the City Centre, reducing congestion and improving air quality. As part of this process, new technologies will be sought and trialled to further improve the traffic network in Perth.

Measure	Title	
C.1	Continued improvement of UTMC system	
Definition		Key Intervention
a. Assess and optimise traffic management in Perth centre on a regular basis		Reduce congestion and increase traffic flow within Perth City through optimisation of traffic management systems
b. Investigate usage of smart technologies alongside traffic management system to suppress congestion (e.g. AQ sensors, variable message signage etc)		
Responsible authority and other partners		Powers to be used
PKC Traffic and Network/Transport Planning		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Reduce Vehicles in Town Centres		

C.2 Anti-Idling Scheme

In 2023 PKC adopted powers to undertake enforcement through Traffic Regulation Orders to compel drivers to switch off idling engines. Fixed penalty notices can now be issued to drivers who refuse to co-operate.

Though the power to issue fixed penalty notices are now available to PKC, in the majority of cases officers would seek to follow a '4 E's' approach to enforcement: **Engage** with the public, **Explain** the risk to public health idling presents, **Encourage** compliance and reinforce the benefits of cleaner air as a result of less idling, and finally **Enforce** if the first 3 E's did not achieve compliance and the switching off of the idling engine.

Measure	Title	
C.2	Anti-idling Scheme	
Definition		Key Intervention
Enforcement of Anti Idling following the '4 E's' approach (Engage, Explain, Encourage and Enforce), issuing of fixed penalty notices for those who refuse to cooperate		Enforcement against idling vehicles can contribute to reducing emissions of air pollutants but also help to raise awareness of air quality issues.
Responsible authority and other partners		Powers to be used
PKC Parking/EH		The Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003
Related Climate Change Action Plan Focus Area		
Engagement and Education – General Engagement		

C.3 Traffic monitoring

Traffic monitoring works hand in hand with air quality monitoring to establish the current situation in Perth and allow the construction of air quality models, which are vital for the assessment of current and future air quality in Perth. Increasing PKC's traffic monitoring capabilities will give us access to more frequent data, allowing the assessment of current conditions and the effect of any short-term changes.

Measure	Title	
C.3	Traffic monitoring	
Definition		Key Intervention
a. Increase regular traffic monitoring within Perth Centre (e.g Traffic Counters, mode share cordon counts, 24hr count data etc)		Increase PKC traffic monitoring capabilities to allow for more data driven decision making and planning
b. Investigate use of ANPR cameras to give a regular view of public fleet composition		
Responsible authority and other partners		Powers to be used
PKC Transport Planning		Voluntary
Related Climate Change Action Plan Focus Area		
Governance – Objective and Target Setting		

D. Reduce Emissions from Sources

D.1 Encourage Local Fleet Operators to Pursue Cleaner Vehicles

PKC takes part in the ECO Stars Fleet Recognition Scheme and has been a member since April 2019. The scheme has since recruited 208 members from the Perth and Kinross area encompassing a fleet of over 7200 vehicles. The team at ECO Stars work with businesses to improve their fleet efficiency, helping to decrease fuel use and vehicle emissions. Local bus and coach operators in Perth do have a relatively modern fleet, but when upgrading can be encouraged to buy vehicles meeting the latest Euro engines standards. Operators can also be encouraged by ECO Stars to use bio-fuels, electric vehicles and/or retro fitting existing vehicles depending on the operator's situation.

Measure	Title	
D.1	Encourage local fleet operators to pursue cleaner vehicles	
Definition		Key Intervention
Continue to utilise ECO Stars scheme to promote the use of lower emission vehicles and best fuel saving practices within AQMA		Encourage a reduction in emissions of NO ₂ and PMs from companies operating vehicles in Perth.
Responsible authority and other partners		Powers to be used
PKC EH, TRL/ECO Stars		Voluntary and contractual
Related Climate Change Action Plan Focus Area		
Transport – Accelerate the EV Transition Business and Industry – Engagement and Empowerment, Strategic Collaboration, Measuring Performance		

D.2 Freight Improvements

PKC is a member of the Tayside and Central Scotland Transport Partnership (TACTRAN) Freight Quality Partnership which includes members from Scottish Enterprise and the private freight sector. PKC and Dundee's EH managers are members of the Freight Quality Partnership, within which air quality is integrated. The partnership acts as a liaison between freight interests and Councils drawing upon established guidance, to help deliver cost effective packages of freight related interventions across the region.

One such project being investigated by PKC Transport Planning and TACTRAN is the development of a freight consolidation centre as part of the future Perth West development, as a method of reducing the trips made in the "last mile" by HGVs entering Perth City. By changing these trips from HGVs to less polluting vehicles such as small vans, electric vehicles, cargo bikes etc., freight emissions within the city can be significantly reduced. Other methods such as dedicated freight rest areas and charging/fuelling services can be used to direct freight transport out with City Centre hotspots.

Measure	Title	
D.2	Freight movements	
Definition	Key Intervention	
a. Continue to work with TACTRAN in the Regional Freight Quality Partnership	Work with TACTRAN to minimise freight contribution to air pollution within Perth AQMA	
b. Investigate the development of a regional freight consolidation centre and other measures to		

reduce the volume of 'last mile' trips by HGVs into the city centre	
c. Investigate Freight Rest/Park Facilities in PKC - integrate with P and R, charging/hydrogen fuelling services	
Responsible authority and other partners	Powers to be used
PKC Transport Planning/ TACTRAN	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Reduce Vehicles in Town Centres	
Business and Industry – Engagement and Empowerment, Strategic Collaboration	

D.3 Public Transport Improvements

After active travel, the next most desirable form of transport is the use of public transport; in the case of Perth, this means bus travel. PKC's Public Transport Unit (PTU) will continue to work with providers to improve and optimise their services, as well as encourage the upgrading of their vehicles where possible to the most efficient options. In addition, air quality modelling data will be shared with bus providers to inform them of areas where buses are responsible for a significant portion of air pollutants and advise on how this could be minimised, for example prioritising the upgrade of vehicles on most polluted routes.

Measure	Title	
D.3	Public transport improvements	
Definition		Key Intervention
a. Develop a BSIP (Bus Service Improvement Partnership) for Perth and Kinross and Tayside	Look at opportunities to improve public transport options and quality, while also working with providers to consider air quality as part of their operations	
b. Encourage fleet operators to report fleet composition and improvements		
c. Ensure emissions are formally included in procurement decisions for public transport		
d. Advise bus providers of air pollution hotspots where buses are a large proportion of contributors		
Responsible authority and other partners		Powers to be used
PKC Public Transport Unit/EH		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Improve Public Transport Provision		
Business and Industry – Data and Strategic Targeting, Engagement and Empowerment, Strategic Collaboration, Measuring Performance		
Governance – Sustainable Procurement		

D.4 Continue to Evaluate the Need for a LEZ in the AQMA

A National Low Emissions Framework (NLEF) Screening Appraisal was carried out by PKC in 2020 to assess whether a Low Emission Zone was required to improve air quality within the Perth AQMA. This assessment found that current AQAP measures were sufficient and an LEZ would not be required.

However, in light of the changes to travel habits and traffic flows following the Covid-19 pandemic, PKC is aware the situation within Perth may change in the future and will therefore continually review

whether a Low Emission Zone or similar vehicle control area should be considered on an annual basis as part of the Annual Progress Report.

Measure	Title
D.4	Continue to evaluate the need for a LEZ in the AQMA
Definition	Key Intervention
Review air quality situation within Perth AQMA on an annual basis to determine whether the existing NLEF assessment is no longer valid	Review changes in AQ within Perth AQMA regularly to assess need for LEZ or alternative vehicle control area
Responsible authority and other partners	Powers to be used
PKC EH	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Reducing Vehicles in Town Centres	

D.5 PKC Fleet Improvement

For several years PKC has been regularly replacing older Fleet vehicles with Euro 6 or Electric vehicles due to air quality being formally considered in tendering process. In addition to this ongoing improvement to the Council's fleet vehicles, we must work to meet the stringent Climate Change targets from the Scottish and UK Governments specifically focused on the public sector. These include the requirement for petrol and diesel cars to be phased out of Perth and Kinross Council's car and light vehicle fleet by 2025 and no new heavy vehicles from 2030. In order to achieve this, significant EV charging infrastructure will be required at all Council buildings including depots, schools and offices.

Measure	Title
D.5	PKC Fleet improvement
Definition	Key Intervention
a. AQ continue to be considered in the purchasing of new fleet vehicles	Continued improvement of PKC's vehicle fleet to benefit AQ and installation of EV charging infrastructure to help meet 2025 target
b. Increase PKC Fleet EV chargers to support change to EV by 2025 deadline	
Responsible authority and other partners	Powers to be used
PKC Fleet/Transport Planning	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Accelerate the EV Transition Governance – Sustainable Procurement	

D.6 PKC Fleet Management

PKC Fleet will continue to improve the Council's vehicle fuel consumption efficiency in order to reduce our contribution to air pollution in Perth. Currently all vehicles are equipped with telematic systems to obtain data on driver routes and fuel consumption. Provision of staff "eco driving" training will be progressed to further reduce fuel consumption from our fleet. An investigation of fleet activities (e.g. waste collection) in relation to pollution hotspots will also be carried out, with the goal of avoiding unnecessary emission contributions caused by congestion at peak times. This investigation could include assessment of frequent fleet journeys to determine if more efficient routes are available to minimise distance travelled.

Measure	Title	
D.6	PKC Fleet management	
Definition		Key Intervention
a. Provision of PKC staff driver training to reduce fuel consumption/vehicle emissions		Minimise PKC contribution to air pollution in Perth and Kinross
b. Investigate fleet activities in relation to pollution hotspots. Assess frequent fleet routes to minimise distance travelled where possible		
Responsible authority and other partners		Powers to be used
PKC Fleet/Waste		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Reduce Vehicles in Town Centres Governance – Business and Performance Management		

D.7 EV Charging Infrastructure

Electric Vehicle infrastructure is being continually expanded by PKC, with 80 EV charging points currently available within the Perth and Kinross area. Modelling has shown that this area has the potential to make the biggest impact on transport emissions in the future, and as such will result in a significant improvement in air quality within Perth City, in particular with regards to NO₂ emissions.

In order to support the transition from fossil fuels to electric, significant investment in electric charging infrastructure will be necessary catering to all users from visiting tourists and shoppers to local residents. This will require both rapid chargers within public car parks and overnight 7kW chargers within local communities where personal home chargers are not possible (e.g. flats, council houses).

Measure	Title	
D.7	EV charging infrastructure	
Definition		Key Intervention
Support rollout of EV chargers throughout Perth and Kinross		Encourage move to electric vehicles by increasing provision of public chargers
Responsible authority and other partners		Powers to be used
PKC Transport Planning, TACTRAN		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Accelerate the EV Transition		

D8. School Travel Plans

All schools in Perth and Kinross have a School Travel Plan which is aimed at reducing the incidence of car usage, especially around the school gates. These are aimed at both pupils and staff. Exclusion zones around several schools within Perth and Kinross have recently been put in place, further restricting car usage within the vicinity of the school entrances during pick up and drop off times. All school travel plans should be revisited in light of these changes to ensure they are up to date and that measures are in place to reduce car usage and increase active travel on the school run.

Measure	Title	
D.8	School travel plans	
Definition		Key Intervention
Review and update existing plans for schools within AQMA and integrate with exclusion zones where applicable		Reduce car usage and vehicle emissions around schools and encourage the use of active travel alternatives
Responsible authority and other partners		Powers to be used
PKC Traffic and Network		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Increase Active Transport Across Perth and Kinross, Improve Public Transport Provision, Reduce Vehicles in Town Centres		

E. Reduce Demand for Traffic

E.1 Promotion and Development of Car Clubs

PKC will investigate the development of community car clubs as a route to reducing vehicles in town centres with a focus on Perth City as well as promote existing and future alternatives to personal car use across Tayside. This should lead to both a reduction in congestion due to less vehicles on the road, as well as reduce transport emissions and greenhouse gas emissions.

Measure	Title	
E.1	Promotion and Development of Car Clubs	
Definition		Key Intervention
Promotion and development of car clubs in Perth and Kinross and wider Tayside to encourage a shift to more sustainable forms of travel		To encourage a shift to more sustainable forms of travel or reducing the need for personal vehicles.
Responsible authority and other partners		Powers to be used
PKC		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Reduce Vehicles in Town Centres		

E.2 Park and Rides

PKC will continue to work with TACTRAN to maintain the success of the Park and Ride schemes at Broxden and Scone which help reduce the amount of traffic entering Perth City Centre. PKC is committed to continued improvements to these facilities to make them safer or more comfortable. In addition, provision of electric charging and alternative fuel infrastructure (e.g. Hydrogen) for both car users and bus providers at Park and Ride locations will be investigated. The bus company Ember which runs a service from Edinburgh to Dundee using electric buses has expressed particular interest in using Broxden Park and Ride as a recharging stop, and we would look to encourage this.

PKC continue to collect activity data at these sites to establish their success and trends in their usage. Moving forward, alternative methods of data collection will be considered such as ANPR cameras for more accurate usage data.

PKC will also continue to investigate provision of additional Park and Ride/Park and Choose facilities with TACTRAN. This includes the future Park and Choose site included within the Cross Tay Link Road development and a site is already earmarked for future investigation (Walnut Grove) that could catch traffic coming from the Dundee side of Perth.

Measure	Title	
E.2	Park and Rides	
Definition		Key Intervention
a. Continue to provide improvements to existing Park and Ride sites (updating bus shelters, passenger information boards etc.) b. Investigate provision of additional Park and Ride/ Park and Choose sites c. Investigate provision of EV and alternative fuel infrastructure for bus charging/refuelling at Park and Ride sites d. Investigate use of cameras to assess Park and Ride usage		To improve public transport provision and accessibility to help reduce road traffic
Responsible authority and other partners		Powers to be used
PKC PTU/Transport Planning/EH, TACTRAN		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Improve Public Transport Provision, Reduce Vehicles in Town Centres, Accelerate the EV Transition		

F. Education and Community Measures

F.1 Promotion of Active Travel

Encouraging the move to active travel will be a key focus within PKC's new Mobility strategy, alongside our existing 'On the Go' social marketing campaigns which are funded through Smarter Choices Smarter Places. To further encourage members of the community to adopt active and sustainable travel alternatives, walking and cycling infrastructure within Perth will continue to be improved. It is also recommended that as part of the AQAP, the Travel Guide is updated and reissued as required.

The Sustrans Perth, People, Place project will invest in sustainable transport corridors across Perth to better connect places and people, with a particular focus on the Dunkeld Road Corridor. As a key link road to the pollution hot spot of Atholl Street, improving active travel on Dunkeld Road is essential to improving air quality in central Perth.

Furthermore, a Perth Active Travel Hub is due to be created in the city integrating with and supporting the Perth, People, Place project. The development in Perth City Centre will provide an active travel hub and will support bike hire facilities and improvements to cycle and walking routes across Perth and the creation of a car club.

Funding streams such as Transport Scotland's eBike Grant Fund are available to help local authorities procure ebikes, etrikes, ecargo bikes etc. to further encourage the move to active travel. An advantage to ebikes over traditional bikes is their appeal to those with mobility issues, due to electric motor taking some of the load for example when going up hills. PKC will investigate the provision of eBikes for Perth, tying in with the above-mentioned active travel projects.

Measure	Title	
F.1	Promotion of active travel	
Definition		Key Intervention
a. Continue to develop/ promote active/sustainable travel through social marketing campaigns, improve active travel infrastructure and continue to investigate funding sources		To encourage a shift away from the use of private motor vehicles for travelling to more sustainable forms of transport or reducing the need for travel.
b. Work with TACTRAN to deliver Walking and Cycling Strategy in the region.		
c. Work with Sustrans and Transport Planning to deliver Perth Active Travel Hub and Perth People Place project		
d. Investigate provision of eBikes for Perth		
Responsible authority and other partners		Powers to be used
PKC Transport Planning, TACTRAN		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Increase Active Transport Across Perth and Kinross Engagement and Education – General Engagement		

F.2 Provision of Travel Information

PKC provides a comprehensive guide to public transport options on our website. This includes an archive of all local bus timetables, information on concession options for bus and rail travel as well as links to Traveline Scotland's Journey Planner to enable public to make informed choices when planning a journey.

To further improve travel information, our Public Transport Unit has been committed to gradually rolling out real time passenger information (RTPI) at key bus stops throughout Perth and Kinross, as experience has shown that provision of RTPI boards in bus stops can increase patronage. As well as the capability to show real time bus information, these boards can also be used to display other important information such as weather warnings, advertisement of active travel events and schemes (e.g. Clean Air Day).

TACTRAN are working to pilot a Mobility as a Service (MaaS) project within the TACTRAN area, which would aim to address the travel issues of those who do not own a car by enabling/assisting people to make multi modal journeys. This region wide MaaS platform would aim to bring together real-time journey planning, booking and the payment systems of public, active and shared mode transport operators. Currently the project is being led by Perth Royal Infirmary, Loch Lomond and Trossachs National Park and Dundee and Angus College, however PKC will investigate whether the Council could integrate with this.

Measure	Title	
F.2	Provision of travel information	
Definition		Key Intervention
a. Maintain current Public Transport Guides and section on PKC website		Provide easy access to all forms of travel information to encourage sustainable transport methods
b. Increased provision of RTPI boards at bus stops throughout Perth		
c. Continue to promote and investigate use of TACTRAN ENABLE MaaS project to help people make multi modal trips		
Responsible authority and other partners		Powers to be used
PKC, TACTRAN		Voluntary
Related Climate Change Action Plan Focus Area		
Transport - Increase Active Transport Across Perth and Kinross Engagement and Education – General Engagement		

F.3 Awareness Raising and Education

PKC have a 'Schools on the Go' package of workshops for both primary and secondary pupils, which is regarded as an example of best practice by Transport Scotland. These workshops encourage pupils to consider why active and sustainable travel is beneficial to the environment and health. The workshops will equip the community with the skills and knowledge to make informed choices that will influence future travel choices.

Events such as Clean Air Day also give a good opportunity to raise awareness on air quality for both school pupils and members of the wider public, and PKC will seek to continue to carry out these projects and expand public engagement opportunities wherever possible.

Measure	Title
F.3	Awareness raising and education
Definition	Key Intervention
a. Continue to encourage and promote and increase awareness of active and sustainable transport options through working with partner organisations b. Educate public on AQ through social media projects, presentations at local schools/community meetings etc.	Continue to encourage and promote and increase awareness of active and sustainable transport options through working with partner organisations and the community.
Responsible authority and other partners	Powers to be used
PKC EH	Voluntary
Related Climate Change Action Plan Focus Area	
Engagement and Education – General Engagement, Schools and Young People	

F.4 Encourage Move to Electric Vehicles

Although the electric vehicle (EV) industry has made significant technological advances in recent years, with most manufacturers producing a variety of EVs and battery technology increasing distance between charges, much work is still to be done to encourage both the public and businesses to change to electric vehicles.

In addition to making sure there is a good provision of electric charging points across Perth and Kinross to give confidence to new users, PKC can further encourage the move to EV through our social media channels in advance of the 2030 end of diesel/petrol vehicle production. Advantages of EVs such as long term savings on fuel, environmental benefits and ease of use can be advertised, as well as signposting government schemes to help with the purchase of EVs and installation of home chargers.

This can be further expanded to businesses and organisations with vehicle fleets in Perth and Kinross. ECO Stars will continue to work with PKC alongside our Licensing team to advocate electric vehicles for businesses, taxi companies and other licensed transport providers, as well as gather feedback from our scheme members on what PKC can do to help them change to electric.

Measure	Title
F.4	Encourage move to EV
Definition	Key Intervention
Encourage the move to EVs through social media and working with taxi, bus and other private companies	Reduce overall vehicle emissions in Perth and Kinross by encouraging public move to electric vehicles
Responsible authority and other partners	Powers to be used
PKC Licencing, ECO Stars/TRL	Voluntary
Related Climate Change Action Plan Focus Area	
Transport – Accelerate the EV Transition Governance – Sustainable Procurement	

F.5 Improve Council's Provision of Air Quality Information

Though the Council can achieve much to improve air quality through the measures proposed within this Action Plan, ensuring the community is well informed of the issues and ways they can help reduce air pollution and travel more sustainably is also vital for success.

Environmental Health currently has an air quality page on the PKC website which contains links to our Air Quality Action plans and Annual Progress Reports. This webpage will be improved further to give the public access to more information on monitoring, recent progress towards AQAP measures and national strategies like CAFS 2. Upcoming and ongoing consultation exercises will also be advertised on this website.

The network of real time passenger information boards at bus stops across Perth and Kinross can be further utilized to advertise air quality, climate change and/or active travel events such as Clean Air Day, issue reminders of anti-idling enforcement and give information on upcoming consultations such as AQAP reviews.

Measure	Title	
F.5	Improve councils' provision of AQ information	
Definition		Key Intervention
Provide public with better AQ information		Inform public of air quality issues, projects and other information to improve uptake of air pollution reducing activities
Responsible authority and other partners		Powers to be used
PKC EH		Voluntary
Related Climate Change Action Plan Focus Area		
Engagement and Education – General Engagement		

G.Improve Local Air Quality Monitoring

G.1 Increase Air Quality Monitoring Network

PKC will continue to monitor air quality within Perth and ensure that monitoring is in line with LAQM statutory duties, thus guaranteeing monitoring data is robust for annual reports and the decisions on air quality measures are well informed. Investigation of new technologies such as small sensors will be carried out in order to increase monitoring data throughout Perth, with particular focus on PM monitoring.

Measure	Title	
G.1	Increase AQ monitoring network	
Definition		Key Intervention
Investigate increased PM monitoring and the use of small sensors for further data in Perth and Kinross in line with greater PM importance in CAFS2 and Environment Bill 2021		Continue to access and review monitoring to collate accurate data to ensure more accurate and informed decisions on air quality measures, modelling and reporting.
Responsible authority and other partners		Powers to be used
PKC EH		Voluntary
Related Climate Change Action Plan Focus Area		
Governance – Objective and Target Setting		

G.2 Increased Air Quality Modelling

PKC has commissioned a regional air quality model for Perth and Kinross which encompasses Perth. The model will allow more continuity with regards to planning applications that require an Air Quality Assessment. The model can also be used to predict any future exceedances of the Air Quality Objectives within the Perth area resulting from future developments. In conjunction with increased traffic monitoring, the air quality model can be continually updated to show the current situation within Perth, helping focus improvement measures.

Measure	Title	
G.2	Increased AQ modelling	
Definition		Key Intervention
Carry out more regular traffic modelling and AQ modelling		Maintain up-to-date air quality model for use within planning and transport decision
Responsible authority and other partners		Powers to be used
PKC EH, External Consultants		Voluntary
Related Climate Change Action Plan Focus Area		
Governance – Objective and Target Setting		

G.3 Scenario Modelling

In order to ensure future changes to Perth's road network do not negatively affect air quality, traffic modelling can be used to predict changes to traffic flows and estimate the change in vehicle emissions. The Perth regional air quality model can then be used to predict air quality concentrations resulting from these road network changes.

This will allow for several different road change scenarios to be explored before any physical road works even begin, enabling any alternative and more efficient changes to be discovered while also ensuring any future air pollution hotspots are designed out early on before they occur. Alternative configurations to existing junctions in hotspot areas (e.g. Atholl Street, Bridgend) can also potentially be optimised through the use of traffic modelling, reducing congestion and improving air quality as a result.

Our Traffic and Network and Transport Planning colleagues will therefore work alongside consultants to carry out modelling works to improve air quality in Perth where possible through road layout and traffic management changes.

Measure	Title	
G.3	Scenario modelling	
Definition		Key Intervention
Carry out both traffic modelling and AQ Modelling of future changes to road network, both planned (Phase 4, Dunkeld Road Corridor) and experimental to assess how changes will affect air quality		Ensure future road changes consider air quality impacts via modelling data, to prevent an increase in emissions
Responsible authority and other partners		Powers to be used
PKC EH/Transport Planning, External Consultants		Voluntary
Related Climate Change Action Plan Focus Area		
Transport – Reduce Vehicles in Town Centres		

4 Assessment of Improvement Measures

This section outlines the work undertaken by the steering group to consider action plan improvement measures as outlined in LAQM Policy Guidance for Scotland 2023 (LAQM. PG (S) (23)).

From the initial full list of options, measures were selected based on their feasibility and effectiveness to take forward into a draft Air Quality Action Plan. This draft will be then taken to public consultation, from which responses will be used to help finalise the options included in the final AQAP.

4.1 Range of Possible Measures

The Policy Guidance LAQM.PG (S) (23) states that AQAPs must focus on 'effective, feasible, proportionate and quantifiable measures' and provide 'evidence that all available options have been considered on the grounds of cost effectiveness and feasibility'.

A range of potential options are available to PKC and other stakeholders to improve local air quality within the Perth AQMA, and the surrounding area.

Therefore, it was important at the early stages of the action planning process to consider all potential options. The identification of potential measures for the consideration of the steering group was undertaken through a review of existing local and regional plans, consideration of measures referenced in LAQM.PG (S) (23) as well as recommendations of members of the steering group.

Whilst PKC may not have the necessary powers to implement all such options, they may engage with other organisations and agencies that have the capacity to take such options forward.

A list of seven 'Option Categories' was presented to the steering group; the group was invited to provide an initial assessment of their feasibility and applicability. Each option category includes several specific options.

4.2 Responses to the Measures

From the draft list of options considered by the steering group, a decision will be made on which options to take forward as measures in the final action plan and those options to be discounted from further action. This decision will be a result of:

- Comments received from the steering group members
- The conclusions from the source apportionment exercise and LAQM assessments presented in [Appendix D](#) and [Appendix E](#).
- Additional comments from Perth and Kinross Council's consultant based on experience in prior assessments.
- Feasibility and acceptability of measures
- Public Consultation on the draft Perth AQAP measures

The measures currently discounted from further development are presented below:

Table 4.1: AQAP Improvement Measures Eliminated from Further Consideration

Options eliminated from further consideration in the Perth AQAP	Reason for Elimination
Tighter restrictions on efficiency of School taxis, minibuses etc. (Euro 6, Hybrid or EV)	High cost implications for both Council and local transport providers due to the large investment required to upgrade existing vehicles. This would likely lead to higher fares for the public.

The options listed above have been excluded from further consideration at this time, after consultation with the steering group as, they were either not considered feasible, or were not believed to have an appropriately targeted impact on the predominant sources of emissions identified in the further assessment. Notwithstanding, should future consultation result in justifiable reasons to revisit any of these options then, the benefits may be reconsidered. More information on the evaluation process regarding the action plan measures can be found in [Appendix F](#).

Table 4.2: Action Plan Measures (to be read in conjunction with Section 5)

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
		Zero 0% Small 1% Medium 2-5% Large > 5%	Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Low ≤ 4 Med 5-9 High ≥10						
A.1 Improve Links with Regional Transport Strategy	<p>Ensure that AQ and Climate change are considered in Transport Planning for Perth at a regional strategy level. Such considerations would include:</p> <p>a. Promoting measures to reduce traffic within Perth City (reducing trips/promoting alternatives)</p> <p>b. Promoting measures to promote ULEV in and around Perth</p>				TACTRAN Transport Planning EH	Yes	N	Long*	Transport	*RTS will cover 2024-2034.

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
A.2 Ensure Mobility Strategy created in line with CAFS2	Ensure that air quality and CAFS2 objectives are integrated into the delivery of the future Perth and Kinross Mobility Strategy.				Transport and Development	Y	Y	Long	Transport	The Mobility Strategy is in draft and will be finalised in 2024.
A.3 Ensure Integration of Air Quality with Other Council Strategies and Policies	a. Joint-working between Council Services to consider air quality implications of existing/ future Council strategies/ policies, b. Ensure air quality impacts and mitigation measures are considered at the design stage for all proposed developments across the Local				PKC	Y	Y	Medium/Long	Governance	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	Development Plan area c. Ensure air quality is formally considered in future tender processes, particularly for new PKC vehicles and public transport decisions (i.e. for school subsidised public services, school buses and taxis)									
A.4 Planning and AQ	a. Continue to consider air quality in planning decisions b. Review/Increase enforcement and monitoring of new development green travel plans.				Planning EH	Y	N	Medium/ Long	Transport Business and Industry	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	c. Improve use of existing AQ Supplementary Guidance d. Ensure provision of EV chargers and active travel infrastructure in developments wherever feasible (e.g. safe cycle storage)									
B.1 Cross Tay Link Road	Provide new crossing connecting A9 to A94, leading to potential AQ benefits for Perth City Centre	Large (5)	Very High (1)	Medium (5)	Traffic and Network Transport Planning Transport Scotland	Y	Y	Short	Transport	Under construction, to be operational from 2025

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
			Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k							
B.2 Incentivise parking out with City Centre hotspots	Investigate options to encourage parking outside Perth City Centre such as improving walking and cycling routes from outer car parks like South Inch, reviewing parking charges within Perth etc.	Small (1)	Medium (3)	Low (3)	Parking	Y	Y	Medium/Long	Transport	
B.3 Encourage Low-Car Development	Define central area within LDP where maximum parking standards are reduced for new developments (both residential and non-residential) to encourage the move to active and sustainable travel	Medium (2)	Low (4)	Medium (8)	Planning	Y	Y	Long	Transport	Would improve health and wellbeing. May be challenging where infrastructure for active travel is not in place

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
C.1 Continued improvement of UTM system	a. Assess and optimise traffic management in Perth centre on a regular basis b. Investigate usage of smart technologies alongside traffic management system to suppress congestion (e.g. AQ sensors, smart signage etc)	Medium (2) Medium (2)	Cost neutral (5) Medium (3)	High (10) Medium (6)	Traffic and Network Transport Planning	Y Y	Y	Short	Transport	
C.2 Anti-Idling Enforcement	Enforcement of Anti Idling following the '4 E's' approach (Engage, Explain, Encourage and Enforce), issuing of fixed penalty notices	Small (1)	Low (4)	Low (4)	Parking EH	Y	Y	Short	Education and Engagement	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	for those who refuse to cooperate									
C.3 Traffic Monitoring	a. Increase regular traffic monitoring within Perth Centre (e.g Traffic Counters, mode share cordon counts, 24hr count data etc) b. Investigate use of ANPR cameras to give a regular view of public fleet composition	Zero(0)	Medium (3)	Low (0)	Transport Planning	Y	N	Medium/Long	Governance	While this would not result in a direct air quality benefit it would be vital for continued management of the AQAP
D.1 Encourage local fleet operators to pursue	Continue to utilise ECO Stars scheme to promote the use of lower emission	Small (1)	Low (4)	Low (4)	EH ECO Stars	Y	Y	Medium	Transport Business and Industry	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
cleaner vehicles	vehicles and best fuel saving practices within AQMA									
D.2 Freight Improvements	<p>a. Continue to work with TACTRAN in the Regional Freight Quality Partnership</p> <p>b. Investigate the development of a regional freight consolidation centre and other measures to reduce the volume of 'last mile' trips into the city centre</p> <p>c. Investigate Freight Rest/Park Facilities in PKC - integrate with Park and Ride, charging/ hydrogen fuelling services</p>	<p>Zero (0)</p> <p>Zero (0)</p> <p>Zero (0)</p>	<p>Cost Neutral (5)</p> <p>Low (4)</p> <p>Low (4)</p>	<p>Low (0)</p> <p>Low (0)</p> <p>Low (0)</p>	<p>TACTRAN</p> <p>Transport Planning</p>	<p>Y</p>	<p>Y</p>	<p>Medium/Long</p>	<p>Transport Business and Industry</p>	<p>While the majority of these measures are investigative and have no direct air quality impact, should they be implemented following successful investigation there will be a much higher potential to improve air quality</p>

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
			Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k							
D.3 Public transport improvements	<p>a. Develop a BSIP (Bus Service Improvement Partnership) for Perth and Kinross and Tayside</p> <p>b. Encourage fleet operators to report fleet composition and improvements</p> <p>c. Ensure emissions are formally included in procurement decisions for public transport</p> <p>d. Advise bus providers of air pollution hotspots where buses are a large proportion of contributors</p>	Small (1)	Medium (3)	Low (3)	PTU EH	Y	Y	Short/ Medium	Transport Business and Industry Governance	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
D.4 Continue to evaluate the need for an LEZ in the AQMA	Review air quality situation within Perth AQMA on an annual basis to determine whether the existing NLEF assessment remains valid	Zero (0)	Low (4)	Low (0)	EH	Y	Y	Long	Transport	
D.5 PKC Fleet Improvement	a. AQ continue to be considered in the purchasing of new fleet vehicles. b. Increase PKC Fleet EV chargers to support change to EV by 2025 deadline	Medium (2)	Medium (3)	Medium (6)	Fleet Transportation and Development	Y	Y	Medium/ Long	Transport Governance	
D.6 PKC Fleet Management	a. Provision of PKC staff driver training to reduce fuel consumption/vehicle emissions	Small (1)	Low (4)	Low (4)	Fleet	Y	Y	Short/ Medium	Transport Governance	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	b. Investigate fleet activities in relation to pollution hotspots. Assess frequent fleet routes to minimise distance travelled where possible									
D.7 EV Charging Infrastructure	Support rollout of EV chargers throughout Perth AQMA	Small (1)	High (2)	Low (2)	Transportation and Development	Y	N	Long	Transport	Dependent on securing additional funding
D.8 School Travel Plans	Review and update existing plans for schools within AQMA and integrate with exclusion zones where applicable	Small (1)	Low (4)	Low (4)	EH PTU Traffic and Network	Y	Y	Short	Transport	Improvement of air quality around schools for health benefit of children with developing lungs.

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
										Improving road safety close to schools could have unintended consequences to locations out with the exclusion zones
E.1 Promotion and Development of car clubs	Promotion and development of car clubs in Perth and Kinross and wider Tayside to encourage a shift to more sustainable forms of travel	Small (1)	Low (4)	Low (4)	PKC	Y	Y	Medium	Transport	

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
			Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k							
E.2 Park and Rides	<p>a. Continue to provide improvements to existing Park and Ride sites (updating bus shelters, passenger information boards etc.)</p> <p>b. Investigate provision of additional Park and Ride/ Park and Choose sites</p> <p>c. Investigate provision of EV and alternative fuel infrastructure for bus charging/refuelling at Park and Ride sites</p> <p>d. Investigate use of cameras to assess Park and Ride usage</p>	Zero (0)	Medium (3)	Low (0)	PTU Transportation and Development EH	Y	N (Y if implemented post investigation)	Medium	Transport	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
F.1 Promotion of active travel	<p>a. Continue to develop/ promote active/sustainable travel through social marketing campaigns, improve active travel infrastructure and continue to investigate funding sources</p> <p>b. Work with TACTRAN to deliver Walking and Cycling Strategy in the region.</p> <p>c. Work with Sustrans and Transport Planning to deliver Perth Active Travel Hub</p>	Medium (2)	Medium (3)	Medium (6)	PKC TACTRAN	Y	Y	Medium	Transport Education and Engagement	

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
			Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k							
F.2 Provision of travel information	<p>a. Maintain current Public Transport Guides and section on PKC website</p> <p>b. Increased provision of RTPi boards at bus stops throughout Perth</p> <p>c. Continue to promote and investigate use of TACTRAN ENABLE MaaS project to help people make multi modal trips</p>	Small (1)	Low (4)	Low (4)	PKC TACTRAN PTU	Y	Y	Short/ Medium	Transport Education and Engagement	
F.3 Awareness raising and education	a. Continue to encourage and promote and increase awareness of active and sustainable transport options through working with partner organisations	Small (1)	Low (4)	Low (4)	PKC EH	Y	Y	Short/ Medium	Education and Engagement	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	b. Educate public on AQ through social media projects, presentations at local schools/community meetings etc.									
F.4 Encourage move to EV	Encourage the move to EVs through social media and working with taxi, bus and other private companies	Small (1)	Low (4)	Low (4)	Transportation and Development EH	Y	Y	Short/ Medium	Transport Governance	
F.5 Improve Council's provision of AQ information	Provide public with better AQ information.	Small (1)	Cost Neutral (5)	Medium (5)	EH	Y	N	Short	Education and Engagement	
G.1 Increase AQ monitoring network	a. Investigate increased PM monitoring and the use of small sensors	Zero (0)	Low (4)	Low (0)	EH	Y	N	Medium	Governance	

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
	for further data in Perth and Kinross in line with greater PM importance in CAFS2 and Environment Bill 2021 b. Utilise small sensors to improve AQ data collection in Perth and Kinross									
G.2 Increased AQ Modelling	Carry out more regular traffic modelling and AQ modelling	Zero (0)	Medium (3)	Low (0)	EH AQ consultant/ Systra	Y	N	Medium	Governance	While the measure would not result in a direct AQ improvement, this work is necessary to establish where improvement

Proposed Measure	Description	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs per annum Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
										measures are most required
G.3 Scenario Modelling	Carry out AQ Modelling of future changes to road network, both planned (Phase 4, DCRD) and experimental to assess how changes will affect air quality	Zero (0)	Medium (3)	Low (0)	EH AQ consultant/ Systra Transport Planning	Y	Y	Medium	Transport	While the measure would not result in a direct air quality benefit, it would support the design of any future scenarios and identify any possible unintended consequences which would be more cost effective than

Proposed Measure	Description	Potential Air Quality Impact	Estimated Costs per annum	Cost Effectiveness	Lead Authority	Feasibility/ Acceptability	Potential Social Impacts / Potential Economic Impacts	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs	Relevant PKC Climate Change Action Plan Focus Area	Comments
			Cost Neutral Low <£20k Medium £20k<£60k High £60k<£200k Very High >£200k							
										mitigation measures.

5 AQ Legislation, Strategies and Plans

Alongside the national legislation and guidance all local authorities must work to, there are several related plans and strategies at the local, regional and national level that are directly aligned with the aims of the AQAP and will help to contribute to overall improvements in air quality across the PKC area. This chapter sets out the main links between these strategies and the AQAP. Some policies are new policies introduced since the existing AQAP was published in 2009.

5.1 Legislation and Guidance

Environment Act 1995

Part IV of the Environment Act 1995¹⁵ places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy with the aim of reducing atmospheric emissions and improving air quality. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland provides the framework for ensuring the air quality limit values are complied with based on a combination of international, national and local measures to reduce emissions and improve air quality. This includes the statutory duty, also under Part IV of the Environment Act 1995, where local authorities must assess air quality in their areas on an annual basis. This review and assessment process is known as Local Air Quality Management (LAQM).

The focus on local air quality is reflected in the air quality objectives (AQOs) set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland¹⁶ and The Air Quality Standards (Scotland) Regulations 2010¹⁷. The strategy presents measures to control and improve the quality of air in the UK and reflects the increasing understanding of the potential health risks associated with poor air quality and the benefits that can be gained from its improvements.

Local Authorities are required to declare an Air Quality Management Area (AQMA) where it is likely that these objectives will not be achieved and to prepare an Action Plan to set out proposed measures to be taken to achieve the air quality objectives.

Environment Act 2021

The Environment Act 2021 acts as the UK's new framework for environmental protection since the UK has left the EU. Schedule 11 outlines the local air quality framework and the duty on local authorities to report on air quality.

The Air Quality Strategy (AQS) for England, Scotland, Wales and N. Ireland

DEFRA and the Devolved Administrations published the Air Quality Strategy¹⁸ in 2011 which introduced new objectives and policy measures, including:

- early uptake of new tighter European vehicle emission standards (Euro standards);
- incentives for cleaner vehicles;
- the following measures that are considered to require additional development work:

¹⁵ Environment Act 1995. Available at: <https://www.gov.scot/publications/national-planning-framework-3/>

¹⁶ The air quality strategy for England, Scotland, Wales and Northern Ireland. March 2011. Available at: <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1>

¹⁷ The Air Quality Standards Regulations 2010. Available at: <http://www.legislation.gov.uk/ukxi/2010/1001/contents/made>

¹⁸ The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1 - GOV.UK (www.gov.uk)

- reducing emissions from small combustion plants;
- retrofitting of particulate filters to HGVs;
- low emission zones;
- a national road pricing scheme.

The Scottish Government have set more stringent national objectives for PM₁₀ in Scotland and have introduced the requirement for local authorities to monitor PM_{2.5} with an annual mean objective level of 10µg/m³ to be achieved by 2020. The relevant Scottish air quality objectives for the key pollutants are presented in **Table 5.1**.

Table 5.1: Scottish Air Quality Objectives

Pollutant	Air Quality Objectives (µg/m ³)	Measured as	Date to be achieved by
Nitrogen Dioxide	40	Annual Mean	31.12.2005
	200	One hour mean, not to be exceeded more than 18 times per year (equivalent to the 99.79th percentile of hourly means)	31.12.2005
Particulate Matter (PM₁₀)	18	Annual Mean	31.12.2010
	50	24 hour mean, not to be exceeded more than 7 times a year (equivalent to the 98.08th percentile of 24-hour means)	
Particulate Matter (PM_{2.5})	10	Annual Mean	31.12.2020

Clean Air Strategy 2019

The Clean Air Strategy¹⁹ published in 2019 is a document which outlines actions set by the Government to tackle air pollution. The strategy applies across the UK, highlighting actions to be taken across Scotland, England, Wales and Northern Ireland. The strategy is a result of an extensive consultation process which has collated feedback on the actions the Government is proposing to help tackle air pollution. The actions in the Strategy are currently still in line with EU requirements to reduce air pollution and provides detailed information on proposals and actions which are required from all parts of government and society. Its aim is to provide guidance on how the Government and Devolved Administrations intend to reduce their emissions.

LAQM Technical Guidance TG.22

Local Air Quality Management Technical Guidance 22²⁰ (LAQM TG.22) is designed to support local authorities in carrying out their duties under the Environment Act 1995 and subsequent regulations. LAQM is the statutory process by which local authorities monitor, assess and take action to improve local air quality. Where a local authority identifies areas of non-compliance of the air quality objectives there is a statutory need to declare the area of non-compliance as an Air Quality Management Area

¹⁹ Department for Environment Food and Rural Affairs: Clean Air Strategy 2019. Available at: <https://www.gov.uk/government/publications/clean-air-strategy-2019>

²⁰ Part IV of the Environment Act 1995: Local Air Quality Management Technical Guidance (TG22), August 22. Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

(AQMA) and to draw up an action plan (AQAP) detailing measures proposed to address the exceedances.

LAQM Policy Guidance PG(S).23

This policy guidance²¹ provides guidance to help local authorities with their local air quality management duties in line with the Environment Act 1995. The guidance outlines the background and legislative framework to which the local authorities must work to; the principles behind reviews and assessments of air quality and the recommended steps; how local authorities should handle the designation of AQMAs; the development of local air quality strategies and the general principles behind air quality and land use planning.

Cleaner Air for Scotland (CAFS2)

Cleaner Air for Scotland²² is a cross-government strategy which details how the Scottish Government, and any partner organisations propose to reduce air pollution and fulfil Scotland's legal requirements. It provides a national framework which allows the public to better understand how the Scottish Government and associated organisations will achieve these goals. The strategy outlines a range of policies and initiatives which include a National Modelling Framework; a National Low Emission Framework; the adoption of World Health Organisation guideline values for particulate matter in Scottish Legislation and proposals for raising more awareness on national air quality.

Cleaner Air for Scotland 2 is a strategy which builds on the progress made since the introduction of Cleaner Air for Scotland: The Road to a Healthier Future (CAFS). Measures in the new strategy will deliver environmental and social benefits and focus on 10 general themes. The sub measures outlined below each theme are relevant to PKC and align with the measures within the PKC AQAP:

- 1. A Precautionary Approach**
 - Consider both air pollution and health when implementing measures to tackle air pollution
- 2. Integrated Policy**
 - Significant overlap between the measures needed to address climate change and improve air quality.
- 3. Placemaking**
 - Reducing the need to travel
 - Safe walking, cycling and public transport options
- 4. Better Data**
 - Continue to collect both air quality and traffic data that is relevant, robust and fit for purpose
- 5. Public Engagement and Behaviours Change**
 - Focus communication on health and environmental impacts, rather than concentrations or emissions
 - Ensure promoted behavioural changes are easier, more convenient and preferably cheaper than the status quo

²¹ Part IV of the Environment Act 1995: Local Air Quality Management Policy Guidance PG(S) (23), March 23. Available at <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2023/03/local-air-quality-management-policy-guidance/documents/part-iv-environment-act-1995-local-air-quality-management-policy-guidance/part-iv-environment-act-1995-local-air-quality-management-policy-guidance/govscot%3Adocument/part-iv-environment-act-1995-local-air-quality-management-policy-guidance.pdf>

²² Cleaner Air for Scotland 2 – business and regulatory impact assessment. The Scottish Government. October 2020. Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-business-regulatory-impact-assessment/documents/http://www.scottishairquality.scot/lez/>

6. Environmental Regulation

- Sector-specific emissions of air pollution (such as point source releases, materials handling and fugitive emissions) are likely to be controlled through permitting

7. Tackling Non-Transport Emissions Sources

- Whilst road transport in urban areas remains the issue of most concern in relation to air quality and its impact on human health, the CAFS review emphasised the need for a greater focus on other sectors, notably domestic (household) combustion and agriculture.

8. Transport

- Manage demand and decrease absolute traffic levels by reducing vehicle journeys
- Reduce the need to travel unsustainably

9. Governance, Accountability and Delivery

- The Local Air Quality Management (LAQM) system is the main focus for air quality action at the local and regional level.

10. Further Progress Review

- Review progress and continue to work towards targets for both air quality and climate change

CAFS2 recognises the shared common sources between greenhouse gases and air pollution such as transport, energy generation and land use. Therefore, measures outlined to reduce air pollution can benefit climate change by reducing greenhouse gases.

National Low Emissions Framework (NLEF)

The NLEF²³, published in January 2019, is intended to compliment and work along with the existing established LAQM regime and work towards the deliverables in CAFS. The NLEF appraisal process is designed to assist local authorities to determine if a LEZ is appropriate to address air quality issues.

The NLEF two stage assessment should be undertaken where transport emissions are the primary reason for the declaration of an AQMA.

The first stage is the screening stage. The screening stage aims to identify if the committed measures are likely to remove exceedances of the air quality objectives and if the Scottish government and SEPA confirms their agreement of the findings, then no further work will be required under the NLEF appraisal process. The action plan measures, and their anticipated timescales will remain.

Where the screening exercise identifies that the committed measures are unlikely to achieve concentrations below the AQ objective levels, there is the need for further assessment under the NLEF appraisal for the AQMA. The first consideration following screening will be if the exceedance is very localised and if more detailed location specific measures could be incorporated into the AQAP. If this approach is deemed suitable then the additional measures and their timescale for implementation will be detailed in the screening outcome report. Otherwise, it is necessary to proceed to the stage two assessment to determine if a LEZ is required.

As part of the 2020 Annual Progress Report, NLEF screening was undertaken in Perth. The NLEF screening concluded that proposed measures for the Perth and Crieff AQMAs are sufficient and there is therefore no need to proceed to a Stage 2 Assessment. The screening for the Perth AQMA identified that a LEZ is not required due to the continuing downward trend in pollutants. Planned projects such as the Cross Tay Link Road (CTLR) are expected to have a positive impact upon air

²³ National Low Emission Framework Available at: <https://www.gov.scot/publications/national-low-emission-framework/documents/>

quality. Assessment and controls of planned development will also ensure no significant adverse effect on air quality.

5.2 Local Policy and Plans

TACTRAN Active travel audits Perth City North Audit

Active Travel is one of the key sub-strategies within the Regional Transport Strategy Refresh aimed to support Cycling Action Plan for Scotland and the National Walking Strategy.

The sub-strategy identifies a series of key actions to improve active travel within the region. Specifically, Action AT6, Audit, identifies that “Where opportunities arise, locally focused active travel audits will identify priorities for future investment in developing the regional walking and cycling network”

The High-Level Actions outlined in the audit for Perth City North²⁴ would reduce reliance on vehicle use to move around Perth and encourage further uptake of active travel methods.

PKC Local Development Plan 2019

The Local Development Plan has been updated since the existing AQAP was published. The most recent publication is the Local Development Plan 2 which was published in 2019²⁵.

Development Plan provides guidance to residents, developers and investors, and allows stakeholders, including the public, to be involved in shaping the future of their area. The Development Plan provides the framework against which planning applications are assessed. The Perth and Kinross Development Plan consists of two linked documents: the Strategic development Plan (SDP) and the Local Development Plan (LDP).

Policy 57 of the LDP is related to Air Quality:

The LDP seeks to prevent the creation of new pollution hotspots, and to prevent introduction of new human exposure where there could be existing poor air quality. As well as aspiring to improve air quality, the policy also aspires to eliminate the gradual worsening in air quality that is caused by the cumulative impact of many small developments.

The LDP outlines that proposals and mitigation measures must not conflict with the actions proposed in Air Quality Action Plans.

Perth's Transport Futures Project

It is widely acknowledged that Perth is a major strategic hub in the Scottish transport network where the principal routes connecting the central belt to North and North East Scotland converge. Perth also has the distinct advantage of having major road connections to all of Scotland's cities with a drive time of within two hours. However, over the past twenty years, as a result of increasing levels of traffic and new development there has been increasing concern and a noticeable increase in traffic congestion and related air quality issues in, and around, Perth.

²⁴ Tactran. Active Travel Audits. Available at: <https://staging.tactran.gov.uk/ActiveTravelAudits.php>

²⁵ Perth and Kinross. Local Development Plan 2. 2019. Available at: <https://www.pkc.gov.uk/ldp2>

As a result of these traffic and air quality issues, it was clear that there were both current and potentially exacerbated future, problems which needed to be addressed. This was required in order to ensure that congestion did not undermine the future development of the city as set out in the Local Development Plan.

The need for a package of measures which address this problem has, therefore, been identified as an issue over many years for successive Councils. These measures have been developed as the Perth Transport Futures Project. In the main the Perth Transport Futures Project is focussed on the need for major road infrastructure which will be required to address key congestion points in the road network and to provide essential linkages to growth areas set out in the Local Development Plan.

As a result of the timelines required for taking various elements of the Perth's Transport Future Project forward it has been broken down to a series of phases. While the individual phases all deliver direct benefits, the ability of the Perth network to accommodate the projected economic growth, including the opportunity to create thousands of jobs and in essence deliver the Local Development Plan allocations, will only be achieved with the delivery of the full package of measures. These measures will be delivered over a number of years and are split into four phases:

- Phase 1 A9/A85 Junction Improvement and Link Road to Bertha Park – completed May 2019
- Phase 2 Cross Tay Link Road (CTLR) – A9 to the A93 and A94
- Phase 3 Bertha Park North Link to A9 (Linking Phases 1 and 2)
- Phase 4 Associated City improvements facilitating a move towards greener travel including measures to further develop the cycling, walking and public transport networks in and around Perth. The implementation of much of Phase 4 is only possible due to the freeing up of capacity on the city's road network as a result of Phases 1 to 3.

Perth 2040: Our Agenda for Change

This is the third edition of the Perth City Plan²⁶, setting out the agenda for action through to 2040. This 20-year strategy for good growth aims to make Perth a smarter and more modern city, while preserving and capitalising on the qualities that make it unique. The plan has focussed the Perth City Development Board's (PCDB) priorities for action into 6 sections:

1. Shaping A Growing City
2. Responding to Climate Change
3. Transport and Digital Connections
4. Revitalising the City Centre
5. Enterprise and Prosperity
6. Inclusion and Social Justice

Long-term goals include developing the area around Perth Train Station into an active travel hub by 2025, Perth being Scotland's leading city for active travel by 2030, and Perth being a carbon-neutral city by 2040, five years ahead of the current Scottish Government target.

An aim of Priority 2 will be further investment in travel infrastructure such as the implementation of city-wide walking and cycling networks, signage, lighting and traffic management changes will help

²⁶ Perth 2040: Our Agenda For Change. Available at: <https://www.investinperth.co.uk/wp-content/uploads/2021/05/Perth-City-Development-Plan.pdf>

bring about changes in travel behaviour, measured by the reduction in miles travelled by car and the increase in cycling or walking journeys.

Furthermore, Priority 4 seeks to make a more people-friendly city centre environment by reclaiming road space for pedestrians and cyclists to reduce cross-town car trips as well as creating a pedestrian-priority promenade on Tay Street by reducing carriageway widths to allow more shared surfaces and tree planting.

While not expected to result in a direct reduction in air pollution, green infrastructure/tree planting delivered through Perth City Centre reallocation of existing road space will lead to an environment more suited to active travel, thereby encouraging more car users to walk or cycle within Perth City Centre. PKC has the goal of becoming the biodiversity capital of Europe, and green infrastructure is a large part of this.

Perth and Kinross Mobility Strategy

The Mobility Strategy, more commonly known as a local transport strategy, will set out Perth and Kinross Council's vision for managing and developing the transport network over a minimum period of 10 years. The Mobility Strategy will consider all modes of transport for the movement of people and goods across Perth and Kinross's rural and urban settings, to help achieve national targets and local objectives. The Mobility Strategy will respond to the climate change agenda and other drivers of change at this time.

The strategy will also consider the impact on the transport networks and people's travel patterns and behaviours of emerging technologies, digital services, housing, inclusion, poverty, health, climate adaption, economic growth, air quality and place making.

The Mobility Strategy will follow Transport Scotland's appraisal guidance (Scottish Transport Appraisal Guidance – STAG). This will help articulate Perth and Kinross' strategy for our transport network for the future and give funding partners confidence in our commitment to achieving national targets.

The draft Mobility Strategy contains several Transport Planning Objectives (TPOs) which relate directly to the improvement of air quality in Perth:

- TPO 3: To reduce CO₂ emissions produced by transport across Perth and Kinross, by reducing car kilometres, decarbonising motorised transport and increasing the share of everyday journeys of people and goods by sustainable and active travel modes
- TPO 7: To improve the capacity and reliability of alternative sustainable freight and logistic modes across Perth and Kinross
- TPO 10: To improve physical and mental health within Perth and Kinross through walking, wheeling and cycling
- TPO 11: To improve air quality across Perth and Kinross's road network by revoking both Air Quality Management Area's and reducing preventable pollutants

PKC EV Infrastructure Strategy and Expansion Plan

PKC want to deliver an ambitious, accessible and expansive EV charging network that meets the needs of all users throughout the Perth and Kinross council region. Using funding from Transport Scotland's Electric Vehicle Infrastructure Fund (EVIF), PKC will expand the existing network and

ensure that those without access to offstreet parking in urban and rural locations will be able to charge their EV at a nearby charging hub, on street solution, or a public car park based charger.

The Transport Scotland EVIF funding will be focussed on 4 Main themes:

1. Mini hubs (3 x rapid, 2 x fast) strategically placed in the region.
2. 40 x fast chargers installed in rural areas, potentially less desirable for private investment.
3. 40 x fast chargers placed in Perth with high population density and a lack of off street parking.
4. 6 x rapid charging units to be added at existing sites (3 at South Inch hub, 3 at Kinross hub).

The delivery of strategically placed mini rapid charging hubs supported by a range of local fast chargers in both urban and rural areas of the region will ensure the network reaches the entire community.

The first phase of the project will build on the network that already exists and form part of an overall strategy for the region out to 2045. By creating substantial network coverage it is hoped to deliver an efficient, sustainable and expansive proposition to the private sector and reduce the need for future public subsidies.

Perth and Kinross Community Plan (Local Outcomes Improvement Plan) 2017-2027

The Perth and Kinross Community Planning Partnership Board (CPP) has the collective statutory duty to reduce inequalities in Perth and Kinross both in geographic areas and within communities of interest through the delivery of the Local Outcomes Improvement Plan (LOIP).

The strategic priorities of the Community Planning Partnership within the 2017 LOIP are currently being reviewed in light of the changes resulting from COVID-19. The new priorities will focus on six areas: Reducing Poverty, Physical and Mental Wellbeing, Digital Participation, Skills, Learning and Development, and Employability. Climate Change is also considered as part of the LOIP as a cross-cutting priority.

The Physical and Mental Wellbeing actions in particular have crossovers with the objectives within this action plan, and include examples such as:

- 4.1 – Review Active Perth and Kinross Strategy, with a focus on removing barriers for key demographics
- 4.2 – Develop Perth and Kinross Mobility Strategy, focusing on delivering safe, affordable, active and sustainable travel options
- 4.3 – Establish Tayside Physician Activity and Green Health Network to develop pathways to support people to be active in their own community

Sustrans Perth, People, Place

The Perth People Place programme seeks to deliver significant improvements in Sustainable transport and active travel with a strategic fit between active travel and other transport interventions and projects, including; emerging opportunities from the National Transport Strategy, Transport Scotland's Strategic Transport Projects Review and the Tactran Regional Transport Strategy.

This will be achieved by taking a whole-systems place-based approach, considering a re-balance of multiple modes of travel and transport and placing health and sustainability at the heart of decision-making.

The Dunkeld Road Corridor is the first project to be developed from the Perth People Place Programme. The Dunkeld Road Corridor is anticipated to be one of several high quality active and sustainable travel areas connecting across multiple communities both within the city of Perth and also serving the wider rural communities.

5.3. Regional Policy and Plans

Tayside and Central Scotland Transport Partnership (TACTRAN) Regional Transport Strategy

The Regional Transport Strategy (RTS) 2024-2034²⁷ is a refresh to the previous 2015-2036 Strategy.

The TACTRAN vision is to deliver:

‘a transport system, shaped by engagement with its citizens, which helps deliver prosperity and connects communities across the region and beyond, which is socially inclusive and environmentally sustainable and which promotes the health and well-being of all’.

The Strategy recognises that the local authorities Dundee City and Perth and Kinross Councils have produced Air Quality Action Plans to address identified hotspots where the EU Limit Values are being exceeded for both nitrogen dioxide (NO₂) and particulates (PM₁₀). One of the key RTS outcomes is to reduce transport emissions within the Dundee and Perth and Kinross air quality management areas.

In addition to the various actions within this action plan which align with the Regional Transport Strategy’s actions, there are a number of RTS actions which will further assist in the reduction of air pollution within Perth City:

- Action 2: Public sector agencies, will be encouraged to make available, and locate new, services within communities
- Action 3: Councils will work with Scottish Government and suppliers to promote digital inclusivity across their areas
- Action 4: All agencies will promote awareness and advantages of sustainable travel
- Action 5: Councils will utilise demand management measures to promote sustainable travel and reduce the impact of travel on communities
- Action 6: Tactran and the Councils will work with Transport Scotland to consider a national demand management mechanism (such as road user charging) to reduce car km driven
- Action 17: Tactran and the Councils will work with operators to improve public transport services
- Action 19: Tactran and the Councils will work with Transport Scotland and operators to Promote Fair Fares
- Action 24: Tactran and the Councils will work with Transport Scotland and the rail industry to promote improved rail connectivity

²⁷ Tactran Regional Transport Strategy 2024-2034. Available at: <https://tactran.gov.uk/projects/regional-transport-strategy/>

TACTRAN Regional EV Strategy

The vision of the TACTRAN Regional EV Strategy²⁸ is to be Scotland's exemplar region for enabling the electrification of transport in the context of a smart, integrated and sustainable mobility system. The Regional EV Strategy Delivery Plan captures delivery, timescale, ownership and progress in relation each of the actions defined within the strategy.

Through this strategy, TACTRAN will support electric vehicle uptake, develop charging infrastructure and promote electric mobility to both the public and businesses. Key strategy objectives of relevance to this action plan include:

- Establish a financially sustainable public charging network scalable to growth in demand and flexible to changes in type of demand
- Normalise the provision of EV infrastructure and electric mobility services within new or developed property
- Ensure citizens and businesses of the region are engaged and appropriately educated in regard to the benefits and use of electric mobility
- Support public health outcomes through improving air quality in the region

²⁸ Tactran Regional EV Strategy. Available at: https://www.tactran.gov.uk/cms-assets/Tactran%20Regional%20EV%20Strategy_FINAL.pdf

6 Appendices

Appendix A: Development of Air Quality Action Plan

A steering group was formed and actively involved in the development of the Action Plan. The members of the steering group are:

- PKC officers from the following departments:
 - Environmental Health
 - Traffic and Network
 - Climate Change and Sustainable Development
 - Development Management
 - Local Development Plan Team
 - Transport Planning
 - PKC Fleet
 - Public Transport
 - Parking
 - Community Greenspace
 - Licencing
- Sweco: Consultants engaged by PKC to assist the steering group and action planning process
- Transport Scotland - Air Quality and Environment Manager
- Tayside and Central Scotland Transport Partnership (TACTRAN)
- NHS Tayside

The meetings followed the guidance of LAQM TG(16) and the subsequent LAQM TG(22) outlining the key requirements for the development of an effective Action Plan:

- Undertake appropriate local monitoring and assessment (source apportionment)
- Decide what levels of actions are required.
- Establish links with other key policy areas/strategies.
- Undertake measures selection and impact assessment.
- Agree monitoring and evaluation of success.
- Undertake Consultation
- Finalise Air Quality Action Plan

The complete AQAP process undertaken is detailed in [Figure 6.1](#):

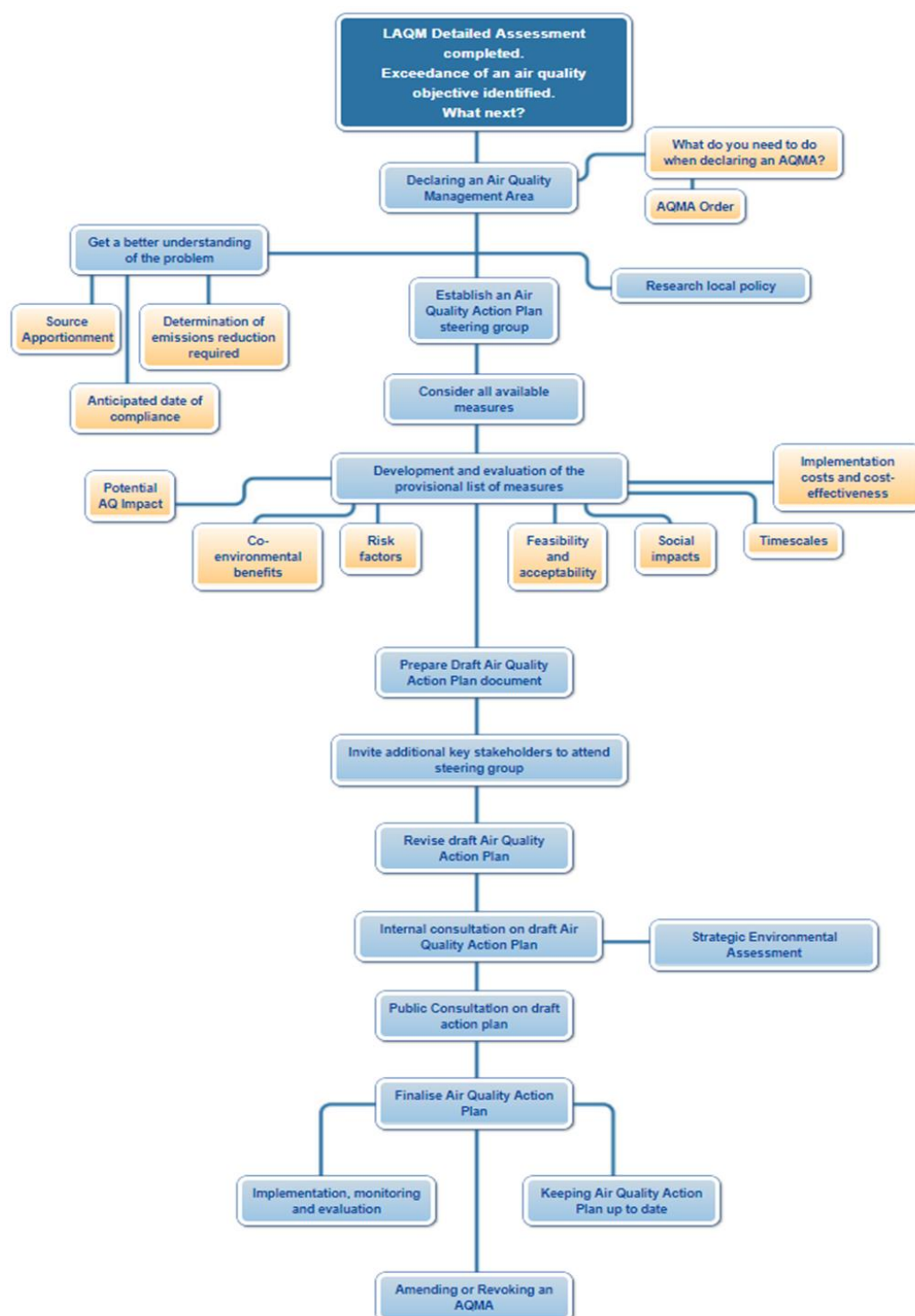


Figure 6.1: The complete AQAP Process

Appendix B: AQMA Order

Environment Act 1995 Part IV Section 83(1)

Perth and Kinross Council AQMA Order

Perth and Kinross Council, in exercise of the powers conferred upon it by Section 83(1) of the Environment Act 1995, hereby makes the following Order.

This Order may be referred to as the "Perth and Kinross Council Air Quality Management Area (No 1) Order 2006" and shall come into effect on the Fifth day of May 2006.

The area shown in red on the attached map is to be designated as an air quality management area ("the designated area").

The designated area incorporates an area within this boundary line:- from a point mid-stream of the River Tay directly under Friarton Bridge, follow the M90 road back to Broxden roundabout continuing down the A9 towards Inveralmond roundabout until the Ward 25 (Hillyland) boundary line crosses it; follow the ward boundary to the River Almond and then the mid-stream line of the River Almond till it meets the River Tay; follow the mid-stream line of the River Tay until the Annaty Burn junction; follow the Annaty Burn until it crosses under the mid-point of the A94 road; from this point take a straight line through the mid point of the eastern junction on the A90(T) road to Walnut Grove to the mid-stream of the River Tay; from this point return up the River Tay to the start point under the Friarton Bridge.

This Order and map may be viewed at all public Council offices, all libraries (including mobile ones) and on the Council Website.

This area is designated in relation to a likely breach of the nitrogen dioxide and fine particles (annual mean) objectives as specified in the Air Quality (Scotland) Regulations 2000, as amended.

This Order shall remain in force until it is varied or revoked by a subsequent order.

This Order together with the attached map are sealed with the Common Seal of Perth and Kinross Council and subscribed for them and on their behalf by Janet Mary Simpson their Legal Manager and Proper Officer for the purposes hereof at Perth on the Twenty-sixth day of April Two thousand and six.





Appendix C: Consultation on the Draft Air Quality Action Plan

This section will be completed following the conclusion of the Draft Perth Air Quality Action Plan public consultation.

DRAFT

Appendix D: Conclusions of LAQM Review and Assessments

Summary of Previous LAQM Review and Assessment in Perth

A. 2004 Detailed Assessment

A Detailed Assessment, completed in 2004 for PKC, found that it was likely that the annual mean NO₂ objective for 2005 would be exceeded and the PM₁₀ objectives for 2010 would be exceeded in areas where personal relevant exposure occurs. The report concluded that PKC needed to declare an AQMA to cover the area of exceedance in the Atholl Street/Barrack Street Junction and possibly other areas of Perth City.

Subsequently the whole of the city of Perth was declared an AQMA for NO₂ and PM₁₀.

B. 2006 Updating and Screening Assessment

An Updating and Screening Assessment for PKC was completed in 2006. At this stage monitoring data and modelling indicated a number of exceedances of the annual mean objective for NO₂ at busy junctions in Perth and no exceedances of the 2004 objectives for PM₁₀ in the PKC area. Projections to 2010 indicated that the annual mean objective for PM₁₀ was unlikely to be met at a number of locations close to junctions in central Perth. All predicted and measured exceedances were inside the existing AQMA. The report concluded that PKC was not required to carry out a Detailed Assessment for carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide, NO₂ and PM₁₀ (both NO₂ and PM₁₀ had already been the subject of a Detailed Assessment and would be looked at in the coming Further Assessment).

C. 2007 Further Assessment

Following the declaration of the Perth AQMA, PKC were obliged to complete a Further Assessment of air quality for Perth. The objective of the Further Assessment was to confirm the conclusions of the Detailed Assessment and to test city centre traffic management scenarios to assess the likely impact they may have on pollutant concentrations in future years and their likely effectiveness - these scenarios included the creation of the Cross Tay Link Road (CTLR) and the City Centre Traffic Management Review (CCTMR) approved in 2006. This report investigated current and potential future NO₂ and PM₁₀ levels through an examination of the location and size of principal traffic emission sources, emissions modelling exercises and by reference to monitored air quality data.

The report also included an assessment of source apportionment, which is the process whereby the contributions from different sources of a pollutant are determined. Source apportionment allows the most important source or sources to be identified and options to reduce ambient concentrations of pollutants can then be considered and assessed.

The outcomes of the 2007 source apportionment suggested a number of key areas to focus efforts to reduce NO₂ and PM₁₀ concentrations:

- Reduce the amount of time that traffic is stationary within Perth City Centre to reduce NO₂
- Reduce the impact of heavy duty vehicles (HDV's) including buses coaches and HGVs to reduce both NO₂ and PM₁₀
- Reduce the background concentration of PM₁₀ via renewed efforts at the national and international scale as well as the whole PKC area

Key conclusions regarding the city centre traffic management scenarios were that both the CTLR and the CCTMR would lead to positive improvement to NO₂ and PM₁₀ concentrations, but that they were not predicted to remove all risk of exceedances of the air quality objectives at the time, due to more stringent objectives being introduced in 2010 and the remaining high volume of traffic on Perth's roads.

The Further Assessment recommended that PKC retain their city wide AQMA for both NO₂ and PM₁₀, and proceed with preparation of an action plan to reduce concentrations.

Further information on all of these assessments can be found on the PKC website : <https://www.pkc.gov.uk/article/15307/Air-quality-reports>

DRAFT

Appendix E: Perth Dispersion Modelling Methodology

Introduction

The most up-to-date version of the Atmospheric Dispersion Modelling System ADMS-Roads Extra (ADMS 5.0.0.1), was used for the assessment of road traffic emissions. This modelling software has been developed by Cambridge Environmental Research Consultants Ltd (CERC) and is a software which models air pollution using road traffic as a source of pollutant emissions.

Model domain

The mapping data used within the assessment is OS OpenDataTM²⁹ and Perth Mastermap data.

The air quality model domain spans the entire Perth AQMA, and also includes major spine roads into the AQMA. The model domain is presented in **Figure 6.2**.

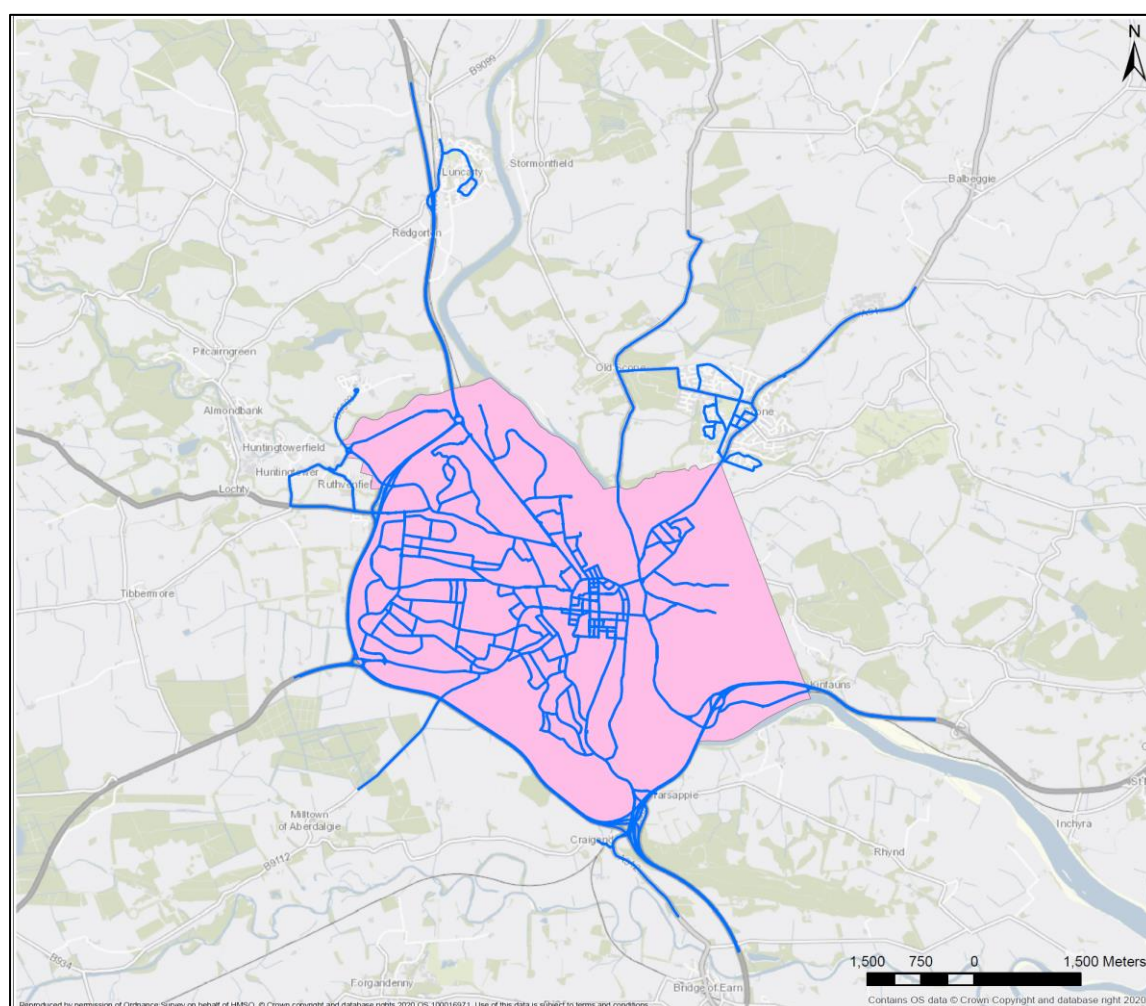


Figure 6.2: Air quality Model Domain

²⁹ <https://www.ordnancesurvey.co.uk/opendatadownload/products.html>

Modelling parameters

Meteorological data

ADMS-Roads uses hourly sequential meteorological data to calculate atmospheric dispersion. The meteorological data file contains a number of parameters including wind speed and direction, cloud cover and solar heat flux.

The nearest site which records all required parameters is at Strathallan Airfield located south west of Perth. Hourly sequential meteorological data for 2019 were used for the air quality modelling assessment.

The wind rose for 2021 is presented in [Figure 6.3](#)

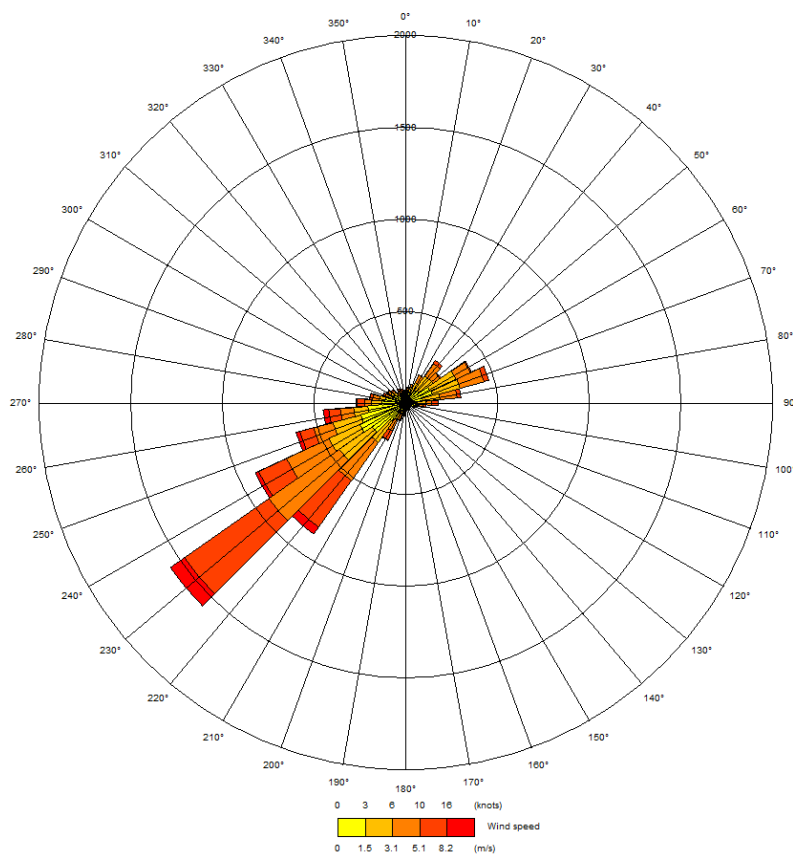


Figure 6.3: 2019 wind Rose Perth Strathallan

Surface roughness and Monin-Obukhov length

A surface roughness of 1m was used to represent the dispersion site, this is representative of cities and woodlands. At the meteorological site, a surface roughness of 0.0344m was used to represent the Strathallan Perth metrological site.

The Monin-Obukhov length is a parameter used to measure the stability of the atmosphere. It describes the turbulence length which is dependent on the meteorological conditions. For very stable conditions, in rural areas, a typical value can range between 2m to 20m. In large urban areas, an

urban heat island effect can occur as result of the buildings and traffic warming the air above the town/city. This can prevent the atmosphere ever becoming stable. A minimum Monin-Obukhov length will vary depending on how large the area is. A minimum Monin-Obukhov length of 30m was set for the dispersion area, which was representative of cities and large towns.

Terrain

A gradient of greater than 1:10 can impact dispersion. Following a review of the study area, terrain was not required to be considered within the assessment, therefore no terrain file was included in the model.

Street canyon

ADMS-Roads does not allow buildings to be included explicitly but allows various street parameters to be input to simulate the local flow around buildings and other obstacles in the vicinity of the road. The street parameters included in the model are road width, street canyon height and road elevation.

Street canyons can be included in the model for roads where there are high rise buildings on either side which act as barriers to the air flow and can channel wind along the road or cause localised air circulations that trap pollutants at street level. Canyon effects are significant for streets where the height of the buildings is at least equivalent or greater than the width of the street.

The advanced street canyon module is an automated module within ADMS roads which requires multiple layers of mapping data include street layout, building height and the road centreline, Mastermap Road centreline and buildings Mastermap shapefile. This module will then use these data to create an additional model input file. This module is most appropriate when modelling large domains.

The geometry of the model domain was reviewed using a combination of GIS mapping data and Google Earth to identify street canyons. Due to the extent of the model domain and the presence of street canyons – particularly within Perth city centre, street canyons were explicitly modelled using the advanced street canyon module.



Figure 6.4: Advanced Street Canyon Module

Road traffic emissions

The traffic data used in the assessment was taken from a traffic model produced by the transport consultants at Systra Ltd.

The transport consultants provided an Annual Average Daily Traffic (AADT) flow for the baseline year of 2019. The traffic data also included average speed data per modelled road link along with a vehicle fleet composition of cars, light goods vehicles (LGV), heavy goods vehicles (rigid and artic) and buses.

Vehicle emission factors

The Emissions Factors Toolkit (EFT V10.1 August 2020 release) was used in the modelling assessment to calculate pollutant emission factors for each modelled road link. This was the most recent EFT available at the time of the assessment.

Emissions were calculated using the built-in EFT (EFT v10.1) in the latest version of ADMS Roads. This version of the model allows for traffic induced turbulence to be calculated when the model calculates the emissions based on the numbers of vehicles, speed and the types of vehicle on each road link modelled explicitly.

Treatment of modelled NO_x road contribution

It is necessary to convert the modelled road NO_x concentrations to NO₂ for comparison with the relevant objectives and to perform model verification.

The Defra NO_x/NO₂ calculator (v8.1) was used to calculate NO₂ concentrations from the road NO_x concentrations predicted by ADMS-Roads. The model requires input of the background NO_x, the modelled road contribution, and accounts for the proportion of NO_x released as primary NO₂. The modelling assessment scenario was set to 2019 and the local authority to Perth and Kinross with the “All Other Urban UK Traffic” option in the model. The NO_x/NO₂ model estimates that 28.96% of NO_x is released as primary NO₂.

Validation of ADMS-Roads Extra

CERC models are continually validated against available measured data obtained from real world situations, field campaigns and wind tunnel experiments. Validation of the ADMS dispersions models have been performed using many experimental datasets that test different aspects of the models. Full details of the latest validation can be found at: <http://www.cerc.co.uk/environmental-software/model-validation.html>.

Source Apportionment

As part of the air quality dispersion modelling assessment, source apportionment was undertaken to quantify the contributions of different pollutant sources to ambient concentrations. This aims to allow the Local Authority's Action Plan to target specific sources when attempting to reduce pollutant concentrations within the AQMA. Tailpipe emissions are predominantly NO_x which is converted to NO₂ through chemical reactions, therefore emissions of NO_x are analysed.

The source apportionment for the Perth and Kinross assessment determined the following:

1. Whether any exceedances of the NO₂ and PM₁₀ objective are due to road traffic
2. The extent to which different vehicle types are responsible for the NO_x/PM₁₀ emissions contributions

The source apportionment analysis showed the highest contributor of NO_x, PM₁₀ and PM_{2.5} emissions on each road based on the traffic model for the most part was cars and followed by buses/coaches, as shown in [Figure 6.5](#).

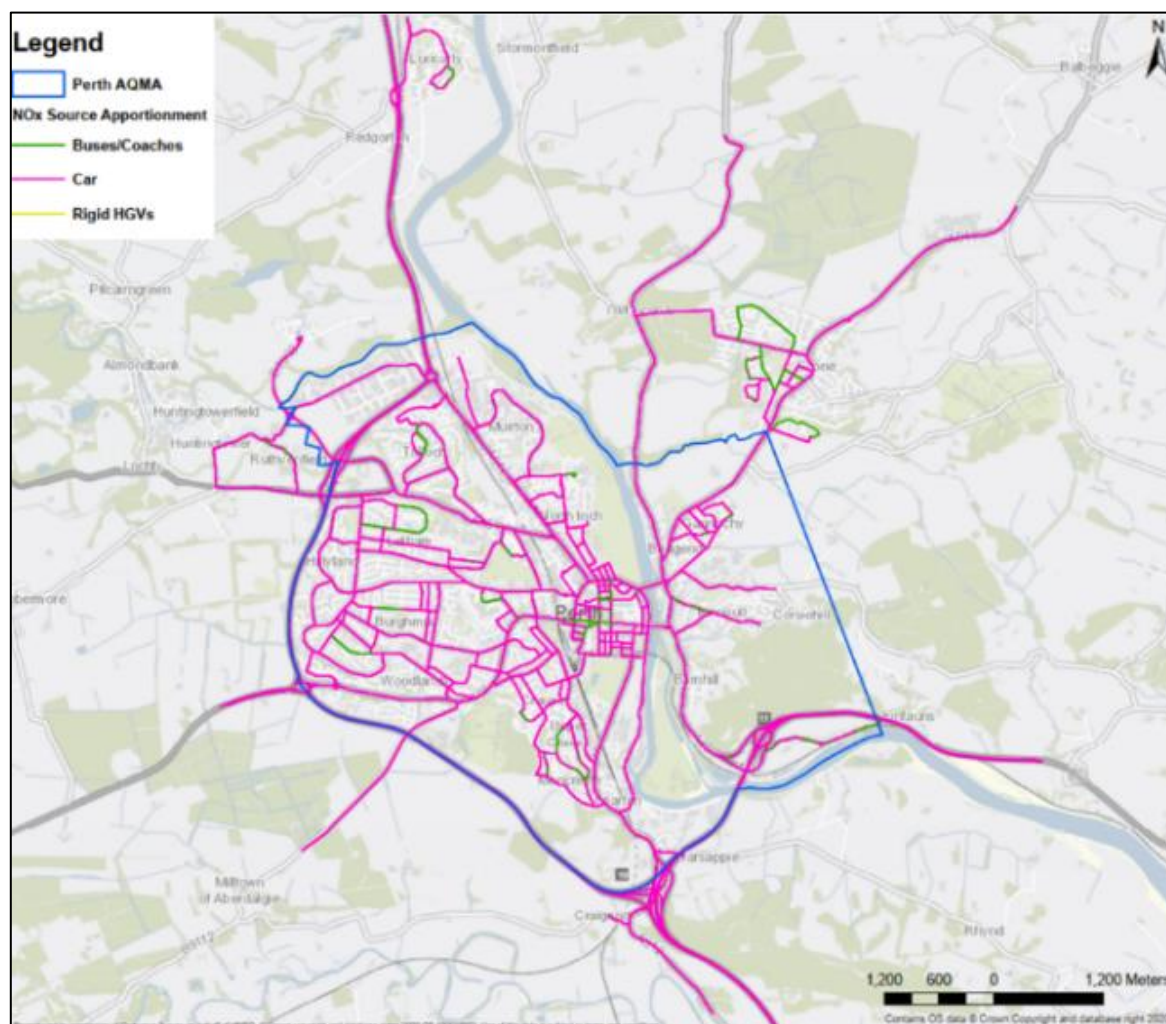


Figure 6.5: NO_x Perth Source Apportionment Analysis

A further detailed breakdown of the source apportionment analysis was undertaken within the Perth city centre area to identify the different vehicles contributing to NO_x emissions. The analysis showed whilst cars were the highest vehicle contributor to emissions out with the city centre area, buses/coaches are also contributing a significant proportion of NO_x emissions particularly on South Street, Mill Street, South Methven Street and York Place ([Figure 6.6](#)).

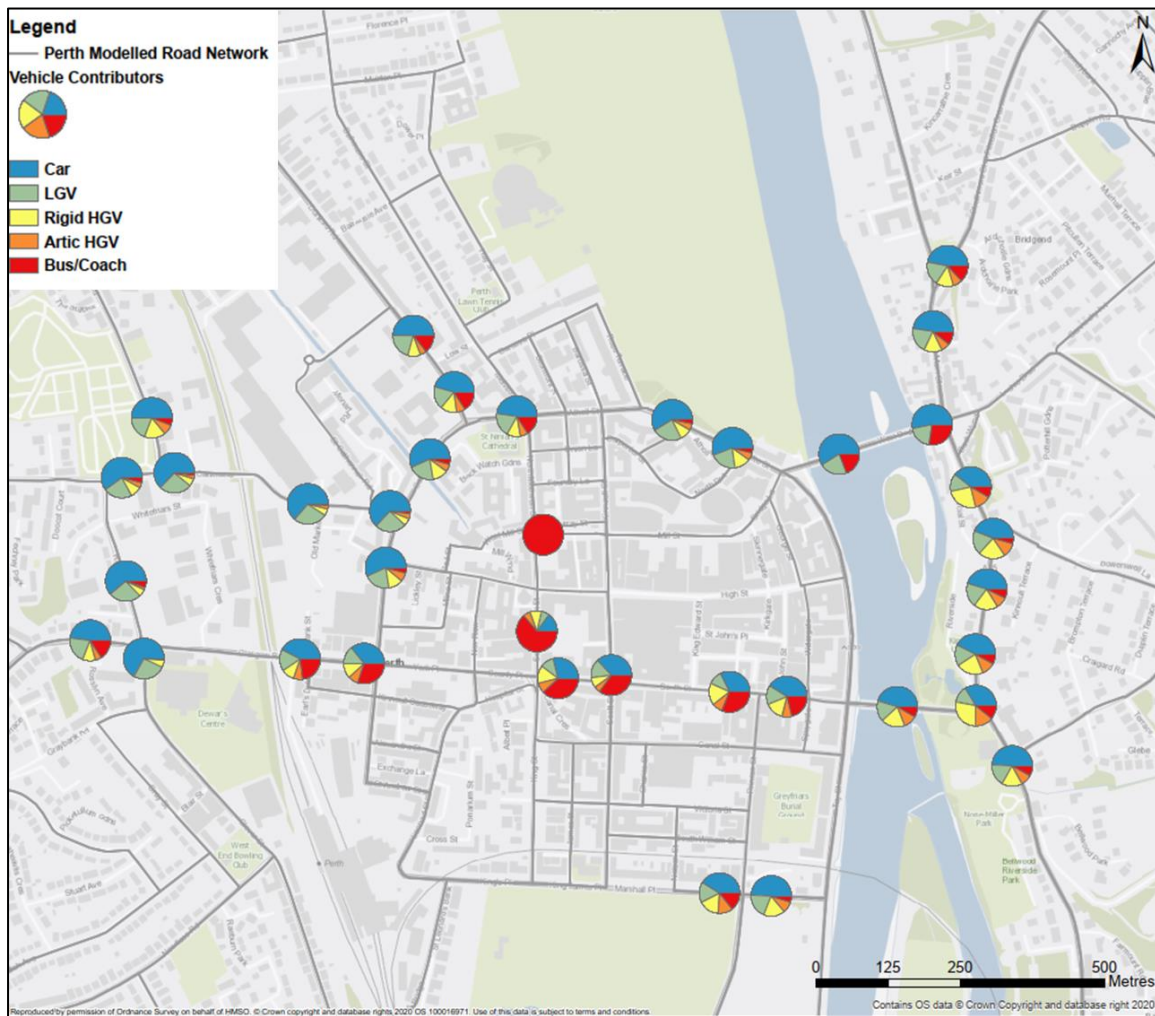


Figure 6.6: Source apportionment – Perth City Centre Link Analysis

Model Verification

Model verification is the comparison of modelled results with available local monitoring data. This identifies how well the model is performing. LAQM.TG (16) recommends making the adjustment to the road contribution of the pollutant only. Prior to applying a model adjustment value, all model inputs have been reviewed and the model refined, where possible. The model is refined as part of the verification process to reduce uncertainties within the modelling.

NO₂ verification

Verification is the process of comparing modelled results with the available local monitoring data. This identifies how accurate the modelled results are in comparison to monitored results and provides a clearer indication on how well the model is performing. The process includes checking and refining model input data to better align modelled results with monitored results. Modelled results can be adjusted in accordance with LAQM TG(16) guidance.

A number of statistical procedures outlined in LAQM TG(16) can be used to evaluate model performance and identify any uncertainties, dependant on the numbers of verification points and study information.

The statistical parameters which can be used to estimate whether the modelled results agree or deviate from observations. can be found in [Table 6.1](#), taken from LAQM TG(16) box A7.17.

Table 6.1: Model performance statistics

Statistical Parameter	Description	Ideal Value
Correlation Coefficient	Measures the linear relationship between the predicted and observed data. A value of zero means there is no relationship and a value of 1 means an absolute relationship exists. This statistic is useful when a large number of model and observed data points are being compared.	1.00
Fractional Bias	Identifies if the model shows a systematic tendency to over or under predict. Fractional bias values vary between +2 and -2, with an ideal value of zero. Negative values suggest the model is over-predicting and positive values suggest the model is under-predicting.	0.0
Root Mean Square Error (RMSE)	Defines the average error or uncertainty of the model. The units of RMSE are the same as the quantities being compared.	0.0

These parameters are used to draw a comparison between the observations against the predictions from a given model in order for performance and uncertainty to be evaluated.

There are a total of 56 monitoring locations in 2019 where model performance could be assessed. These locations are located throughout the Perth AQMA. As part of the model verification process each monitoring location was reviewed for suitability. Monitoring sites which are at kerbside locations or located at complex junctions were discounted in accordance with LAQM TG(16) which has stated that kerbside locations are unsuitable for model verification. This review resulted in 38 monitoring locations being suitable for verification.

The advanced street canyon module was ran through the model to best represent the surrounding geometry of the monitoring locations. The initial comparison of the modelled vs measured NO₂ is shown in **Figure 6.7**, with all of the monitoring locations included. The modelled road NO_x would require an adjustment factor of 0.9942 and had an RMSE of 7.08 µg/m³. A review of this model run showed a large number of sites falling out with the limits of acceptability. The sites not suitable for inclusion due to them being kerbside locations and located at complex junctions were removed with the aim to improve the verification process.

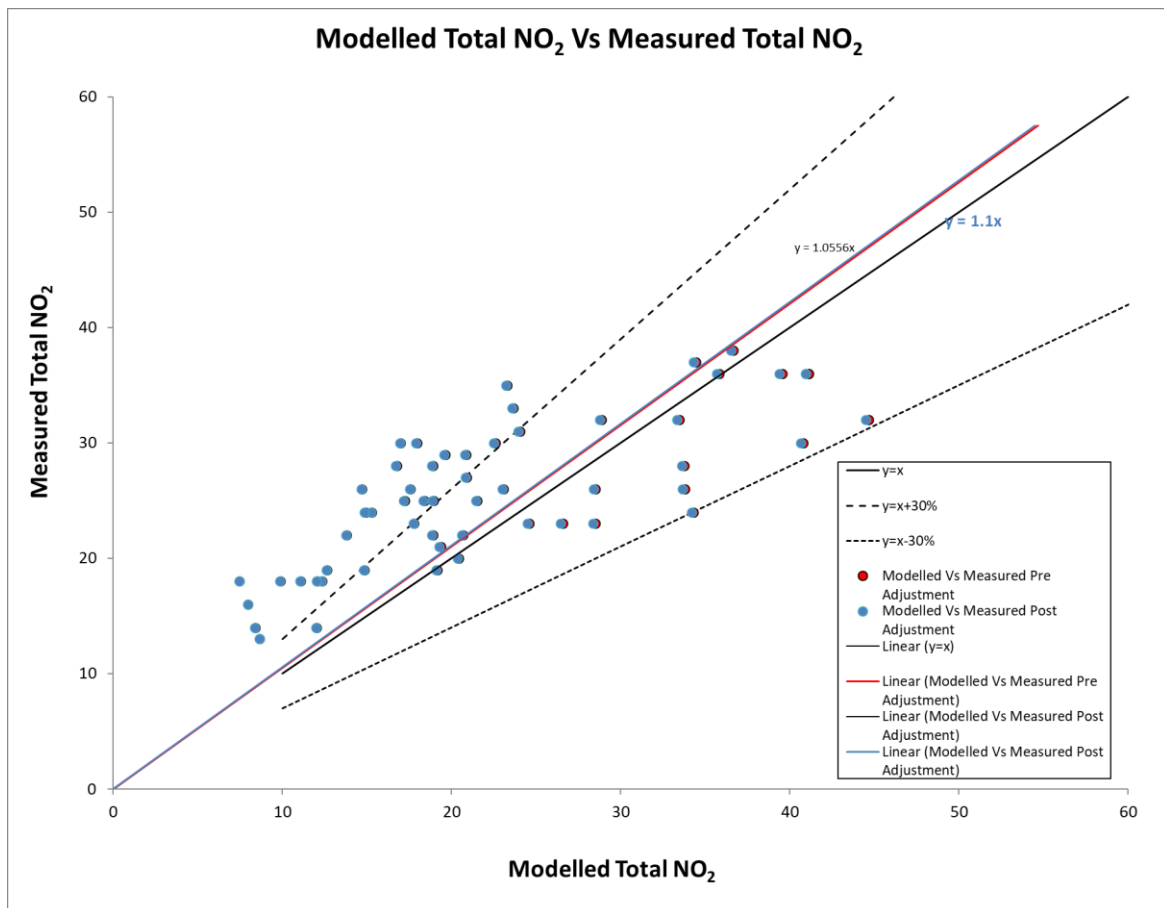


Figure 6.7: Modelled vs measured NO₂ at all monitoring locations

Following the removal of unsuitable monitoring locations, the verification was updated producing an adjustment factor of 1.0089 and RMSE of 6.48 µg/m³. The removal of unsuitable monitoring locations resulted in an improvement of the RMSE indicating an overall improvement in the model.

A comparison of the pre and post-adjusted modelled NO₂ is shown in [Figure 6.8](#).

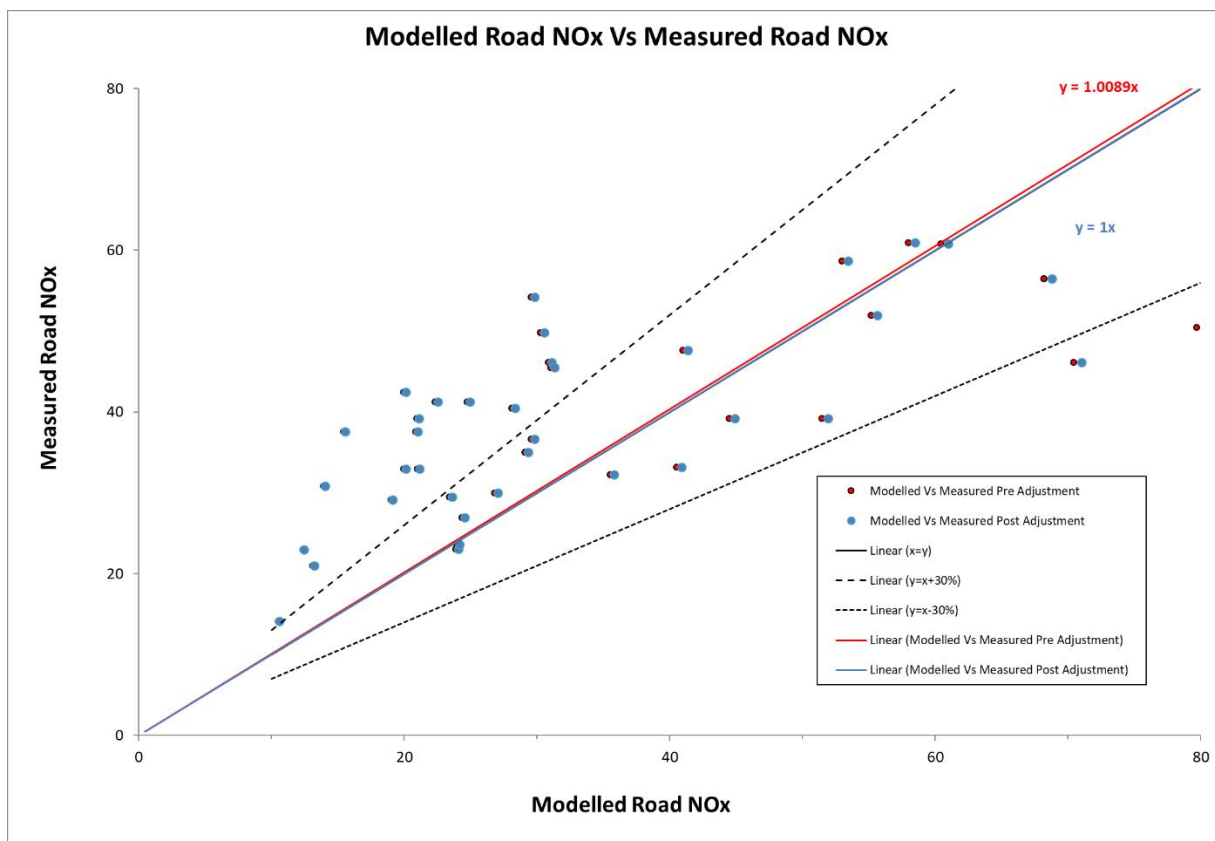


Figure 6.8: Modelled vs measured NO₂

Details of the post adjusted modelled results are provided in [Table 6.2](#).

Table 6.2: Post adjustment results

Measuring Location	Measured $\mu\text{g}/\text{m}^3$	Modelled $\mu\text{g}/\text{m}^3$
P98	18	12.4
P111	24	15.3
P112	19	14.9
P104	26	28.7
P110	23	17.9
P107	25	21.6
P62	23	26.7
P63	30	22.7
P7	14	12.1
P20	23	24.8
P36	26	17.7
P37	22	19.0

Measuring Location	Measured $\mu\text{g}/\text{m}^3$	Modelled $\mu\text{g}/\text{m}^3$
P103	35	23.4
P116	26	14.8
Perth 2	36	41.4
P1	33	23.8
P13	26	23.2
P29	28	19.0
P30	29	19.7
P31	22	20.8
P33	32	29.1
P34	37	34.6
P35	20	20.5
P39	32	33.7
P40	32	45.0
P41	31	24.2
P43	38	36.9
P61	36	41.4
P64	36	36.1
P67	28	34.0
P79	30	41.1
P89	29	21.0
P90	25	19.0
P97	27	21.0
P109	25	18.5
P47	19	19.3
P72	28	16.8
P102	21	19.5

The model does appear to be underpredicting at a few monitoring locations and is out with the 25% model performance target set by LAQM TG(16). This underprediction is likely due to the additional emissions associated with queuing traffic which was not included in the traffic model and therefore air quality model. The model performance at the remaining sites showed some over prediction however

still within the model performance target set by LAQM TG(16) – demonstrating there is no systematic error in the model.

All modelling inputs were reviewed. No further adjustments could be made to traffic flow data as the air quality modelling is based on the outputs from the traffic model used within the assessment.

Verifying modelling data with diffusion tube data will always be subject to uncertainty due to the limitations in diffusion tube monitoring data, even automatic data has some uncertainties. The model results should be considered in this context.

The results of this initial comparison of the modelled vs measured indicates that the model is performing within LAQM TG(16)'s target 25% and the error in the model (RMSE) is also within 10%. Therefore, no model adjustment was required, and the results presented are worst case.

Appendix F: Evaluation of Action Plan Measures

Potential Air Quality Benefit

This is a key assessment in that the AQAP must focus on prioritising measures which will improve air quality most effectively. The assessment is complex in that the detailed assessment of any given measure could normally be subject to a study of its own requiring significant resources.

A qualitative assessment relying on a level of judgement has been adopted. The method used is outlined below:

- The description of the measure and the proposed change to be brought about by the it is used alongside the source apportionment analysis. This identifies what proportion of the source's pollutant emissions would potentially be affected by the measure.
- A view is then taken on how much of the emissions source would actually be reduced and in turn what level of reduction in air quality could be achieved by the measure.

For the purpose of the assessment of potential air quality benefit each measure has been assessed using the following classifications:

- **Zero** local AQ benefit if the realistic intervention is 0% or worse
- **Small** local AQ benefit if the realistic intervention is 1%
- **Medium** local AQ benefit if the realistic intervention is 2-5%
- **Large** local AQ benefit if the realistic intervention is >5%.

Implementation Costs

The potential implementation costs of each option are assessed as follows:

- **Cost neutral** (measure already implemented through existing plans/ programmes)
- **Low** costs (up to £20k annually e.g. for small surveys or campaigns or other options using current resources)
- **Medium** costs (up to £60k annually e.g. for a full-time officer plus resources)
- **High** costs (up to £200k annually e.g. for small traffic management schemes)
- **Very high** costs (above £200k annually e.g. for new infrastructure)

These cost bandings may be subject to revision.

Cost effectiveness

The effectiveness of each measure in improving air quality is compared to the implementation costs in the following matrix.

AQ benefit \ Cost	Score	Zero	Small	Medium	Large
Score		0	1	2	3
Neutral	5	0	5	10	15
Low	4	0	4	8	12
Medium	3	0	3	6	9
High	2	0	2	4	6
Very High	1	0	1	2	3

The assessed implementation costs and potential air quality impacts have been given a weighted score. The product of the weighted scores for each option is calculated. The results can be interpreted as follows:

- If the product is **high** (10 or more) then the measure is more cost-effective (significant impacts for the cost involved) and perhaps favourably cost-effective
- If the product is **medium** (between 5-9) then the measure is in the **medium** range of cost-effectiveness
- If the product is **low** (4 or less) then the measure is less cost-effective (small impacts for the cost involved) and perhaps unacceptably poor in cost-effectiveness terms.

This method only estimates the *relative* cost-effectiveness of options rather than their *absolute* values. The method is useful during discussions of the relative priority of different options. The final cost-effectiveness value is sensitive to changes in the assumptions of how effective a measure might be in reducing emissions and how costly it is.

Potential Co-Environmental Benefits

In this assessment other environmental benefits are highlighted.

- Carbon reduction .Climate change: The likely effect on carbon emissions is assessed as being an overall reduction or a local reduction perhaps with emissions being relocated elsewhere.
- Noise.

Without detailed information on the true impacts of the options these assessments rely on judgement.

Potential Social Impacts

Potential social impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether or not it is likely that the option would potentially:

- Provide health benefits in terms of lower exposure to pollutants or increased mobility
- Increase road safety

- Improve accessibility

Without detailed information on the true impacts of the options these assessments rely on judgement.

Potential Economic Impacts

Potential economic impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether or not it is likely that the option would potentially:

- Influence sustainable development or accessibility in Perth
- Reduce or increase overall travel time
- Place additional requirements on operators.

Feasibility and Acceptability

Each option has been assessed for its feasibility against three simple criteria. These are whether the authority has:

- The executive powers under existing legislation to implement and enforce a measure. Alternatively, whether the authority has an existing mechanism to influence other agencies to implement a measure.
- Secured funding for the measure or a straightforward route for securing funding.
- Characterised the potential positive and negative impacts of the measure with sufficient evidence or confidence to make a decision to implement the measure.

Table 6.3 below sets out the criteria adopted for defining the option as being feasible over the short, medium or long term, or as being unfeasible. Each option is assessed against each criterion. The final feasibility timeframe is defined according to which of the three assessments results in the longest of the four possible terms (short, medium, long or unfeasible). For example, an option for which powers are clear and for which impacts are well characterised but for which funding will be difficult to obtain would be assessed as feasible over the long term.

Table 6.3: Criteria for Feasibility Analysis

Criteria for feasibility analysis			
Feasible in the:	Authority has the powers	Funding secured	Potential positive and negative impacts are well characterised
Short term (1-2 years)	Yes, clearly defined and already exercised	Yes potentially straightforward	Yes
Medium term (3-6 years)	Yes but novel or with an element of uncertainty	Yes with forward planning	Not without further study
Long term (>6 years)	Highly uncertain	No or extremely difficult	Not without further study
Unfeasible	No	Will never attract funding	Hard to characterise and with high risks

Appendix G: Glossary of Terms

Abbreviation	Description
AQ	Air Quality
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality objectives
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AADT	Average Annual Daily Traffic
ANPR	Automatic Number Plate Recognition
AQS	Air Quality Strategy
CAFS	Cleaner Air for Scotland
CO₂	Carbon Dioxide
COMEAP	Committee On the Medical Effects of Air Pollution
CTLR	Cross Tay Link Road
Defra	Department for Environment, Food and Rural Affairs
EH	Environmental Health
EFT	Emissions Factor Toolkit
EU	European Union
EV	Electric Vehicle
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LOIP	Local Outcomes Improvement Plan
LDP	Local Development Plan
LEZ	Low Emission Zone
MaaS	Mobility as a Service

MPG	Miles Per Gallon
NLEF	National Low Emissions Framework
NO₂	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OS	Ordinance Survey
PKC	Perth and Kinross Council
PM₁₀	Particulate matter with a diameter of 10µm (micrometres or microns) or less
PM_{2.5}	Particulate matter with a diameter of 2.5µm (micrometres or microns) or less
RMSE	Root Mean Square Error
RTPI	Real Time Passenger Information
RTM	Real Time Monitor
RTS	Regional Transport Strategy
SEPA	Scottish Environmental Protection Agency
SG	Scottish Government
TACTRAN	Tayside and Central Scotland Transport Partnership
ULEZ	Ultra Low Emission Vehicles
UTMC	Urban Traffic Management Control
WHO	World Health Organisation

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